

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 crops in systems where the entire field surface is tilled prior to planting.

**PURPOSE**

- Reduce sheet and rill erosion.
- Reduce wind erosion.
- Reduce soil particulate emissions.
- Maintain or improve soil condition.
- Increase plant-available moisture.
- Provide food and escape cover for wildlife.

**CONDITIONS WHERE THIS PRACTICE APPLIES**

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

This practice includes tillage methods commonly referred to as mulch tillage, or chiseling and disking. It applies to mulching idle or fallow land,

tillage of annually planted crops, and tillage for planting perennial crops.

It also includes some planting operations, such as hoe drills, air seeders, and “no-till” drills that disturb a larger percentage of the soil surface during the planting operation.

**CRITERIA**

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

Loose residue to be retained on the field shall be uniformly distributed on the soil surface.

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, drills, or air seeders 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

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

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**

The amount of randomly distributed surface residue needed and the amount of surface soil disturbance allowed to reduce erosion to the planned soil loss objective shall be determined using the current approved water erosion prediction technology. Calculations shall 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 Reduce Wind Erosion**

The amount and orientation of residue needed and the amount of surface soil disturbance allowed to reduce erosion to the planned soil loss objective shall be determined using the current approved wind 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 of residue needed.

#### **Additional Criteria to Reduce Soil Particulate Emissions**

The amount and orientation of residue needed and the amount of surface soil disturbance allowed to reduce wind erosion to the tolerable soil loss value (T) shall be determined using the current approved wind erosion prediction technology. Calculations shall account for the effects of other practices in the conservation management system.

#### **Additional Criteria To Maintain or Improve Soil Condition**

An evaluation of the cropping system using the current approved soil conditioning index procedure shall result in a positive trend.

#### **Additional Criteria To Increase Plant-Available Moisture**

**Reducing Evaporation from the Soil Surface.** A minimum of 2000 pounds per acre or 60 percent surface residue cover shall be maintained 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 Provide Food and Escape Cover for Wildlife**

The time that residue is present, the amount and orientation of residue, and the height of stubble needed to provide adequate food and cover for the target species shall be determined using an approved wildlife habitat evaluation procedure.

Residues shall not be removed unless it is determined by the wildlife habitat evaluation procedure that removal would not adversely affect habitat values. Stubble shall be maintained standing over winter. Tillage shall be delayed until spring in order to maintain waste grain on the soil surface during winter.

Harvest or tillage operations that disturb or cover the entire field shall not be performed during the nesting and brood-rearing period of the target species.

**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 Suitability Rating.

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.

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

**Increasing Soil Organic Matter Level and Reducing CO<sub>2</sub> 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.

CO<sub>2</sub> 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 CO<sub>2</sub> 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 CO<sub>2</sub> 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 CO<sub>2</sub> 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 disturbing standing stubble or heavy residue during the nesting season 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.

**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.

**OPERATION AND MAINTENANCE**

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

**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