



CONSERVATION ENHANCEMENT ACTIVITY

E328G

CONSERVATION STEWARDSHIP PROGRAM

Crop rotation on recently converted CRP grass/legume cover for soil organic matter improvement

Conservation Practice 328: Conservation crop rotation

APPLICABLE LAND USE: Crop (Annual & Mixed)

RESOURCE CONCERN: Soil

ENHANCEMENT LIFE SPAN: 1 Year

Enhancement Description

Crop rotation on acres converted, no more than 2 years prior, from CRP grass/legume cover to annual crops. Diverse rotation with living roots and residue cover throughout year and minimal disturbance. Enhancement not applicable on hayland.

Criteria

- This enhancement is limited to acres where the conversion of CRP grass/legume conservation cover to annual crops took place not more than 2 years prior to enrollment in CSP. This enhancement is not applicable on hayland.
- Crops must be grown in a planned sequence as outlined in plan. The crop rotation must include a minimum of four different crops. For purposes of these criteria a cover crop is considered a different crop.
- Where applicable, plan suitable crop substitutions when the planned crop cannot be planted due to weather, soil conditions, or other local situations.

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- Grow crops that will produce a positive trend in the Organic Matter (OM) subfactor value over the life of the rotation, as determined by the Soil Conditioning Index. (management SCI value)
- The crop rotation includes at least 2 years of high residue crops and/or cover crops per 3 years of the rotation. **(See STATE list of high residue crops)**
- For crop diversity, the planned crop sequence of at least 4 different crops should contain at least 3 different crop types; for example a mix of the following: warm season grass; warm season broadleaf; cool season grass; cool season broadleaf.
- Leave crop residue on the soil surface throughout the year.
- Keep a living root system established as much as practical for the given soil, cropping system, and climate area. Maximize root growth periods by planting the next crop or cover crop as soon as practical after the harvest and/or utilize perennial crops in the rotation. Aim to have living roots at least 90% of available growing days. **(See STATE provided guidance of options to maximize living root systems in local climate and cropping systems; determine available growing days and period of no growth, such as frozen periods in the north)**. Show before and after management files from current NRCS wind and water erosion prediction technologies to document benchmark and planned crop rotation to show increase in living root periods.
- Minimize all types of soil disturbance. No more than one crop-year in the rotation will have a Soil Tillage Intensity Rating (STIR) value greater than 20 and the rotation will have a positive trending SCI.

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Documentation and Implementation Requirements

Participant will:

- Prior to implementation, provide NRCS with the current and planned crop rotation and planned field operation(s) used for each crop.

Current Management – Crop Rotation

Field	Acres	Planned Crops (in sequence)	Length of Crop Rotation (years)	Crop Type (Warm Grass-WG, Cool Grass-CG, Warm Broadleaf-WB, Cool Broadleaf-CB)

Current Management – Field Operations

Field	Crop	Field Operation	Timing of Field Operation (month/year)

Planned Management – Crop Rotation *(Crop rotation must include at least 4 different crops from 3 of the different crop types. The rotation must also include 2 years of high residue crops and/or cover crops per 3 years of the rotation. Use STATE list of high residue crops.)*

Field	Acres	Planned Crops (in sequence)	Length of Crop Rotation (years)	Crop Type (Warm Grass-WG, Cool Grass-CG, Warm Broadleaf-WB, Cool Broadleaf-CB)



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Planned Management – Field Operations

Field	Crop	Field Operation	Timing of Field Operation (month/year)

- During implementation, notify NRCS of any planned changes in crops, crop rotation, or field operations to verify the planned system meets the enhancement criteria.
- During implementation, leave crop residue on the soil surface throughout the year.
- During implementation, take dated pictures with field indicated at least every 3 months to show residue or growing crops.
- After implementation, if changes to the rotation were made, complete the tables above to document the applied Conservation Crop Rotation for the contract period and provide to NRCS.
- After implementation, provide for review pictures showing residue or growing crops throughout the year.

NRCS will:

- As needed, provide technical assistance in selecting crop rotations or substitute crops that would meet the criteria of the enhancement.
- Prior to implementation, verify the enhancement is planned for acres where the conversion from CRP grass/legume conservation cover to annual cropland took place no more than 2 years prior to enrollment in CSP. **Conversion Date:** _____
- Prior to implementation, verify the enhancement is not planned on hayland.



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- Prior to implementation, verify the crop rotation includes at least 2 years of high residue crops and/or cover crops per 3 years of the rotation. (Use STATE list of high residue crops)
- Prior to implementation, verify the planned crop rotation includes at least 4 different crops and contains at least 3 different crop types; for example a mix of the following: warm season grass; warm season broadleaf; cool season grass; cool season broadleaf.
Planned number of crops: _____
Planned number of crop types: _____
- Prior to implementation, use information provided from the participant to calculate the management Soil Conditioning Index (SCI) value for each field using current NRCS wind and water erosion prediction technologies. Crop rotation must produce a positive trend in the Organic Matter (OM) subfactor value.
Management SCI Value = _____ **OM subfactor value =** _____
- During implementation, evaluate planned changes in crops, crop rotation, or field operations to verify the planned system meets the enhancement criteria.
- After implementation, if the applied crop rotation is different than the planned crop rotation, use information provided from the participant to document that the applied rotation met the enhancement criteria.
Applied number of crops: _____
Applied number of crop types: _____
- After implementation, if the applied crop rotation is different than the planned crop rotation, use information provided from the participant to calculate SCI value to document that the applied rotation met the enhancement criteria.
Management SCI Value = _____ **OM subfactor value =** _____
- After implementation, review pictures showing residue or growing green crops throughout the year to verify the applied system meets the enhancement criteria.



