

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

**RESIDUE AND TILLAGE MANAGEMENT
MULCH TILL**

(Acre)
CODE 345



DEFINITION

Managing the amount, orientation, and distribution of crop and other plant residue on the soil surface year-round, while limiting the soil-disturbing activities used to grow and harvest crops in systems where the field surface is tilled prior to planting.

PURPOSE

- Reduce sheet and rill erosion.
- Reduce wind erosion.
- Maintain or improve soil quality.
- Increase plant-available moisture.
- Reduce energy use.

CONDITIONS WHERE THIS PRACTICE APPLIES

This practice applies to all cropland.

This practice includes tillage methods commonly referred to as mulch tillage where a majority of the soil surface is disturbed by tillage operations, such as vertical tillage, chiseling and disking and also includes tillage/planting systems with relatively minimal soil disturbance, but which do not meet the criteria for Florida NRCS conservation practice standard Residue and Tillage Management No Till/Strip Till/Direct Seed, Code 329. It applies to stubble mulching on summer-fallowed land, to tillage of annually planted crops, and tillage for planting perennial crops.

It also includes some planting operations, such as hoe drills that disturb a larger percentage of the soil surface during the planting operation and cropping systems in which the majority of the surface area is disturbed during harvest operations.

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

CRITERIA**General Criteria Applicable To All Purposes Stated Above**

Uniformly distribute residues over the entire field.

Residue shall not be burned.

Combines shall be equipped with spreaders capable of redistributing residue over at least 80 percent of the working width of the header.

Tillage implements shall be equipped to operate through plant residues without clogging and to maintain residue on or near the soil surface by undercutting or mixing.

Planters, or drills shall be equipped to plant in residue distributed on the soil surface or mixed in the tillage layer.

The number, sequence, and timing of tillage and planting operations and the selection of ground-engaging implements, shall be managed to achieve the planned amount, distribution, and orientation of residue after planting or at other essential time periods to meet the planned purpose. Acceptable alternative tillage sequences shall be initially determined by a residue budget using locally applicable data on residue production by crops and residue reduction by tillage machines. Further adjustments shall be made as needed during the tillage sequence based on field measurements of remaining residue.

A minimum of 30 percent of the soil surface shall be covered by plant residue immediately following the planting of the crop.

Impact to cultural resources, wetlands and Federal and State protected species shall be evaluated and avoided or minimized to the extent practicable during planning, design and implementation of this conservation practice in accordance with established National and Florida NRCS policy, General Manual (GM) Title 420-Part 401, Title 450-Part 401, and Title 190-Parts 410.22 and 410.26; National Planning Procedures Handbook (NPPH) FL Supplements to Parts 600.1 and 600.6; National Cultural Resources Procedures Handbook (NCRPH); and The National Environmental Compliance Handbook (NECH).

Additional Criteria To Reduce Sheet and Rill Erosion and Reduce Wind Erosion

Determine the amount of randomly distributed surface residue needed and the amount of surface soil disturbance allowed for managing erosion to the planned soil loss objective using current NRCS approved water and wind erosion prediction technology. Ensure that calculations account for the effects of other practices in the management system.

Partial removal of residue by means such as baling or grazing shall be limited to retain the amount of residue needed.

Tillage operations shall be limited to methods that leave residue on the surface and maintain the planned cover conditions.

Additional Criteria To Maintain or Improve Soil Quality

Ensure that an evaluation of the cropping system using the current approved soil conditioning index (SCI) procedure shall result in a positive trend. Ensure that calculations account for the effects of other practices in the management system.

Additional Criteria To Increase Plant-Available Moisture

Reducing Evaporation from the Soil Surface. Maintain a minimum 60 percent surface residue cover throughout the year.

Partial removal of residue by means such as baling or grazing shall be limited to retain the minimum 60 percent residue cover.

Additional Criteria to Reduce Energy Use

Ensure the Soil Tillage Intensity Rating (STIR) for the single crop establishment and harvest is less than or equal to 80.

