NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

STRIPCROPPING

(Ac.)

CODE 585

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 supports one or more of the following purposes:

- Reduce water erosion – Resource Concern (SOIL EROSION - Sheet, rill, & wind erosion)
- Reduce wind erosion – Resource Concern (SOIL EROSION - Sheet, rill, & wind erosion)
- Reduce the transport of sediment and other water and wind borne contaminants – Resource Concerns (Excess nutrients in surface and ground waters and WATER QUALITY DEGRADATION – Pesticides transported to surface and ground waters)
- Protect growing crops from damage by wind-borne soil particles – Resource Concern (DEGRADED PLANT CONDITION – Undesirable plant productivity and health)

CONDITIONS WHERE PRACTICE APPLIES

This practice applies on cropland.

CRITERIA

General Criteria Applicable to All Purposes

Arrangement and Vegetative Condition of Strips. Strips of crops susceptible to erosion shall be alternated 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 water erosion vectors.

Strip Width. Strip width shall be determined by the current erosion prediction tool. Strip widths shall be multiples of the width of the planting equipment. Predictions shall account for the effects of other practices in the conservation management system.

Vegetative Cover. Vegetation in a strip cropping arrangement shall consist of crops, forages, specialty crops, or cover crops grown in a planned rotation. At least 50% of the rotation shall consist of erosion resistant crops or sediment trapping cover in any given year. Erosion resistant strips shall consist of vegetation that reduces erosion to the planned conservation objective. No two adjacent strips shall be in an erosion-susceptible condition at the same time during the year. However, two adjacent strips may be in erosion-resistant cover at the same time.

The designed crop rotation shall be followed on each adjacent strip. The sequence of the rotation shall be staggered or offset to achieve the desired conservation planning objective.

A vegetative cover shall be selected that is tolerant of the anticipated depth of sediment deposition.

Acceptable cover is specified by each specific purpose as stated below.

Additional Criteria to Reduce Water Erosion and Associated Transport of Sediment and Other Water-borne Contaminants

Number of Strips. A strip cropping system shall consist of two or more strips within the conservation planning slope length or “L”.

Alignment of Strips. Strip boundaries shall run parallel to each other and as close to the contour as practical.

Strip Width. The width of a strip shall not exceed the critical slope length for contouring.

If a correction strip is required that strip may vary in width but shall 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. These strips shall be wide enough to allow the equipment to be lifted and/or turned and meet the same rows across the turn strip.

Minimum Row Grade. Row grades for soils with slow to very slow infiltration rates (soil hydrologic groups C or D), or for crops sensitive to ponded water conditions for periods of less than 48 hours, shall be designed with positive row drainage of not less than 0.2 percent on slopes where ponding is a concern.

Maximum Row Grade. The maximum row grade shall not exceed one-half of the up-and-down hill slope percent used for conservation planning or 2 percent whichever is less.

Up to a 25% deviation from the design row grade is permitted within 150 feet of a stable outlet.

When the row grade reaches the maximum allowable design grade, a new baseline (key line) shall be established up or down slope from the last contour line and be used for layout of the next contour pattern.

Headlands/End Rows: On fields where row crops and tillage are a part of the rotation, headlands/end rows with a slope steeper than the maximum allowable row grade for that field shall be maintained in permanent sod.

Additional Criteria to Reduce Wind Erosion and Associated Transport of Sediment and Other Wind Borne Contaminants

Number of Strips A strip cropping system shall consist of two or more strips within the entire area prone to wind erosion.

Alignment of Strips. Strip boundaries shall run parallel to each other.

Orientation. Strips shall be oriented as close to perpendicular to the critical wind erosion direction for the susceptible period as practical

Width of Strips. The effective width of strips shall be measured along the prevailing wind erosion direction for those periods when wind erosion is expected to occur and for which the system is designed.

When the orientation of erosion-susceptible strips deviates from perpendicular to the prevailing wind erosion direction, the width of these strips shall be correspondingly adjusted using current wind erosion prediction technology.

The width of strips shall be determined using the currently approved wind erosion prediction technology to meet the soil loss objective. Calculation shall account for the effects of other practices in the conservation management system. Strips having protective cover and managed as part of a crop

rotation may be the same width as the erosion-susceptible strips or may be narrower, but in any case shall not be less than 25 feet.

