**NATURAL RESOURCES CONSERVATION SERVICE**

**CONSERVATION PRACTICE STANDARD**

# RESIDUE MANAGEMENT, SEASONAL

**(Ac.)**

**CODE 344**

## DEFINITION

Managing the amount, orientation, and distribution of crop and other plant residues on the soil surface during a specified period of the year, while planting annual crops on a clean-tilled seedbed, or when growing biennial or perennial seed crops.

## PURPOSES

- Reduce sheet and rill erosion.
- Reduce soil erosion from wind and associated airborne particulate matter.
- Improve Soil Condition
- Reduce off-site transport of sediment, nutrients or pesticides.
- Manage snow to increase plant available moisture.
- Provide food and escape cover for wildlife.

## CONDITIONS WHERE PRACTICE APPLIES

This practice applies to all cropland that uses full-width clean tillage to establish crops.

Seasonal residue management includes managing residues of annual crops from harvest until the residue is:

- Buried by tillage for seedbed preparation
- Removed by grazing, or
- Mechanically removed

It also includes the management of residues from biennial or perennial seed crops from the time of seed harvest until regrowth begins the next season.

## CRITERIA

### General Criteria Applicable to All Purposes

All residues shall be uniformly distributed over the entire field.

Combines or similar harvesting machines shall be equipped with spreaders capable of redistributing residues over at least 80 percent of the working width of the header.

When residues are left in rows after harvest or combines and harvesting equipment do not re-distribute residues, flail choppers, shredders, rotary mowers, or harrows may be used to evenly distribute residue over the field surface.

Residues shall not be burned unless burning is an accepted practice in an integrated pest management (IPM) program developed and recommended by PNW Land Grant University.

Tillage operations during the residue management period shall be limited to undercutting tools such as blades or wide sweeps that minimize residue flattening or burial.

### Additional Criteria to Reduce Sheet and Rill Erosion and Erosion from Wind

The amount and orientation of residue needed to reduce erosion within the soil loss tolerance (T) or any other planned soil loss objective shall be determined using current approved erosion prediction technology.

Partial removal of residue by means such as baling, grazing, or other harvest methods shall be limited to retain the amount needed to meet the erosion reduction objective. The remaining residue shall be maintained on the surface through periods when erosion has the potential to occur, or until planting, whichever occurs first. Erosion prediction estimates shall account for the effects of other practices in the conservation management system.

Any tillage that occurs during the management period shall be limited to methods that maintain the planned cover conditions.

### Additional Criteria to Improve Soil Condition

The quantity and orientation of residue needed to achieve a positive soil condition index value shall be determined using current approved

erosion prediction technology and the current approved Soil Condition Index.

**Additional Criteria to Reduce Off-site Transport of Sediment, Nutrients or Pesticides.**

The quantity and orientation of residue required to reduce off-site movement of agricultural chemicals and sediment during the specified period shall be determined using the appropriate assessment tool(s) [Windows Pesticide Screening Tool (WIN-PST), Phosphorus Index (PI), Leaching Index (LI), erosion prediction technologies, or other recognized tools] for the site conditions.

Residue shall be left standing, flat, or in combination with a minimum of 50% surface cover for reducing surface transport of nutrient, pesticides, and sediment.

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

**Trapping Snow.** Crop stubble standing height during the time significant snowfall is expected to occur shall be:

- at least 10 inches for crops with a row spacing of less than 15 inches;
- at least 15 inches for crops with a row spacing of 15 inches or greater.

These heights shall be present over at least 50% of the field.

Fall field operations that disturb residue shall be limited to undercutting type tools that minimize residue flattening and burial, and shall be done as close to perpendicular as possible to the direction of prevailing winds during the time that significant snowfall is expected to occur.

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

The amount of residue, height of the stubble, and length of the management period necessary for meeting habitat requirements for the target species or wildlife population shall be determined using an approved habitat evaluation procedure.

Tillage operations shall be delayed until the end of the management period to maintain the food and cover value of the residue.

**CONSIDERATIONS**

Removal of plant residue by baling or grazing may have a negative impact on resources. These activities should not be performed without full evaluation of impacts on other resources.

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

Chopping or flailing straw after harvest on orchardgrass, tall fescue, and perennial ryegrass seed fields promotes nutrient cycling, suppresses some weeds such as annual bluegrass, and reduces nutrient and pesticide runoff.

When planting into a clean tilled seedbed, completing tillage and planting in a single operation, or by performing primary tillage no more than three days before planting can minimize exposure to erosion; and in limited moisture areas, can conserve moisture for germination. These “till plant” systems can also increase the risk of root disease transmission from weeds, and can volunteer to the planted crop through the “green bridge” process.

Leaving standing stubble taller than the 10 inch minimum will increase the amount of snow trapped.

Leaving one or two rows of unharvested crop standing at intervals across the field can enhance the value of residue for wildlife habitat. Unharvested crop rows have the greatest value when they are adjacent to other cover types, such as grassy or brushy areas or woodland.

In areas that are in non-attainment for PM10, and for other areas with particular sensitivities to PM from dust, residue cover is especially important, and should ensure that levels of PM moving off-site are below critical thresholds, including maintenance of proper visibility.

Consider the relationship between crop residues and soil fungi and other soil microorganisms. Adequate residue will provide food and habitat to beneficial soil flora and fauna, which positively impact soil aggregate stability, moisture retention, infiltration, fertility, and breakdown of inorganic compounds.

No till planting annual spring small grains appropriate for the climatic zone in the fall, that winter-kill, will provide additional cover and/or feed for wildlife, grazing animals, soil erosion protection, and water (snow) retention without adding additional weed control measures.

**PLANS AND SPECIFICATIONS**

Specifications for establishment and operation of this practice shall be prepared for each field or treatment unit according to the Criteria described in this standard.

Specifications shall be recorded using approved job sheets, narrative statements in the conservation plan, or other acceptable methods.

**OPERATION AND MAINTENANCE**

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

**REFERENCES**

Brady, C.N., and R.R. Weil. 2001. The nature and properties of soils. 13th ed.

Cadish, G., and K.E. Giller (ed). 1997. Driven by nature: plant litter quality and decomposition. CABI, Wallingford, UK.

Renard, K.G., G.R. Foster, G.A. Weesies, D.K. McCool, and D.C. Yoder, Coordinators. 1997. Predicting soil erosion by water: A guide to conservation planning with the Revised Universal Soil Loss Equation (RUSLE). U.S. Department of Agriculture, Agriculture Handbook No. 703.

Shaffer, M.J., and W.E. Larson (ed.). 1987. NTRM, a soil-crop simulation model for nitrogen, tillage and crop residue management. USDA Conserv. Res. Rep. 34-1. USDA-ARS.

Tate, R.L. 1987. Soil organic matter: biological and ecological effects. John Wiley and Sons, New York.

USDA, NRCS. 2002. National Agronomy Manual. 190-V. 3rd ed.