

**NATURAL RESOURCES CONSERVATION SERVICE  
CONSERVATION PRACTICE STANDARD**

**RESIDUE MANAGEMENT, SEASONAL  
(ACRE)  
Code 344**

**DEFINITION**

Managing the amount, orientation, and distribution of crop and other plant residues on the soil surface during part of the year, while growing crops in a clean tilled seedbed.

**PURPOSES**

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

- Reduce sheet and rill erosion.
- Reduce soil erosion from wind.
- Manage snow to increase plant available moisture.
- 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 residue management methods practiced during the part of the year from harvest until residue is buried by tillage for seedbed preparation.

**CRITERIA**

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

Loose residue to be retained on the field shall be uniformly distributed on the soil surface. Where combines or similar machines are used for harvesting, they shall be equipped with spreaders capable of redistributing residues over at least 80 percent of the working width of the header.

Residues shall not be burned.

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

The amount 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 or grazing shall be limited to retain the amount needed. The remaining residue shall be maintained on the surface through periods when sheet and rill erosion has the potential to occur, or until planting, whichever occurs first. Calculations 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 which leave residue on the surface and maintain the planned cover conditions utilizing the Revised Universal Soil Loss

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

Equation (RUSLE) or current approved technology.

At a minimum, residues may be grazed, baled, chiseled, or disked after harvest, providing a minimum of 50 percent cover is left on the soil surface during the non-crop period from harvest to seedbed preparation, 30 days or less prior to planting.

**Additional Criteria to Reduce Soil Erosion From Wind.**

The amount 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 wind erosion prediction technology. Partial removal of residue by means such as baling or grazing shall be limited to retain the amount needed. The remaining residue shall be maintained on the surface through periods when soil erosion by wind has the potential to occur, or until planting, whichever occurs first. Calculations 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 which leave residue on the surface and maintain the planned cover conditions utilizing the Wind Erosion Equation (WEE) or current approved technology.

At a minimum, residues may be grazed, baled, chiseled, or disked after harvest, providing a minimum of 50 percent cover is left on the soil surface during the non-crop period from harvest to seedbed preparation, 30 days or less prior to planting.

**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 six inches in any case except for soybean stubble.

Stubble shall be maintained in a standing orientation over winter to trap and retain snow. Any tillage that occurs during this period shall be limited to undercutting tools such as blades, sweeps, or deep tillage implements such as rippers or subsoilers.

Loose residue may be removed providing that the remaining residue is left standing.

**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. Refer to practice standard 645 "Upland Wildlife Habitat Management" for recommendations.

Residues shall not be removed unless it is determined by the habitat evaluation procedure that such removal will not adversely affect habitat values.

Tillage shall be delayed until the end of the management period to maintain the food and cover value of the residue (crop residues will be left standing over winter).

**CONSIDERATIONS**

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

When planting in a clean seedbed, exposure to erosion can be minimized by completing tillage and planting in a single operation, or by performing primary tillage no more than three days before planting.

When planting in a clean seedbed in areas with limited moisture, moisture for germination can be increased by completing tillage and planting in a single operation, or by performing primary tillage no more than three days before planting.

The effectiveness of stubble to trap snow increases with stubble height. Variable height stubble patterns may be created to further increase snow storage.

The value of residue for wildlife habitat can be enhanced by leaving rows of unharvested crop standing at intervals across the field.

## PLANS AND SPECIFICATIONS

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

The following information provides additional guidance for carrying out selected components of this practice:

The amount of crop residue produced and the percentage of residue covering the soil surface will vary with crop species, variety, yield, time of tillage (spring vs. fall), and depth and speed of tillage operation. The following information can be used in planning crop residue use for common field crops.

**Corn.** For each bushel of corn, approximately 56 pounds of residue is produced.

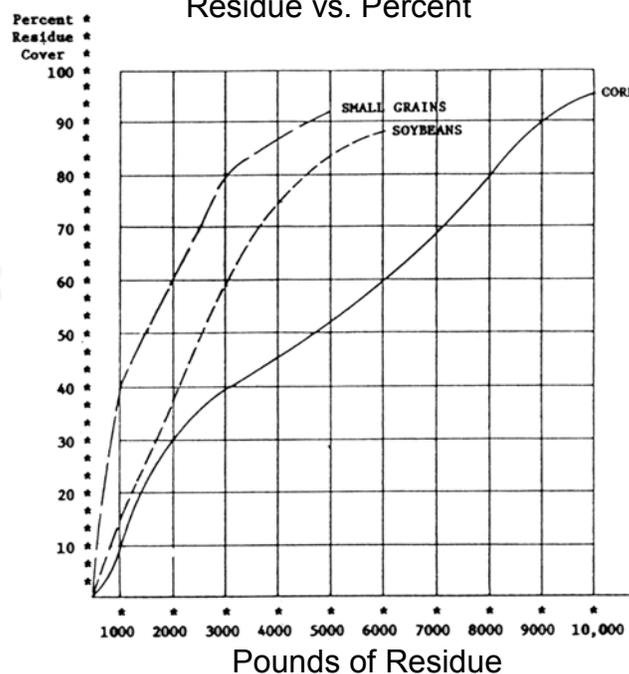
**Soybeans.** For each bushel of soybeans, approximately 45-90 pounds of residue is produced. The amount of

soybean residue produced can vary greatly with the variety and time of planting. Late maturing, taller soybeans normally produce much higher residue levels than earlier maturing, shorter varieties.

**Small Grain.** For each bushel of winter small grain, approximately 100 pounds of residue is produced. Spring small grain will produce approximately 60-75 pounds of residue per bushel.

**Pounds of Residue and Percent Ground Cover.** Figure 1 can be used to estimate percent ground cover based on pounds of residue produced.

Figure 1 – Pounds of Residue vs. Percent



**Note:** Values presented in Figure 1 are the best estimates that can be obtained from actual measurements and published research data. Published data varies considerably between sources.

**Percent Ground Cover and Tillage Operations.** Residue cover will vary depending upon weather conditions, soil



## REFERENCES

The following publications are available at NRCS field offices or on the Iowa NRCS Home Page at: <http://www.ia.nrcs.usda.gov>.

- NRCS Upland Wildlife Habitat, Practice Code 654.
- Crop Residue Management Guide, NRCS publication SCS-CRM-01, January 1992.
- Iowa Job Sheet – Crop Residue Management, NRCS, August 1991.