

NATURAL RESOURCES CONSERVATION SERVICE  
CONSERVATION PRACTICE STANDARD

**RESIDUE MANAGEMENT, RIDGE TILL**

(Acre)  
CODE 329C

**DEFINITION**

Managing the amount, orientation, and distribution of crop and other plant residues on the soil surface year-round, while growing crops on performed ridges alternated with furrows protected by crop residue.

**PURPOSES**

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

- \* Reduce sheet and rill erosion.
- \* Reduce wind erosion.
- \* Maintain or improve soil organic matter content and tilth.
- \* Manage snow to increase plant available moisture.
- \* Modify cool wet site conditions.
- \* Provide food and escape cover for wildlife.

**CONDITIONS WHERE PRACTICE APPLIES**

This practice applies to all cropland and other land where crops are grown.

This standard includes tillage and planting methods commonly referred to as ridge till or ridge planting. It does not include no-till planting on ridges, or bedding or listing operations that bury crop residues.

**CRITERIA**

**General Criteria Applicable to All Purposes Named Above**

Following crop harvest and any secondary residue removal, residues shall be maintained until planting with no additional disturbance except for normal weathering.

Ridge height shall be maintained throughout the harvest and winter seasons by controlling equipment or livestock traffic.

After planting, residues shall be maintained in the furrows until the ridges are rebuilt by cultivation. Ridges shall be rebuilt to their original height and shape during the last row cultivation.

Loose residues to be retained on the field shall be uniformly distributed on the soil surface. Cultivation and planting equipment designed to operate on ridges shall be used, such as cultivators equipped with ridging attachments, and planters equipped with ridge planting attachments such as row cleaning devices and guidance systems.

**Additional Criteria to Reduce Sheet and Rill Erosion**

The amount and placement of residue needed, and the orientation of ridges in relation to the contour, shall be determined using current approved erosion prediction technology. Calculations shall account for the effects of other practices in the conservation management system. Partial removal of residue by means such as baling or grazing, shall be limited to retain the amount needed.

Planting and fertilizer placement shall disturb no more than one third of the row width. Soil and residue removed from the top of the ridge shall be moved into the furrow between the ridges.

After planting, the top of the ridge shall be maintained at least 3 inches higher than the furrow between the ridges.

The ridge shall be shaped to prevent erosion along the row by directing runoff to the protected furrow area.

**Additional Criteria to Reduce Wind Erosion**

The amount and orientation of residue needed during periods when wind erosion is expected to occur, shall be determined using current approved wind erosion

prediction technology. Partial removal of residue by means such as baling or grazing, shall be limited to retain the amount needed. Calculations shall account for the effects of ridge height, spacing, and direction, and of other practices in the conservation management system.

#### **Additional Criteria to Maintain or Improve Soil Organic Matter Content and Tillth**

The amount of residue needed to achieve the desired soil condition, shall be determined using the current approved soil conditioning index procedure. Partial removal of residue by means such as baling or grazing shall be limited to retain the amount needed. Calculations shall account for the effects of other practices in the conservation management system.

Cultivation to rebuild ridges shall be done using tools that maintain residues in the surface layer.

#### **Additional Criteria to Manage Snow to Increase Plant Available Moisture**

Stubble shall be left standing as high as possible by the harvesting operation, but not less than 6 inches in any case. Stubble shall be maintained standing over winter to trap and retain snow. In cases where the 6-inch stubble height cannot be achieved, ridges shall be oriented not to exceed 45 degrees from perpendicular to the prevailing wind direction during periods of expected snow cover.

#### **Additional Criteria To Modify Cool Wet Site Conditions**

Ridge height prior to planting shall not be less than 6 inches. After planting, the top of the ridge shall be maintained at least 3 inches higher than the furrow between the ridges.

#### **Additional Criteria to Provide Food and Escape Cover for Wildlife**

The amount of residue and height of stubble needed to provide cover during winter months shall be determined using an approved habitat evaluation procedure. Residues shall not be removed unless it is determined by the habitat evaluation procedure that removal will not adversely affect habitat values. Stubble shall be maintained standing over winter.

## **CONSIDERATIONS**

In rainfall erosion areas, the tillage and planting system provides at least 30 percent coverage of the soil surface with plant residues after planting a crop. The soil is left undisturbed from harvest to planting except for nutrient injection. Planting is completed in a seedbed prepared on ridges with sweeps, disk openers, coulters or row cleaners. Residue is left on the surface between ridges and ridges rebuilt during cultivation.

