

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

CONSERVATION CROP ROTATION

(Acre)

CODE 328

DEFINITION

Growing crops in a recurring sequence on the same field

PURPOSES

This practice may be applied as part of a conservation management system to support one or more of the following purposes.

- Reduce sheet and rill erosion
- Reduce soil erosion from wind
- Maintain or improve soil organic matter content
- Manage the balance of plant nutrients
- Improve water use efficiency
- Manage saline seeps
- Manage plant pests (weeds, insects and diseases)
- Provide food for domestic livestock
- Provide food and cover for wildlife

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to all cropland with the following exception.

This standard does not apply to pastureland, hayland or other land uses where crops are grown occasionally only to facilitate renovation or re-establishment of perennial vegetation.

CRITERIA

General Criteria Applicable to All Purposes

Grow crops in a planned recurring sequence as outlined in the Plans and Specifications section of this standard.

Select crops that are adapted to the climatic region, the soil resource and the goals of the producer. Refer to Colorado State University publications or other approved sources for appropriate recommendations.

A conservation crop rotation may include crops planted for cover or nutrient enhancement.

Select crops that produce sufficient quantities of biomass at the appropriate time to decrease erosion by water and or wind to within acceptable soil loss levels. If selected crops do not produce sufficient biomass, plan and apply the Colorado Cover Crop 340, Conservation Practice Standard or other appropriate practices.

Determine residue requirements using current approved erosion prediction technology. Soil loss estimates shall account for the effects of other practices in the conservation management system.

Additional Criteria to Maintain or Improve Soil Organic Matter Content

Select crops that produce the amount of plant biomass needed to maintain or improve soil organic matter content as determined using the Rusle 2 Soil Conditioning Index Procedure.

If partial removal of residues by means such as baling or grazing occurs, maintain enough residues on the field to achieve the desired soil organic matter content goal.

Manage grazing of cover and green manure crops to retain adequate biomass.

Additional Criteria to Manage the Balance of Plant Nutrients

Determine appropriate crop selection and sequence according to a rotational nutrient budget developed in accordance with the Colorado Nutrient Management 590, Conservation Practice Standard and Job Sheet.

When crop rotations are designed to add nitrogen to the system, grow nitrogen-fixing crops immediately prior to or interplanted with nitrogen-depleting crops.

To decrease excess soil nutrients, grow crops or cover crops with sufficient rooting depths and nutrient requirements to utilize the excess nutrients.

Additional Criteria to Improve Water Use Efficiency

The selection of crops and varieties, sequence of crops or the annual decision to plant a crop or to fallow, shall be determined based on local climate potential, irrigation water availability and an approved water balance procedure.

Additional Criteria to Manage Saline Seeps

Delineate and manage saline seeps and associated recharge areas according to a plan developed to be consistent with the Colorado Salinity and Sodic Soil Management 610, Conservation Practice Standard.

Select crops to be grown in recharge areas for rooting depth potential and water requirements, to utilize all plant available soil water. Do not summer fallow recharge areas. Determine crop selection and sequence using an approved water balance procedure.

If excess subsoil moisture exists below the rooting depth of crops commonly grown in the recharge area, establish and maintain deep-rooted perennial crops such as alfalfa, for the number of years needed to dry the soil profile.

Select crops to be grown in saline seep discharge areas for their tolerance to soil salinity.

Additional Criteria to Manage Plant Pests (Weeds, Insects, Diseases)

Alternate crops to break the pest cycle and or allow for the use of a variety of control methods according to a plan developed to be consistent with the Colorado Pest Management 595, Conservation Practice Standard. Remove affected crops and alternate host crops from the rotation as needed, to break the life cycle of the targeted pest.

Select resistant varieties listed in appropriate Colorado State University publications or other approved sources when there is a history of a pest problem.

Additional Criteria to Provide Food for Domestic Livestock

Select crops to balance the feed supply with livestock numbers according to a plan developed to be consistent with the Colorado Prescribed Grazing 528, Conservation Practice Standard.

Determine the needed amount of selected crops using the Prescribed Grazing 528, Livestock Forage and Feed Worksheet.

Additional Criteria to Provide Food and Cover for Wildlife

Manage crops selected to provide either food and or cover for the targeted wildlife species according to the Colorado Cropland Wildlife Habitat Evaluation Guide.

CONSIDERATIONS

When used in combination with Stripcropping, Code 585, the crop sequence should be consistent with the stripcropping design.

When used in combination with residue management practices, selection of high residue producing crops and varieties, use of cover crops and adjustment of plant population and row spacing can enhance production of the kind, amount and distribution of residues needed.

When maintaining or improving soil organic matter content is a purpose, enhance effectiveness by managing crop residues, tillage practices, utilizing animal wastes or applying mulches, to supplement the biomass produced by crops in the rotation.

Where excess plant nutrients or soil contaminants are a concern, utilize deep-rooted crops or cover crops to recover or remove the nutrient or contaminant from the soil profile.

Where precipitation is limited, conserve seasonal or erratic moisture for crop use by maintaining crop residues on the soil surface to increase infiltration and to decrease runoff and evaporation. Where winter precipitation occurs as snow, trap snow with standing residue, windbreaks or other barriers.

Where improving water use efficiency on deep soils is a concern, rotating or combining deep-rooted crops with shallow rooted crops can help utilize all available water in the soil profile.

Decrease crop damage by wind erosion by selecting crops that are tolerant to abrasion from windblown soil, or tolerant to high wind velocities. If crops sensitive to wind erosion damage are grown, decrease the potential for plant damage with crop residue management, field windbreaks, herbaceous wind barriers, intercropping or other methods of wind erosion control.

