Natural Resources Conservation Service

CONSERVATION PRACTICE STANDARD

STRIPCROPPING

CODE 585

(ac)

DEFINITION

Growing planned rotations of erosion-resistant and erosion-susceptible crops or fallow in a systematic arrangement of strips across a field.

PURPOSE

This practice is used to accomplish one or more of the following purposes–

- Reduce sheet and rill erosion
- Reduce wind erosion
- Reduce excess nutrients in surface waters
- Reduce sediment transport to surface waters
- Reduce pesticide transport to surface waters
- Improve plant productivity and health

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to cropland.

CRITERIA

General Criteria Applicable to All Purposes

Alternate strips of crops susceptible to erosion with strips of erosion-resistant crops or cover. The orientation shall be at angles as close as practical to perpendicular to the critical wind and/or water erosion vectors.

Determine the maximum width of each strip using the current erosion prediction tool(s). Include the effects of other practices in the conservation management system in the design and soil loss predictions. Adjust strip widths to be multiples of the width of the planting equipment.

Include crops, forages, specialty crops, or cover crops to be grown in a planned rotation in the stripcropping arrangement. At least 50 percent of the rotation must be in erosion-resistant crops or sediment-trapping cover. Vegetation in the erosion-resistant strips must reduce erosion for the intended purpose. Do not include erosion-susceptible crops in adjacent strips at the same time during the year. However, two adjacent strips may be in erosion-resistant cover at the same time.

Follow the designed crop rotation on each strip while the point or year in the sequence of the rotation is staggered or offset to achieve the intended purpose.

Plan a minimum of two strips within the conservation planning slope length.

Run the strip boundaries parallel to each other and as close to the contour as practical. Include a minimum of two strips within the area prone to wind erosion.

Do not exceed the critical slope length for contouring when designing the width of the strips.

Additional Criteria to Reduce Sheet and Rill Erosion, Reduce Excess Nutrients in Surface Waters, Reduce Excessive Sediment in Surface Waters, or Reduce Pesticide Transport to Surface Waters

If a correction strip is required, that strip may vary in width but be no narrower than the widest working field implement used to traverse the strip.

Where field contours become too sharp to keep machinery aligned with the contour during field operations, establish sod turn-strips on sharp ridge points and/or valleys. Design these strips to be wide enough to allow the equipment to be lifted and/or turned and meet the same rows across the turn strip.

Design the row grades with positive row drainage for not less than 0.2 percent on slopes where ponding is a concern. This would include sites with soils with slow to very slow infiltration rates (soil hydrologic groups C or D), or where crops are sensitive to ponded water.

Row grades must be designed to be as near level as possible while allowing drainage. The maximum row grade must not exceed one-half of the up-and-down-hill-slope percent used for conservation planning with a maximum of 4-percent row grade.

Up to a 10-percent deviation from the design row grade is permitted within 50 feet of a stable outlet.

Establish a new baseline (key line) up or down slope from the last contour line for the layout of the next contour pattern when the row grade reaches the maximum allowable design grade.

On fields where headlands/end rows have a slope steeper than the maximum allowable row grade for that field, maintain the headlands/end rows in permanent sod.

Additional Criteria to Reduce Wind Erosion, Reduce Excess Nutrients in Surface Waters, Reduce Excessive Sediment in Surface Waters, or Reduce Pesticide Transport to Surface Waters

Measure the effective width of strips along the prevailing wind erosion direction for those periods when wind erosion is expected to occur and for which the system is designed. Adjust the width of the strips when the orientation of erosion-susceptible strips deviates from perpendicular to the prevailing wind erosion direction using current wind erosion prediction technology.

Additional Criteria to Improve Plant Productivity and Health

To protect growing crops from damage by wind-borne soil particles, measure the effective width along the prevailing wind erosion direction during those periods when sensitive crops are susceptible to damage by wind-borne soil particles.

Using the current wind erosion prediction technology, design the width of strips to not exceed the width permitted by the crop tolerance to wind erosion. Refer to the crop tolerances to wind in the NRCS National Agronomy Manual, other accepted technical references, or other planned crop protection objectives.

CONSIDERATIONS

Stripcropping may need to be used in combination with other conservation practices to meet the goals of the resource management system.

To improve cropping system diversity and associated benefits, consider a crop rotation at least 3 years in length including at least three crop species from different plant families.

Wildlife benefits can be enhanced by selecting species and management practices that provide habitat for pollinators, wildlife, and desired organisms.

Consider delaying mowing on sod turn-strips until after the nesting season.

To capture and manage soil moisture, select crops, crop sequence, and varieties with sufficient density and cover to intercept runoff and blowing snow. Manage the height of standing residues to maximize snow trapping potential.

Stripcropping can reduce airborne particulate matter (PM) emissions.

The conservation crop rotation on strip-cropped fields should be consistent with the farm enterprise crop mix and/or associated livestock operation. These will influence the proportion of row crops, close- growing crops, specialty crops, cover crops, and grass/legume forage crops.

Prior to design and layout, obstruction removal or changes in field boundaries or shape should be considered, where feasible, to improve the effectiveness of the practice and the ease of performing field operations across the slope.

Prior to layout, inspect the field to find key points for commencing layout or getting a full strip width to pass by an obstruction or ridge saddle. Whenever possible, run the strip boundary parallel with fence lines or other barriers, as long as row gradient criteria are met. Account for access road widths when they must cross the field, and adjust the strip boundary on either side accordingly.

When this practice is used in combination with diversions or terraces coordinate the strip layout with the diversion or terrace grade and spacing so that strip boundaries will parallel terraces wherever possible within the criteria for row grade. Where grass-back or narrow-base terraces are used, allow for the uncropped width along the terrace so that the same strip width is maintained for all strips in the field.

Stable outlets may be necessary where runoff results in concentrated flow erosion. Acceptable stable outlets include grassed waterways, field borders, filter strips, or water and sediment control basins.

When the erosion-resistant strip is living vegetation, the species established on non-organic operations, should either be tolerant to herbicides used on the cropped strips or protected from damage by herbicides used on the cropped strips.

For all organic or transitioning to organic operations, follow all National Organic Program rules.

PLANS AND SPECIFICATIONS

Prepare specifications for each site and purpose on the implementation requirements document. Documentation must include—

- Design soil map unit.
- Strip widths.
- Number of strips.
- Crops in rotation and offset of each strip.
- Critical slope length.
- Minimum row grade.
- Maximum row grade.
- Water erosion results if applicable.
- Wind erosion results if applicable.

OPERATION AND MAINTENANCE

Sediment accumulations along strip edges must be smoothed or removed and distributed over the field as necessary to maintain practice effectiveness.

Mow sod turn-strips at least once a year. Harvesting is optional.

Erosion-resistant strips in rotation must be managed to maintain the planned vegetative cover and surface roughness.

If the strip alignment is lost due to adjacent strips being in hay or permanent cover, the original strip alignment and width will be reestablished as needed.

REFERENCES

Flanagan, D.C., M.A. Nearing. USDA-Water Erosion Prediction Project, Hillslope Profile and Watershed Model Documentation, NSERL Report #10, July 1995.

Foster, G.R. 2004. Draft reference guide, Revised Universal Soil Loss Equation Version 2, (RUSLE2). National Sedimentation Laboratory, Oxford, MS.

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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, Agricultural Research Service (ARS), Agriculture Handbook No. 703.

USDA ARS Agricultural Systems Research Unit (June 2016), “The Wind Erosion Prediction System WEPS 1.5 User Manual”, URL: https://infosys.ars.usda.gov/WindErosion/.