

Soil Erosion Enhancement Activity – SOE04 - Continuous no-till



Enhancement Description

This enhancement is for using a continuous no-till, strip till, or direct seeding method of planting throughout the planned rotation. High residue levels are maintained by including high residue-producing crops, or by low residue crops followed by a cover crop in the rotation. Termination of all cover crops is accomplished using chemical methods or non-chemical methods, such as flail mowing, roller crimper and frost kill.

Land Use Applicability

Cropland

Benefits

Use of continuous no-till, strip till, or direct seeding leaves high levels of crop residue that can reduce erosion by wind and water up to 90%. The result is increased soil organic matter and added weed control as compared to intensively tilled soils with no surface residue. This will in turn, enhance and protect water quality and biotic communities that depend on clean water. Mechanically terminating cover crops using a flail mower or roller crimper can eliminate the use of herbicides, thereby reducing potential offsite water quality problems while leaving the soil undisturbed.

Conditions Where Enhancement Applies

This enhancement applies to all acres of annually planted cropland.

Criteria

Implementation of this enhancement **requires** the use of continuous no-till, strip till, or direct seeding of all crops in the planned rotation. The no-till, strip till, or direct seeding system must incorporate the following activities:

1. Rotations that include only high residue producing crops:
 - a. No cover crop is required if a Soil Tillage Intensity Rating (STIR) ≤ 10 is maintained for the rotation.
 - b. Cover crops, if required:
 - i. Can be a single grass species or a multiple species mixture that includes at least 50% grass or legume adapted for the local area
 - ii. Must be planted using a no-till system
 - c. Use only crops that produce high residue levels throughout the rotation, e.g. corn, wheat



- d. Residue removal is prohibited (Exception: residue removal is allowed for optimal crop production where SCI (Soil Conditioning Index) can be maintained greater than zero and the criterion of 3(c) is still met).
2. Rotations that include low residue crops
 - a. Cover crops must be used after ALL low residue crops, e.g. vegetables, cotton, soybeans
 - b. Plant cover crops using a no till system
 - c. Cover crops can be a single grass species or a multiple species mixture that includes at least 50% grass or legume adapted for local use.
 - d. Maintain a minimum Soil Tillage Intensity Rating (STIR) ≤ 10 for the planned rotation
 - e. Residue removal is prohibited
3. Additional Criteria
 - a. All residues must be uniformly distributed over the entire field
 - b. No full-width tillage is permitted regardless of the depth of the tillage operation
 - c. Field(s) must have a soil loss at or below the soil tolerance (T) level for wind and/or water erosion for the crop rotation and a Soil Tillage Intensity Rating (STIR) of ≤ 10 for each rotation

Adoption Requirements

This enhancement is considered adopted when the STIR criteria, residue and/or cover crops listed above have been implemented on the land use acreage.

Documentation Requirements

Documentation for each field where this enhancement is applied:

1. Planned crop rotation showing cover crops that will be used after low residue crops,
2. Planting method used for each crop in the rotation (no-till, strip till, direct seeding),
3. List of all other potential ground disturbing farming operations,
4. Method of cover crop termination, e.g. chemical, flail mowing, roller crimper, or combination,
5. Dates for farming operations,
6. Map showing fields and acreage, and
7. Photographs of planted crops.



United States Department of Agriculture
 Natural Resources Conservation Service

IDAHO ADDENDUM 2012
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Additional guidance for continuous no till:

A continuous no-till rotation in Idaho will likely involve small grains only. All equipment used during the entire crop rotation will be identified and verified in RUSLE2 or WEPS for the STIR value, as documented in the operations files. In order to maintain a STIR value less than ten for the rotation, hoe-type drills and some anhydrous fertilizer shank operations may not fit this enhancement. Drills identified as “no-till” or “one-pass” may not meet the requirements of this enhancement.

YOU MUST REVIEW THIS ENHANCEMENT WITH THE STATE AGRONOMIST BEFORE USING THIS ENHANCEMENT.

Table 1.High residue producing crops.

Crop	Lbs. Residue per Bushel
Barley	65
Corn (sweet)	55
Corn (grain)	55
Flax	80
Oats	60
Rye	80
Sorghum (grain)	70
Milo	80
Millet	80
Teff	6 lbs residue per lb seed
Triticale	100
Wheat winter	90

Table 2. Legume cover crop species with associated agronomic data.

Cover Crop Species	Life Cycle	Potential Fixed Nitrogen (lbs/A)	Seeding Rate (lbs/A)	Seeding Depth (inches)	% Nitrogen Content ¹	Rhizobium Inoculant Type
Legumes						
Annual medic*	SA	40-100	10-40	1/4 to 1/2	1.5	A
Berseem clover*	SA	60-90	9-20	1/4 to 1/2	2.6	R
Crimson clover*	SA	50-60	12-20	1/4 to 1/2	2.7	R
Austrian peas	SA / WA	30-100	70-150	1 to 2	2.2	C
Hairy vetch	WA	60-180	25-40	1/4 to 1/2	3.7	C
Mammoth red clover	B	60-70	8-15	1/4 to 1/2	2.9	B
Sweetclover (yellow)	B	70-90	8-15	1/4 to 1/2	3.1	A
Alfalfa	P	50-150	9-25	1/4 to 1/2	3.3	A
White clover	P	60-100	5-7	1/4 to 1/2	3.9	B
Medium red clover	P	60-70	10-15	1/4 to 1/2	2.9	B
Alsike clover	P	60-70	4-10	1/4 to 1/2	2.9	B

*Cover crops not commonly used in Idaho

¹ Dry weight basis, data from USDA Plant data base and UC SAREP online Cover crop database (<http://www.sarep.ucdavis.edu/ccrop/>)

Table 3. Non Legume cover crop species with associated agronomic data.

Species	Life Cycle	% Nitrogen Content ¹	Seeding Rate (lbs/A)	Seeding Depth (inches)
Buckwheat*	SA	1.25	35-60	1/4 to 1/2
Forage turnips	SA	3.3	3-5	1/4 to 1/2
Forage radish	SA		10-15	1/4 to 1/2
Oilseed radish	SA	3.8 tops 2.5 roots	25	1/4 to 1/2
Mustards (White)	SA	3.5	15	1/4 to 1/2
Mustards (Oriental)	SA	3.5	10	1/4 to 1/2
Canola / Rape	SA/WA	3.5	15	1/4 to 1/2
Annual ryegrass	SA	1.3	15-25	1/4 to 1/2
Barley	SA / WA	2.2	50-100	1 to 2
Rye	SA / WA	2.8	50-100	1 to 2
Triticale	SA / WA	2.0	50-100	1 to 2
Wheat	SA / WA	2.3	50-100	1 to 2
Oats	SA	2.1	35-70	1 to 2
Sudangrass	SA	1.3	20-60	1 to 2

*Cover crops not commonly used in Idaho

¹ Data from USDA Plant data base and UC SAREP online Cover crop database (<http://www.sarep.ucdavis.edu/ccrop/>)

Notes:

Life cycles: P = perennial, WA = winter annual, SA = summer annual, B = biennial

Nitrogen values vary depending on cover crop densities (biomass produced) and date of planting

Use any of the non-legume cover crop species to scavenge nitrogen left in the soil, refer to CSP enhancement WQL10.

**This activity may NOT be used with the following enhancements:
ANM12, ANM21, ENR01, SOE03, WQL09**

Potential Duplicate Practices:

**329 - Residue & Tillage Management - No Till/Strip Till/Direct Seed,
328 - Conservation Crop Rotation, 340 - Cover Crop**