Consider adjusting the cropping sequence to avoid potential negative impacts of residual soil herbicides, and runoff effects on aquatic and wildlife habitat.

Decrease soil compaction by adjusting crop rotations to include deep-rooted crops that are able to extend to and penetrate the compacted soil layers, as well as avoiding crops that require field operations when soils are wet.

Leave several unharvested rows around the edges of the field to provide protection and/or food for overwintering wildlife.

Develop crop plantings to benefit particular communities, species or wildlife life stages. Food plots or crops for wildlife could be provided as part of a habitat restoration project as an initial food and cover source for wildlife until food and cover producing vegetation becomes established.

Crop residues may be a valuable food source for wintering wildlife where winter browse is sparse.

Consider minimizing pesticide use if applied to crops raised for wildlife.

To decrease furrow irrigation-induced erosion, select crops or cover crops that grow within the wetted perimeter of the furrow, or ones that produce enough residues that adequate amounts remain in the furrow.

To decrease sprinkler irrigation-induced erosion, select crops or cover crops that develop surface cover or canopy rapidly, or ones that produce enough residues that adequate amounts remain on the soil surface.

Use soil conditioners such as polyacrylamides to improve infiltration and decrease irrigation-induced erosion.

Crop salt tolerance varies considerably among species but also is highly dependent upon cultural conditions. Yield response relations show that crops tolerate salinity to a threshold level. Salinity that exceeds the threshold level results in linear yield decreases as salinity increases.

If the salt content of irrigation water increases, select crops tolerant of the expected vadose zone salinity levels and take appropriate steps to minimize root zone salt accumulations through use of proper leaching techniques.

PLANS AND SPECIFICATIONS

Prepare plans and specifications for each field or management unit according to the Criteria and Operation and Maintenance sections of this standard.

Specifications shall describe the requirements for applying this practice to meet the intended purpose.

Specifications shall be recorded on a Colorado Conservation Crop Rotation 328, Conservation Practice Job Sheet.

OPERATION AND MAINTENANCE

Rotations shall provide for acceptable substitute crops in case of crop failure or shift in planting intentions for weather-related or economic reasons. Acceptable substitutes are crops having similar properties that meet the criteria for all the resource concerns identified for the field or treatment unit.

In areas where summer fallow is considered, make the decision to plant a crop or fallow based on soil moisture at planting time.

Fallow fields only when soil moisture is not adequate to produce a crop. If moisture supply is adequate but limited, select and grow short-season shallow-rooted crops. Deep-rooted crops shall follow shallow-rooted crops in subsequent years, if needed, to utilize all plant available water in the root zone.

REFERENCES

Colorado Field Office Technical Guide, Section IV. [Conservation Crop Rotation 328 Job Sheet](#). 2006. USDA, NRCS. Lakewood, CO.

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Colorado Field Office Technical Guide, Section IV. [Conservation Crop Rotation 328 Statement of Work](#). 2006. USDA, NRCS. Lakewood, CO.

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Colorado Field Office Technical Guide, Section IV. [Cover Crop 340 Conservation Practice Standard](#). 2006. USDA, NRCS. Lakewood, CO.

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<http://efotg.nrcs.usda.gov/references/public/CO/CO590.pdf>

Colorado Field Office Technical Guide, Section IV. [Nutrient Management 590 Job Sheet](#). 2006. USDA, NRCS. Lakewood, CO.

http://efotg.nrcs.usda.gov/references/public/CO/CO590_JS.xls

Colorado Field Office Technical Guide, Section IV. [Prescribed Grazing 528 Conservation Practice Standard](#). 2003. USDA, NRCS. Lakewood, CO.

<http://efotg.nrcs.usda.gov/references/public/CO/CO528std.pdf>

Colorado Field Office Technical Guide, Section IV. [Prescribed Grazing 528 Livestock Forage and Feed Worksheet](#). 2003. USDA, NRCS. Lakewood, CO.

[http://efotg.nrcs.usda.gov/references/public/CO/ws528\(3\).doc](http://efotg.nrcs.usda.gov/references/public/CO/ws528(3).doc)

Colorado Field Office Technical Guide, Section IV. [Salinity and Sodic Soil Management 610 Conservation Practice Standard](#). 2006. USDA, NRCS. Lakewood, CO.

<http://efotg.nrcs.usda.gov/references/public/CO/CO610.pdf>

Colorado Field Office Technical Guide, Section IV. [Salinity and Sodic Soil Management 610 Job Sheet](#). 2006. USDA, NRCS. Lakewood, CO.

<http://efotg.nrcs.usda.gov/references/public/CO/CO610.pdf>

Colorado Field Office Technical Guide, Section IV. [Upland Wildlife Habitat Management 645 Conservation Practice Standard](#). 2005. USDA, NRCS. Lakewood, CO.

<http://efotg.nrcs.usda.gov/references/public/CO/645.pdf>

Colorado Field Office Technical Guide, Section I, Technical Notes, Biology Technical Note 8, [Wildlife Habitat Evaluation Guide - Cropland](#).

2005. USDA, NRCS, Lakewood, CO. <http://efotg.nrcs.usda.gov/references/public/CO/cropland.doc>

Colorado Field Office Technical Guide, Section I, Erosion Prediction, [Excel Wind Erosion Equation \(WEQ\) Colorado Guidance Document](#). 2003. USDA, NRCS, Lakewood, CO.

http://efotg.nrcs.usda.gov/references/public/CO/CO_Excel_WEQ_Guidance.pdf

[Revised Universal Soil Loss Equation, Version 2](#), 2004. USDA NRCS, Washington DC.

http://fargo.nserl.purdue.edu/rusle2_dataweb/RUSLE2_Index.htm