CONSIDERATIONS

General - Removal of crop residue, such as by baling or grazing, can have a negative impact on resources. These activities should not be performed without full evaluation of impacts on soil, water, animal, plant, and air resources.

Mulch till may be practiced continuously throughout the crop sequence, or may be managed as part of a residue management system that includes other

tillage methods such as no till. Selection of acceptable tillage methods for specific site conditions may be aided by an approved Soil Tillage Intensity Rating (STIR).

Energy savings in fuel used can be estimated using NRCS approved energy software to determine the impact of alternative tillage systems.

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 in the rotation, use of cover crops, and adjustment of plant populations and row spacing.

A field border planted to permanent vegetation can:

- allow unobstructed turning for equipment
- eliminate unproductive end rows
- provide food and escape cover for wildlife
- provide travel lanes for farming operations.
- provide habitat for beneficial insects and pollinators.

See Florida NRCS conservation practice standard Field Border, Code 386, for further guidance.

When providing technical assistance to organic producers, residue management, and tillage activities should be consistent with the USDA – Agricultural Marketing Service National Organic Program standard.

Increasing Soil Organic Matter Level and Reducing CO₂ Loss from the Soil – Where improving soil tilth is a concern, use of undercutting tools will enhance accumulation of organic material in the surface layer.

CO₂ loss is directly related to the volume of soil disturbed, the intensity of the disturbance, and the soil moisture content and soil temperature at the time the disturbance occurs. The following guidelines can make this practice more effective:

- Shallow soil disturbance (1-3 inches) releases less CO₂ than deeper operations.
- When deep soil disturbance is performed, such as by subsoiling or fertilizer injection, make sure the vertical tillage slot created by these implements is closed at the surface.
- Planting with a single-disk opener no-till drill will release less CO₂ than planting with a wide-point hoe/chisel opener air seeder drill.

- Soil disturbance that occurs when soil temperatures are below 50° F will release less CO₂ than operations done when the soil is warmer.

Increasing Plant-available Moisture – Tillage and planting operations done on the contour will help slow overland flow and increase infiltration, thus increasing the potential for increased water storage in the root zone.

Providing Food and Escape Cover for Wildlife – Avoid tillage and other soil and residue/stubble disturbing operations during the nesting season and brood-rearing period for ground-nesting species.

Forgoing fall shredding or tillage operations will maximize the amount of wildlife food and cover during critical winter months.

Leaving rows of unharvested crop standing at intervals across the field or adjacent to permanent cover will enhance the value of residues for wildlife food and cover. Leaving unharvested crop rows for two growing seasons will further enhance the value of these areas for wildlife.

An approved habitat evaluation procedure will aid in determining the appropriate time and amount of residue and stubble needed to provide adequate food and cover for the target wildlife species.

PLANS AND SPECIFICATIONS

For each site, specifications and purpose of treatment shall be prepared, and recorded using approved specification sheets, job sheets, technical notes, and/or narrative statements in the conservation plan or other acceptable documentation.

Plans and Specifications shall include:

- field number(s) and acres
- purpose(s) for this practice
- crop(s) where this practice will be used
- the type and timing of soil disturbing operations
- estimated surface residue following each operation

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.

OPERATION AND MAINTENANCE

Evaluate/measure the crop residues cover and orientation for each crop to ensure the planned amounts and orientation are being achieved.

REFERENCES

National Cultural Resources Procedures Handbook (NCRPH)

National Environmental Compliance Handbook (NECH)

NRCS General Manual (GM)

Title 190, Part 410.22-Procedures for NRCS Assisted Programs

Title 190, Part 410.26-Protection of Wetlands

Title 420, Part 401-Cultural Resources

Title 450, Part 401-Technical Guides

National Planning Procedures Handbook (NPPH)
FL Supplements to Parts 600.1 and 600.6

Florida NRCS conservation practice standard
Field Border, Code 386

Soil Conditioning Index

Wildlife Habitat Evaluation Procedure

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