Additional Criteria to Protect Growing Crops from Damage by Wind-borne Soil Particles

Strip width. The effective width shall be measured along the prevailing wind erosion direction during those periods when sensitive crops are susceptible to damage by wind-borne soil particles.

The width of strips shall not exceed the width permitted by the crop tolerance to wind erosion during specific crop stage periods, using current wind erosion prediction technology. Refer to the crop tolerances to wind (Table 502-1) in the National Agronomy Manual, other accepted technical references, or other planned crop protection objectives.

When the orientation of erosion-susceptible strips deviates from perpendicular to the prevailing wind erosion direction, the width of these strips shall be correspondingly adjusted using current wind erosion prediction technology.

Number of Strips. A strip cropping system shall consist of two or more strips within the entire area susceptible to wind erosion.

Alignment of Strips. Strip boundaries shall run parallel to each other.

Orientation of Strips: Strips shall be oriented as close to perpendicular to the prevailing wind erosion direction for the susceptible period as practical.

CONSIDERATIONS

Strip cropping 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 three years in length including at least three crop species from different plant families.

The conservation crop rotation on stripcropped 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.

Wildlife benefits can be enhanced by selecting species and management practices that provide habitat for pollinators, wildlife, and or 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/or blowing snow. Manage the height of standing residues to maximize snow trapping potential.

Stripcropping can reduce airborne particulate matter (PM) emissions.

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.

Considerations Specific to Soil Erosion from Water

Design and install the strip layout to best facilitate operation of machinery used on the strips. To avoid point rows and partial machine passes, lay out strip widths to have some multiple of full width passes of seeding implements or sprayers. Where adjustments are required to maintain in-row grade within design limitations, install odd area correction strips or turn strips. Keep these adjustment areas to a minimum by adjusting the entire field layout.

On ridge tops, where grades are within row grade limits, row crops may be planted in turn strips that are established where field contours become too sharp. Plant these areas last and harvest them first.

Protect areas of existing or potential concentrated flow erosion by any one or more suitable conservation practices, such as grassed waterways, water and sediment control basins, diversions, terraces, or underground outlets.

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 are necessary where runoff results in concentrated flow erosion. Acceptable stable outlets include grassed waterways, field borders, filter strips, water and sediment control basins, or underground outlets for terraces and diversions.

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

Retaining as much crop residue as possible on the soil surface by using reside management practices can maximize critical slope lengths.

PLANS AND SPECIFICATIONS

Specifications for installation and maintenance of Stripcropping shall be prepared for each field or treatment unit according to the Criteria described in this standard.

Specifications pertaining to implementation shall be recorded on Implementation Requirements documents.

OPERATION AND MAINTENANCE

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

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

Conduct all farming operations parallel to the strip boundaries except on end rows that have gradients flatter than the criteria set forth in this standard or where the end rows have at least 75 percent residue cover.

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

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

REFERENCES

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

Foster, G.R. 2005. Draft science documentation, 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, Agriculture Handbook No. 703.

USDA, ARS. 2006. The wind erosion prediction system, (WEPS ver. 1.2.9), User Manual, 2011 Wind Erosion Research Unit, Manhattan, Kans.

USDA-AMS National Organic Program Final Rule 7 CFR Part 205. http://www.ams.usda.gov/AMSv1.0/nop

USDA-AMS National Organic Program National List of Allowed and prohibited Substances. http://www.ams.usda.gov/AMSv1.0/nop

Table 502–1 Crop Tolerance to Blowing Soil

(190-V-NAM, 4th Ed., February 2011)

Tolerant T	Moderate tolerance 2 ton/acre	Low tolerance 1 ton/acre	Very low tolerance 0 to 0.5 ton/acre
Barley	Alfalfa (mature)	Broccoli	Alfalfa seedlings
Buckwheat	Corn	Cabbage	Asparagus
Flax	Onions (>30 days)	Cotton	Cantaloupe
Grain Sorghum	Orchard crops	Cucumbers	Carrots
Millet	Soybeans	Garlic	Celery
Oats	Sunflowers	Green/snap beans	Eggplant
Rye	Sweet corn	Lima beans	Flowers
Wheat		Peanuts	Kiwi fruit
		Peas	Lettuce
		Potatoes	Muskmelons
		Sweet potatoes	Onion seedlings (<30 days)
		Tobacco	Peppers
			Spinach
			Squash
			Strawberries
			Sugar beets
			Table beets
			Tomatoes
			Watermelons