

**NATURAL RESOURCES CONSERVATION SERVICE
MONTANA CONSERVATION PRACTICE SPECIFICATION**

RESIDUE AND TILLAGE MANAGEMENT

NO TILL (ACRE)

CODE 329

PURPOSE: Residue management systems can be designed to accomplish one or more of the following:

- Reduce sheet, rill and wind erosion
- Reduce tillage induced particulate emissions
- Maintain or increase soil quality and organic matter content
- Reduce energy use
- Increase water use and precipitation storage efficiency
- Provide food and escape cover for wildlife.

No Till systems can be described as managing year-round the amount, orientation, and distribution of crop and plant residue on the soil surface. No Till systems do not include crops such as sugar beets that have soil disturbing activities at harvest. These crops would fall under reduced till systems (Code 345).

No Till seeding systems involve only an in-row tillage operation during the planting operation and a seed row/furrow closing device. There is no full-width tillage performed from the harvest or termination of one cash crop to the harvest or termination of the next cash crop in the rotation regardless of the depth of the tillage operation.

CONSERVATION MANAGEMENT SYSTEMS

No till residue management systems are established as a component of a resource management system. Crop rotation, pest management, nutrient management, various structures, and buffer practices are used in resource management planning to address natural resource concerns identified during the planning process.

PRACTICE SPECIFICATIONS

Practice specifications are provided to assure the residue management system meets the resource needs and producer's objectives. The specifications are based on the amount, timing, and orientation of crop residue left on the soil surface.

GENERAL CRITERIA APPLICABLE TO ALL PRACTICE PURPOSES

Residue shall not be burned.

Residue to be retained on the field must be uniformly distributed over the entire field. Removing residue from the row area prior to or as part of the planting operation is acceptable.

No full-width tillage can be performed from the time of the harvest of one cash crop to the harvest of another cash crop, regardless of the depth of tillage. The Soil Tillage Intensity Rating (STIR) provides indication of soil quality based on the cropping system used. A lower number represents a healthier soil trend where a higher number means soil health is compromised. The STIR value shall include all field operations that are performed during the crop interval between harvest of the previous crop and harvest or termination of the current crop (includes fallow periods). The STIR value shall be no greater than 20.

The required amount, timing, and orientation of residue will be in accordance with site-specific data based on soils, crops and tillage operations. Current Wind Erosion Prediction System (WEPS) and water Revised Universal Soil Loss Equation (RUSLE2) erosion prediction technology will be used to establish minimum

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requirements that take into consideration supporting practices. Wind and/or water erosion must be held to the soil loss tolerance (T) for the entire rotation.

CRITERIA APPLICABLE TO SPECIFIC PRACTICE PURPOSES

Reduce Sheet/Rill Erosion and Reduce Wind Erosion and Tillage Induced Particulate Matter. Use current wind (WEPS) and water (RUSLE2) erosion prediction technology to determine amount of randomly distributed surface residue needed, residue levels needed throughout the year and amount of surface soil disturbance allowed to reduce erosion to the desired level.

Improve Soil Quality and Organic Matter Content. Soil conditioning Index must be zero or higher. WEPS or RUSLE2 should be used to determine SCI for the entire rotation. The RUSLE2 soil conditioning index folder must be opened and the WEPS average 'annual gross soil loss' must be entered into the 'wind & water induced ero' input cell. The RUSLE2 'soil loss for cons. plan t/ac/yr' value must be entered into WEPS 'water erosion' input cell to get accurate SCI values from both programs.

Increase Water Use and Precipitation Storage Efficiency. Maintain a minimum of 2,000 pounds per acre (small grain equivalents) of residue cover on the soil surface, maintain a minimum stubble height of at least 10 inches throughout the year.

Reduce Energy Use. Reduce the total energy from field operations by at least 25% compared to the benchmark condition. Use the current approved NRCS tools (WEPS or RUSLE2) for determining energy use.

Provide Food and Cover for Wildlife. Use the Montana NRCS Wildlife Habitat Appraisal Guides to evaluate wildlife habitat.

GENERAL CONSIDERATIONS

Secondary removal of crop residue by baling or grazing is limited in order to retain the amount of residue needed to achieve the intended purpose(s). These activities should not be performed without full evaluation of impacts on soil, water, animal, plant, and air resources.

Consider using high residue crops before or after fragile residue crops or planting cover crops to increase residue and reduce potential of wind and/or water erosion.

Organic producer's residue management and tillage activities should be consistent with the USDA-Agricultural Marketing Service National Organic Program standard.

Residue shall not be shredded after harvest.

Using No Till throughout the rotations can enhance increase organic matter, provide additional resistance to wind and water erosion, increase carbon levels in the soil, reduce amount of particulate matter from field operations, reduce energy inputs and increase infiltration.

CONSIDERATIONS FOR SPECIFIC PRACTICE PURPOSES

Improve soil organic matter. Keeping soil disturbance to a minimal by using single disc or narrow point chisel planters will reduce CO₂ loss. Anhydrous injectors, manure injectors, and similar equipment may need to be modified to operate in high residue situations. Vertical slot created when injecting fertilizer should be closed at the surface.

Improve Soil Health/ Quality. Use diverse crop rotations that incorporate different crop types (cool-season grass, cool-season legume, warm-season grass or warm-season legume) into the rotation.

Manage soil moisture and protecting crops from freeze damage. The type, timing and depth of soil-disturbing activities influence soil moisture loss. Shallow operations or operations that do not invert the soil will

reduce moisture loss will reduce moisture loss compared to deeper operations. Leaving stubble taller than ten inches will reduce evaporative losses and trap more snow.

Improve Wildlife Food and Cover. Leave rows of unharvested crop standing in the field or adjacent to permanent cover, leave crop residues undisturbed after harvest and avoid disturbing standing stubble during the primary nesting season (April 15 – August 1). The Montana NRCS Wildlife Habitat Appraisal Guides will generally be used to evaluate wildlife habitat. Use Field Office Technical Guide (FOTG), Section IV, Practice Standard, Upland Wildlife Habitat Management (Code 645) for planning assistance and guidelines to provide food and cover for wildlife.

PLANS AND SPECIFICATIONS

The specifications shall identify, as appropriate:

The resource concern to be treated or the purpose for applying the practice.

Planned crop(s), the amount of residue produced by each crop, all field operations or activities that affect: residue cover, residue orientation and surface disturbance.

The amount of residue (pounds/acre or percent surface cover) required to accomplish the purpose, and the time of year it must be present.

The maximum STIR value allowed to accomplish the purpose, and the time of year that soil disturbance is allowed.

The minimum soil conditioning index (SCI) value required to accomplish the purpose.

The current and planned rotation with crops, crop yields, all tillage operations, fertilizer and pest management, residue removal (if any) and other pertinent operations will be documented. The producer will fill out Jobsheet MT329-JS with planned stubble height at harvest of each crop. The planner will attach copies of the WEPS or RUSLE2 runs. Documentation will include the annual and rotational erosion rates, STIR and SCI values and energy calculations for the benchmark and contracted crop rotation.

Rotations shall provide for acceptable substitute crops for weather or economic reasons. Acceptable substitute crops should have similar properties for all identified resource concerns and must have an annual STIR rating equal or less than planned tillage and crop for that year.

Any changes to the planned rotation and tillage must be approved prior to any site preparation or planting for the year of the deviation.

OPERATION AND MAINTENANCE

Evaluate/ measure the crop residues in the field to ensure planned amounts are being met. Adjust management, tillage or harvest operations as needed.