In wind erosion areas, the tillage and planting system is used to maintain at least 1000 pounds per acre of flat, small grain residue equivalent on the soil surface throughout the critical wind erosion period. The soil is left undisturbed from harvest to planting except for nutrient injection. Planting is completed in a seedbed prepared on ridges with sweeps, disk openers, coulters or row cleaners. Residue is left on the surface between ridges and ridges are rebuilt during cultivation.

Burning of plant residue or excess removal of residue by such means as baling or grazing often produces negative impacts on resources. These activities should not be performed without full evaluation of impacts on soil, water, animal, plants and air resources.

Ridge till may be practiced continuously throughout some crop sequences, or may be managed as part of a residue management system which includes other tillage and planting methods such as mulch till or no till. In mixed systems, ridges must be periodically re-established. Selection of acceptable tillage methods for specific site conditions may be aided by an approved Soil Tillage Suitability Rating.

Production of adequate amounts of crop residues necessary for the proper functioning of this practice can be enhanced by selection of high residue producing crops and crop varieties in the rotation, use of cover crops, and adjustment of plant populations and/or row spacing.

By providing a choice of weed control methods, this practice can reduce herbicide requirements when used in a conservation management system.

Where improvement of soil tillth is a concern, continuous ridge planting will allow organic material to accumulate in surface horizon. Reconstruction of ridges in the same row area year after year will maximize organic matter buildup and biological activity in the row.

Soil compaction may be reduced by controlled traffic, where wheel traffic from all operations is limited to the area between designated rows or traffic areas.

Where ridges direct runoff to areas of concentrated flow, these areas can be protected by grassed waterways, water and sediment control basins, underground outlets, or other suitable practices.

### **Endangered Species Considerations**

Determine if installation of this practice with any others proposed will have any effect on any federal or state listed Rare, Threatened or Endangered species or their habitat. NRCS's objective is to benefit these species and others of concern or at least not have any adverse effect on a listed species. If the Environmental Evaluation indicates the action may adversely affect a listed species or result in adverse modification of habitat of listed species which has been determined to be critical habitat, NRCS will advise the land user of the requirements of the Endangered Species Act and recommend alternative conservation treatments that avoid the adverse effects. Further assistance will be provided only if the landowner selects one of the alternative conservation treatments for installation; or at the request of the landowners, NRCS may initiate consultation with the Fish and Wildlife Service, National Marine Fisheries Service and/or California Department of Fish and Game. If the Environmental Evaluation indicates the action will not affect a listed species or result in adverse modification of critical habitat, consultation generally will not apply and usually would not be initiated. Document any special considerations for endangered species in the Practice Requirements Worksheet.

Some species are year-round residents in some streams, such as, freshwater shrimp. Other species, such as steelhead and salmon, utilize streams during various seasons. Be aware that during critical periods, such as spawning, eggs in gravels and rearing of young may preclude activities in the stream that may directly affect the stream habitat during those periods. For example, there should be no disturbance of stream gravel beds that may have eggs in them. That could include any equipment in the stream or even walking in the stream or work upstream that may result in sediment depositing in the gravel beds. Document any special considerations for endangered species in the Practice Requirements Worksheet.

### **Water Quantity**

This practice has an insignificant effect on the quantity of surface and ground water.

1. Effects on the water budget, especially on volumes and rates of runoff, infiltration and evaporation.
2. Effects of crop residue on soil moisture.
3. Effects of snowcatch and melt on the water budget. Consider managing standing stubble to increase snow catch in water-limited areas.

### **Water Quality**

When this practice is employed, raindrops are intercepted by the residue reducing detachment, soil dispersion, and soil compaction. Erosion may be reduced and the delivery of sediment and associated pollutants to surface may be reduced. Reduced soil sealing, crusting and compaction allows more water to infiltrate, resulting in an increased potential for leaching of dissolved pollutants into the ground water.

Crop residues on the surface increase the microbial and bacterial action on or near the surface. Nitrates and surface-applied pesticides may be tied-up and less available to be delivered to surface and ground water. Residues trap sediment and reduce the amount carried to surface water. Crop residues promote soil aggregation and improve soil tilth.

1. Filtering effects of crop residue on movement of sediment and dissolved and sediment-attached substances.
2. Effects of crop residue placement on dissolved and sediment-attached nutrient movement.

### **PLANS AND SPECIFICATIONS**

Specifications for establishment and operation of this practice shall be prepared for each field or treatment unit. Specifications shall be recorded using approved specification sheets, job sheets, or other acceptable documentation.

### **OPERATION AND MAINTENANCE**

No operation and maintenance requirements have been identified for this practice.