NRCS Documentation Review:

I have reviewed all required participant documentation and have determined the participant has implemented the enhancement and met all criteria and requirements.

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Participant Name _____ Contract Number _____

Total Amount Applied _____ Fiscal Year Completed _____

NRCS Technical Adequacy Signature Date



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SOUTH DAKOTA (SD) SUPPLEMENT TO CONSERVATION ENHANCEMENT ACTIVITY

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Additional Criteria for SD

In addition to the criteria specified in the national job sheet E328G, the following additional criteria apply in SD:

South Dakota list of high residue crops:

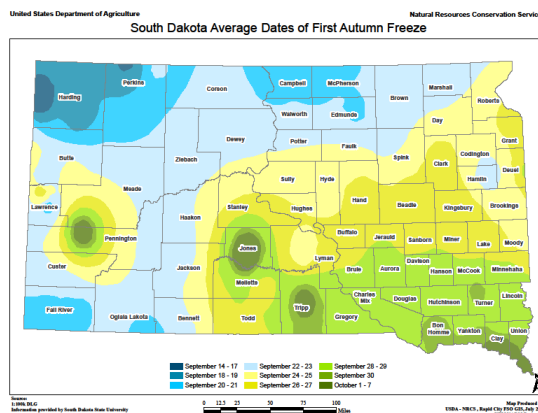
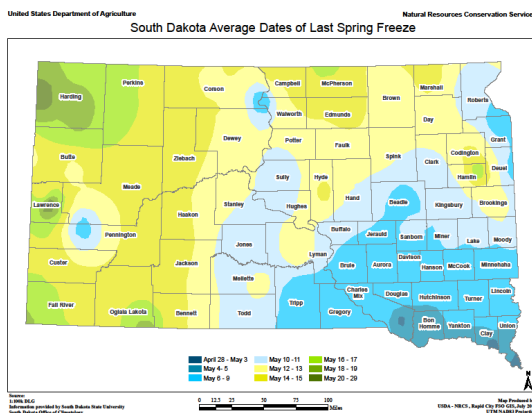
Alfalfa	Corn, Popcorn	Perennial Grass (All)	Sorghum, Grain
Barley	Millet	Rye	Triticale
Corn, Grain	Oats	Spelt	Wheat (All)

* Annually planted crops that are hayed, or ensiled will be considered low residue crops. When a low residue crop is followed by a cover crop (properly grazed or ungrazed) it will be considered high residue if the cover crop mix contains 60 percent (%) or more grass species. If the cover crop is planted after August 1, the grasses need to be overwinter types (i.e. winter wheat/Rye/Triticale).

** Grazing can occur on crop aftermath (high residue crops) and cover crops as long as at least 60% residue is maintained to insure there is adequate plant material remaining for the benefit of soil health.

South Dakota guidance to maximize living root systems:

Maps identifying SD Average Dates of First Autumn Freeze and Last Spring Freeze are located in the Field Office Tech Guide (FOTG) under Section I/Maps/1. General/SD Average Dates of First Autumn Freeze and SD Dates of Last Spring Freeze





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Climatic Data by county can also be obtained from the Agricultural Applied Climate Information System. This link can be accessed through the FOTG under Section II/Climatic Data/AgACIS

- Step 1. Product - select Frost/freeze dates
- Step 2. Choose location
- Step 3. Variable - select Minimum temperature <=32°F
- Step 4. Year – select 1981-2010
- Step 5. Select Go

Example:

Climate Data for Beadle County, South Dakota

1. Product	2. Location	3. Variable	4. Year	5. View
<input type="radio"/> Daily data for a month <input type="radio"/> Daily almanac <input type="radio"/> Monthly avgs/totals <input type="radio"/> Monthly occurrences <input type="radio"/> Monthly extremes <input type="radio"/> Daily extremes <input type="radio"/> Daily/monthly normals <input type="radio"/> Record extremes <input checked="" type="radio"/> Frost/freeze dates <input type="radio"/> TAPS <input type="radio"/> FROST <input type="radio"/> GROWTH <input type="radio"/> WETS <input type="radio"/> DAYS	HURON RGNL AP HURON WESSINGTON 2SE	<input type="radio"/> Min temp <= 36° F <input checked="" type="radio"/> Min temp <= 32° F <input type="radio"/> Min temp <= 28° F <input type="radio"/> Min temp <= 24° F <input type="radio"/> Min temp <= 20° F <input type="radio"/> Min temp <= 16° F	<input type="radio"/> This year <input type="radio"/> Last year <input type="radio"/> 1971-2000 <input checked="" type="radio"/> 1981-2010 <input type="radio"/> Other range: Start: 2016 End: 2016	<input type="button" value="Go"/>

Product Description:
 FROST/FREEZE DATES - finds the last spring and first fall occurrence of minimum temperatures below the selected threshold. This product is available for the current year, the previous year, an average of the normal periods, or any other range of years in the period of record. Additional

Powered by **ACIS**
 NOAA Regional Climate Centers

In SD the living root period will be between the normal killing frost in the spring and fall. Either identified resource may be utilized to determine the living root period in SD.



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Example rotations include:

Year 1	Year 2	Year 3	Year 4
Corn	Soybean or Sunflowers	Oat & Pea mix followed by high residue cover crop mix	
Spring Wheat	Winter Wheat (add cover crop mix after harvest to extend living root period)	Corn	Soybean or Sunflowers
Corn Interseed or aerial seed winter wheat or rye into standing corn	Soybeans Interseed or aerial seed a flax small grain mix	Corn Interseed or aerial seed winter wheat or rye into standing corn	Soybeans Interseed or aerial seed a flax small grain mix
Corn	Sorghum-sudan silage followed by winter wheat	Winter Wheat (followed by cover crop to get 4th crop)	