United States Department of Agriculture

Conservation Enhancement Activity

E328E

CONSERVATION STEWARDSHIP PROGRAM

Soil health crop rotation

Conservation Practice 328: Conservation Crop Rotation

APPLICABLE LAND USE: Crop (Annual & Mixed)

RESOURCE CONCERN: Soil

PRACTICE LIFE SPAN: 1 Year

Enhancement Description

Implement a crop rotation which addresses all four principle components of soil health: increases diversity of the cropping system; maintains residue throughout the year; keeps a living root; and minimizes soil chemical, physical and biological disturbance. The rotation will include at least 4 different crop and/or cover crop types (crop types include cool season grass, warm season grass, cool season broadleaf, warm season broadleaf) grown in a sequence 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 (SCI). The current NRCS wind and water erosion prediction technologies must be used to document the rotation and SCI calculations.

Criteria

- Crops must be grown in a planned sequence as outlined in the plan. The crop rotation must include a minimum of four different crop types. For the purpose of this 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.
- 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 (SCI). (management SCI value)

CONSERVATION STEWARDSHIP PROGRAM

- 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 should contain four 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 (crop STIR value) and the rotation will have a positive trending SCI (management SCI value).

Documentation and Implementation Requirements

CONSERVATION STEWARDSHIP PROGRAM

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 *(Planned crop rotation must include at least 2 years of high residue crops and/or cover crops per 3 years of the rotation and at least 4 different crop types. 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)

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, take dated pictures with field indicated at least every 3 months to show residue or growing crops.
- ☐ During implementation, leave crop residue on the soil surface throughout the year.
- ☐ 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 planned crop rotation includes at least four different crop types.
- ☐ 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, 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 = _____

- ☐ Prior to implementation, use NRCS wind and water erosion prediction technologies to document benchmark and planned crop rotation to show increase in living root periods.
- ☐ 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 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.

Participant Name _____ Contract Number _____

Total Amount Applied _____ Fiscal Year Completed _____

_____ _____
NRCS Technical Adequacy Signature Date

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IDAHO SUPPLEMENT TO

CONSERVATION ENHANCEMENT ACTIVITY

CONSERVATION STEWARDSHIP PROGRAM

E328E

Additional Criteria for Idaho

- For the purposes of this enhancement an Idaho specific list of High and low residue crops has been developed. If a crop is not found on this list please consult your Idaho State Agronomist to determine if the crop will be considered to be a high or low residue crop.

HIGH RESIDUE CROPS
High residue crops are defined as: All annual cool season small grain and grass crops where residue following harvest is not removed. This includes cool season spring and winter varieties of wheat, triticale, rye, barley, and oats. AND: All annual warm season grass crops where residue following harvest is not removed. This includes millet, sorghum, sudan, teff, field corn, and sweet corn. AND: Any perennial broadleaf or grass (excluding orchard or vinyard crops) where the above ground biomass remains on the field and is not removed. This includes alfalfa seed, bluegrass seed, ryegrass seed, and fescue seed. AND: Any cover crop where the residue has not been removed.

NOTE: For a crop to meet the definition of a high residue crop as indicated above, crop residues must not be burned or otherwise removed from the field. This includes removal by way of harvesting, baling, green-chopping, and/or grazing.
LOW RESIDUE CROPS
Low residue crops are defined as: All vegetable and root crops where residue following harvest is low or decomposes rapidly. This includes asparagus, beans, beets, brocolli, brussels sprouts, cabbage, cantaloupes/musk mellons, carrots, cauliflower, celery, cucumbers, eggplant, garlic, herbs, hops, horseradish, Kale, lettuce, okra, onions, parsley, peas, peppers, potatoes, pumpkins, radishes, squash, sugarbeets, tomatoes, turnips, and watermelons. AND: All low residue grain/seed crops. This includes camelina, canola, chickpea/garbonzo beans, flax, lentils, mustard, safflower, and sunflower. AND: All high residue annual crops or perennial crops (excluding orchard or vinyard crops) where residues have been removed by grazing or baling. This includes alfalfa for hay/silage, clover hay/silage, corn silage, sorghum hay/silage, sudan hay/silage, mint, and oats for hay/silage, AND: All cover crops in the rotation that have residue removed at or following termination.

- As one of the requirements for this enhancement a living root should be growing in the soil as much as possible throughout the crop rotation. As per the requirements

CONSERVATION STEWARDSHIP PROGRAM

listed on the national jobsheet above, you should aim to have a living root growing in the field for 90% of the available growing days. Use the following table to determine the number of days needed to achieve 90% of the available growing days.

Irrigated Cropland fields:
The number of available growing days will be equal to the number of frost free days listed on the frost free day spreadsheet located in Section II of the FOTG. Use the most limiting soil on the planning unit where the crop rotation is being planned. The most limiting soil is the one on the planning unit with the least possible frost free days. The frost free day spreadsheet can be found in section II of the FOTG under Soils Information\Soils Interpretations. This method only applies to irrigated cropland.
Non-irrigated Cropland fields:
In Idaho, soil moisture for non-irrigated cropland comes almost entirely in the winter months. Soil moisture is the most limiting factor in producing a crop on non-irrigated cropland in Idaho. Any removal of moisture during the crop year would take vital soil moisture away from the crop and likely reduce crop yield. This makes the use of early or late season cover crops not feasible for non-irrigated cropland in Idaho. In Idaho non-irrigated cropland, the only real available growing days would be in a fallow year when there is no crop growing. If the benchmark condition includes a fallow year in the crop rotation, a crop or cover crop must be used in place of the fallow year in order to be considered as having a living root growing in the system as long as possible. The only exception to this rule will be if the fallow year is critical to conserving adequate soil moisture for the following years crop. Any exceptions must be approved by the Idaho State Agronomist.

Additional Documentation Requirements for Idaho

- Document the frost free days per year and most limiting soil in the table below for irrigated cropland where this enhancement will be applied. If cropland is not irrigated then document as N/A.

Frost Free Day's per year:	MUSYM of most limiting soil:

- Implementation of this enhancement must meet all "general criteria" and "additional criteria related to the applicable practice purpose" listed in the NRCS conservation practice standard for the conservation crop rotation (328) practice.

- Crop rotation must be documented using the current Idaho 328 specification, and SCI will be documented using the applicable erosion prediction technology.