

**NATURAL RESOURCES CONSERVATION SERVICE
CONSTRUCTION SPECIFICATIONS**

CONSERVATION CROP ROTATION

1. Scope

The work shall consist of growing crops in a planned, recurring rotation to maintain soil tilth, minimize pests, conserve irrigation water, benefit wildlife, and/or reduce soil erosion on fields designated on the conservation plan map or drawing.

2. General

The crop rotation shall provide a reasonable economic return based on normal expectations for the area and the cultivars grown.

Soil erosion protection shall be provided during the critical rainfall water erosion period or critical wind erosion period when specified on the Conservation Crop Rotation Plan Job Sheet.

The crop rotation shall be intense enough to utilize and manage soil moisture or reduce or eliminate the dependence on irrigation, and diverse enough to reduce the potential of pest infestations.

3. Materials

Chemicals used in performing this practice shall be federally, state, and locally registered and shall be applied strictly in accordance with authorized registered uses, directions on the label, and other federal, state, and local policies and requirements.

Chemical containers shall be properly stored and disposed of in a safe manner according to state and local ordinances or procedures.

Seed inoculates will be compatible to the legume cultivar being grown and applied within 48 hours of planting.

4. Sheet and Rill Erosion Control

Cultural operations, plant growth, and crop residues shall reduce the predicted rainfall sheet and rill erosion for the crop rotation to the soil loss tolerance identified for each field.

Crop rotations will include non-fragile (see Table 1), high residue-producing (see Table 2) crops during at least 25 percent of the rotation. Low residue-producing crops will not be grown more than two consecutive years in the sequence unless supplemented by a cover crop, green manure crop, or the application of at least 10 tons/acre of livestock wastes according to Conservation Practice Standard and Construction Specifications 590, Nutrient Management.

5. Wind Erosion Control

Cultural operations including irrigation, plant growth, and crop residues shall reduce the predicted wind erosion rate for the crop rotation to the soil loss tolerance identified for each field, except that it shall also protect young plants from excessive damage caused by wind blown soil.

6. Irrigation Induced Erosion Control

On furrow and sprinkler irrigated fields where irrigation is planned, cultural operations and crop residues or cover crops shall be used in conjunction with irrigation water management to reduce the predicted irrigation induced erosion rate for the crop rotation to the soil loss tolerance specified for each field. On furrow and sprinkler irrigated fields where irrigation is no longer planned, cultural

operations, plant growth, and crop residues shall reduce the predicted rainfall sheet and rill erosion for the crop rotation to the soil loss tolerance identified for each field. An approved chemical additive (such as polyacrylamide) may be used in conjunction with irrigation water management on furrow irrigated fields.

In areas with an adopted surface water quality standard for suspended sediment, irrigation induced erosion shall be reduced to the rate needed to achieve that standard alone or in conjunction with sediment basins or similar entrapment structures.

7. Soil Tilth Maintenance

Crops shall produce the amount of crop residues and root biomass needed to maintain soil organic matter. The crop rotation will consist of at least 30 percent non-fragile, high residue producing crops when a no-till system is implemented as part of the conservation management system.

When residues will be incorporated, the crop rotation will consist of at least 50 percent non-fragile, high residue producing crops and will not be incorporated deeper than four inches below the soil surface. Crops producing at least 3,000 lbs./ac. residue will be used in the rotation. Cover and green manure crops and/or animal waste may be substituted for crop residues. Crop residue will be left on the soil surface or incorporated into the upper four inches of the soil surface.

Sheet, rill, and wind erosion will be controlled at below the Tolerable Soil Loss (T) value.

Soil compaction shall be treated using deep tillage alone or in combination with deep-rooted crops. Compaction treatments with deep tillage alone will be implemented during a period when the soil surface is dry through the restrictive layer so that the restrictive layer is fractured.

When implementing no-till planting systems, incorporate cover crops and deep-rooted crops into the crop rotation.

Other treatments needed to maintain soil tilth shall be performed when specified on the Conservation Crop Rotation Plan Job Sheet.

