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.

PURPOSES

- Reduce sheet and rill erosion.
- Reduce soil erosion from wind and associated airborne particulate matter.
- Manage snow to increase plant available moisture.
- Harvest and utilize renewable bioenergy feedstocks.
- Provide food and escape cover for wildlife.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to all cropland including cropland where biomass is removed for biofuel feedstocks.

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

Uniformly distribute all residues over the entire field.

Harvest equipment shall distribute residues over at least 80 percent of the working width of the header.

Residues shall not be burned.

Limit residue flattening and burial tillage operations prior to and during the critical residue management period in order to meet the planned soil loss objectives.

The Soil Conditioning Index (SCI) for the planned crop rotation, residue management system, and location shall have a positive trend.

Additional Criteria to Reduce Soil Erosion and/or to Harvest and Utilize Renewable Bio-energy Feedstocks

Determine the amounts, orientation and timing of surface residue needed to reduce soil erosion to the planned soil loss objective using current approved erosion prediction technology.

Limit partial removal of residue by means such as baling, grazing, or other harvest methods to retain the amount needed to meet the planned soil loss objectives.

Maintain crop residue on the surface through periods when erosion has the potential to occur, or until planting, whichever occurs first.

Account for the effects of other practices in the conservation management system when estimating erosion.

Site and crop rotation specific critical erosion periods shall be identified in the plan.

Revised Universal Soil Loss Equation (RUSLE2) is the current South Dakota (SD) NRCS approved erosion prediction technology for sheet and rill erosion.

http://fargo.nserl.purdue.edu/rusle2_dataweb/RUSLE2_Index.htm

The Wind Erosion Prediction System (WEPS) is the current SD NRCS approved erosion prediction technology for wind erosion.

http://www.weru.ksu.edu/nrcs/wepsnrcs.html

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 percent of the field.

Limit fall field operations that disturb residue to undercutting type tools and 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

Determine 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 using an approved habitat evaluation procedure.

Use the approved habitat evaluation procedure, SD-CPA-19, Wildlife Habitat Quality Rating Worksheet.

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.

When planting into a clean tilled seedbed, completing the 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.

Leaving standing stubble taller than the 15 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 off-site PM levels are below critical thresholds, including maintenance of proper visibility.

Consider the relationship between crop residues and soil fungi or organisms. Adequate residue will provide food and habitat to beneficial soil flora and fauna, which positively impacts: 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.

Plans and specification shall document:

- Field or CMU identification and acres;
- Conservation practice purposes for design and implementation;
- Crop rotation, crops and planned yields;Critical residue management periods during the rotation;

- A management record or erosion prediction profile/run report for the planned crop rotation created with RUSLE2 or WEPS documenting:
  - residue management methods;
  - residue amounts generated;
  - residue removals;
  - Residue remaining during the critical residue management periods.
- Plan specifications shall be recorded using approved practice specification sheets and additional documents listed as Documentation Requirements for this conservation practice (SD-DR-344).

OPERATION AND MAINTENANCE

Evaluate the effectiveness of the planned residue management to ensure the planned purpose(s) and client objectives are being achieved. Adjust the management system or choose alternative technologies to achieve the planned purposes and objectives and update the practice specification.

REFERENCES

Brady, C.N., and R.R. Weil. 2008. The nature and properties of soils. 14th 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, National Agronomy Manual, M_190_NAM_500 - Fourth Edition - March 2011.

USDA-NRCS. National Planning Procedures Handbook, H_180_600_TOC - Amend. 5 - February 2010.