8. Manage Saline Seeps

Crops grown in the recharge area of saline seeps shall be selected for rooting depths and water requirements adequate to fully utilize plant available water in the soil profile. Summer fallow will not be used. Crop selection and sequence shall be determined using an approved water balance procedure.

If excess subsoil moisture exists below the rooting depth of crops commonly grown in the recharge area, deep-rooted perennial crops shall be established for the number of years needed to dry the soil profile.

Crops grown in the discharge area of saline seeps shall be selected for their tolerance to salinity levels in the discharge area.

9. Plant Nutrient Supply

Application of nitrogen and phosphorus shall be based on realistic yield goals for similar crops in the area and shall account for residual nutrients in the soil and what will be delivered in any irrigation water.

When the crop rotation is designed to add nitrogen to the system, nitrogen-fixing crops shall be grown immediately prior to or interplanted with nitrogen-depleting crops.

Where deep leaching of nitrogen is a concern, crops or cover crops with rooting depth and nutrient requirements that utilize nitrogen shall be grown and shall also comply with Construction Specifications 590, Nutrient Management.

10. Pest Control

Crops shall be alternated to break adverse pest cycles that cannot be overcome using resistant cultivars.

Integrated crop management including biological control shall be used to the level that maintains economic returns.

11. Wildlife Food and Cover

Crop rotations designed to provide food and cover for wildlife will consist of at least three crops, one of which will be a legume. Refer to Conservation Practice Standard 645, Upland Wildlife Habitat Management, for planting, harvesting, and other management considerations.

12. Documentation

Documentation for this practice will include (asterisk [*] indicates minimum required documentation):

- *Identified problem or resource concern and practice objective.
- *Location on conservation plan map.
- *Extent in acres.
- *Crop rotation or sequence.
- Comparable erosion prediction calculations.
- Fertility management.
- Pest (weed, disease, insect) management.
- Seeding mixture and rates for rotation seeding.

Practice specifications will be recorded in the conservation plan narrative, appropriate job sheet, or the conservation assistance notes.

13. Other Requirements

The owner, operator, contractor, and other persons shall conduct all work and operations in accordance with proper safety codes for the type of equipment and operations being performed with due regard to the safety of all persons and their property.

Table 1. Residue Produced by Crops

CROP	Estimated Air Dry		
	Residue Produced	Units	
Corn	56	lbs/bu grain	
Corn Silage Stubble	21	lbs/in/10,000 plants/ac	
Grain Sorghum	56	lbs/bu grain	
Soybeans	75	lbs/bu grain	
Sunflowers	2.2	lbs/lb grain	
Oats	64	lbs/bu grain	
Winter Wheat	102	lbs/bu grain	
Winter Wheat (fall growth)	175-400	lbs/ac	
Spring Wheat	78	lbs/bu grain	
Rye	84	lbs/bu grain	
Rye (fall growth)	175-600	lbs/ac	
Millet	80	lbs/bu grain	
Dry Edible Beans	2.2	lbs/lb grain	
Barley	72	lbs/bu grain	
Safflower	1.5	lbs/lb grain	
Potatoes	6	lbs/cwt	
Sorghum Silage Stubble			
Plant Population:	<58,000 plants/ac	32	lbs/in/10,000 plants/ac
	>58,000 plants/ac	186	lbs/in/10,000 plants/ac
Rape Seed	2	lbs/lb grain	
Buckwheat	1.5	lbs/lb grain	
Field Peas (dry)	1.2	lbs/lb grain	

Table 2. Residue Types

<u>Nonfragile</u>	<u>Fragile</u>
Alfalfa or legume hay	Canola/rapeseed
Barley*	Dry beans
Buckwheat	Dry peas
Corn	Fall seeded cover crops
Flaxseed	Lentils
Forage Silage	Mustard
Grass Hay	Potatoes
Millet	Safflower
Oats*	Soybeans
Pasture	Sugar Beets
Popcorn	Sunflowers
Rye*	Vegetables
Sorghum	
Triticale*	
Wheat*	

*If a combine is used with a straw chopper or otherwise cuts straw into small pieces in harvesting small grain, then the residue should be considered as being fragile.