



CONSERVATION ENHANCEMENT ACTIVITY

E340E

CONSERVATION STEWARDSHIP PROGRAM

Use of soil health assessment to assist with development of cover crop mix to improve soil health

Conservation Practice 340: Cover Crop

APPLICABLE LAND USE: Crop (Annual & Mixed), Crop (Perennial), Pasture

RESOURCE CONCERN: Soil

ENHANCEMENT LIFE SPAN: 1 Year

Enhancement Description

Soil health assessment (year 1) to evaluate current crop rotation in addressing soil organic matter depletion. Results are utilized to select a multi-species cover crop mix to add to the current crop rotation. Follow up assessment completed (year 3).

Criteria

- Plant species, seedbed preparation, seeding rates, seeding dates, seeding depths, fertility requirements, and planting methods will be consistent with applicable local criteria and soil/site conditions (**REFER TO STATE SPECIFIC LISTS**).
- Determine the method and timing of termination to meet the grower's objective and the current NRCS Cover Crop Termination Guidelines.
- Select species that are compatible with other components of the cropping system.
- Ensure herbicides used with crops are compatible with cover crop selections.

E340E - Use of soil health assessment to assist with development of cover crop mix to improve soil health	September 2023	Page   1
---	----------------	----------



# CONSERVATION STEWARDSHIP PROGRAM

- Cover crops may be established between successive production crops, or companion-planted or relay-planted into production crops. Select species and planting dates that will not compete with the production crop yield or harvest.
- Do not burn cover crop residue. Do not harvest the cover crop.
- If the specific rhizobium bacteria for the selected legume are not present in the soil, treat the seed with the appropriate inoculum at the time of planting.
- Cover crop must provide soil coverage during all non-crop production periods to the maximum extent possible considering the cropping system, climate, and soils in the annual crop rotation. **(STATES SHALL PREPARE GUIDANCE FOR THEIR LOCAL CLIMATES AND CROPPING SYSTEMS)**
- Soil health assessment will be used to evaluate impact of current conservation crop rotation in addressing soil organic matter depletion, as well as additional soil health objectives of the individual grower (primary assessment made in Year 1). During Year 3, a follow up assessment will be completed to allow time for the addition of a cover crop and other management activities to have an impact on soil health. No specific soil health assessment type is required or recommended by NRCS, but at a minimum the assessment must account for soil organic matter. The specific assessment selected should provide the grower information based on their soil health objectives.
- Minimum 4 species cover crop mix will be selected based on producing higher volumes of organic material and root mass to maintain or increase soil organic matter. The cover crop mix must be compatible with the local soil, climate, and cropping systems.
- Planned crop rotation including cover crops, biomass produced, and associated management activities must achieve a management soil conditioning index (SCI) of zero or higher and results in a positive trend in the Organic Matter (OM) sub factor value over the life of the rotation.

**Additional criteria when livestock are included in the system:**

*Cover Crops may only be grazed in a manner that retains or enhances the purpose of increasing soil organic matter.*

E340E - Use of soil health assessment to assist with development of cover crop mix to improve soil health	September 2023	Page   2
---	----------------	----------



## CONSERVATION STEWARDSHIP PROGRAM

- Grazing plan must be developed to document livestock management. Plan must include at a minimum a forage estimate and livestock inventory for all fields implementing this enhancement that will be grazed. For soil health benefits, utilization by livestock must be less than 50% of available cover crop forage.
- Before cover crops are grazed, they must have produced enough biomass to allow for grazing while maintaining soil health benefits. Cover crops planted in late fall will not typically be well enough established, however if stands are adequate cover crops may be grazed in the spring prior to termination.
- Different cover crop species have varying tolerances to grazing; this should be taken into consideration when developing cover crop seeding specifications.
- Grazing shall not occur during wet soil conditions.
- Some pesticides have restrictions on grazing following application (up to 18 months). Refer to pesticide labels.

E340E - Use of soil health assessment to assist with development of cover crop mix to improve soil health	September 2023	Page   3
---	----------------	----------



# CONSERVATION STEWARDSHIP PROGRAM

## Documentation and Implementation Requirements

### Participant will:

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

### Current Management Rotation

Field	Planned Crops/Cover Crop (in sequence)	Planting Date	Harvest/Termination Date

### Current Field Operations for each crop

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

### Planned Management Rotation Including Cover Crop

Field	Planned Crops/Cover Crop (in sequence)	Planting Date	Harvest/Termination Date



# CONSERVATION STEWARDSHIP PROGRAM

## Cover Crop Mix (minimum of 4 species) and Seeding Rate

Species	Variety	Seed Size	Typical Seeding Depth	Seeding Rate (PLS lbs/acre)	Percent of Mix (%)

### Establishment and Management Considerations:

Task	Provide information and details
Seedbed Preparation	
Seeding Date	
Seeding Depth	
Seeding Method	
Fertilizer, as needed	
Weed Management, as needed	
Grazing Management, as needed	
Termination Date (window)	
Termination Method	

### Soil Health Assessment:

Producer Objective	Year 1 Assessment Value	Year 3 Assessment Value
Soil Organic Matter (required)		

- Prior to implementation, read and follow current [NRCS Cover Crop Termination Guidelines](#).
- Prior to implementation, if livestock are included in the system consider cover crop species tolerant to grazing.



# CONSERVATION STEWARDSHIP PROGRAM

- Prior to implementation, if livestock are included in the system develop a grazing plan which must document livestock management. Plan must include at a minimum a forage estimate and livestock inventory for all fields implementing this enhancement that will be grazed. For soil health benefits, utilization by livestock must be less than 50% of available cover crop forage.
- During implementation, cover crops must not be burned or harvested.
- During implementation, if livestock are included in the system maintain records of forage utilization.
- During implementation, notify NRCS of any planned changes in crops, crop rotation, or unharvested areas to verify the planned system meets the enhancement criteria.
- After implementation, if changes to the cover crop and crop rotation were made, complete the tables above to document the applied Cover Crop for the contract period and provide to NRCS.
- After implementation, if livestock are included in the system provide grazing plan and forage utilization records to NRCS for review to verify additional criteria of the enhancement were met.
- After implementation, provide soil health assessment results and any documentation of changes made to NRCS for review to verify implementation of the enhancement.

**NRCS will:**

- As needed, provide technical assistance in selecting cover crop mixes for the crop rotations or substitute species that would meet the criteria of the enhancement.
- As needed, provide additional assistance to the participant as requested.
- Prior to implementation, provide and explain the current [NRCS Cover Crop Termination Guidelines](#).
- Prior to implementation, use information provided from the participant to calculate the management Soil Conditioning Index (SCI) and Organic Matter (OM) sub factor value over the life of the rotation using current NRCS Soil Conditioning Index (SCI) procedure. Cover crop must increase SCI and OM sub factor from the current/benchmark condition and SCI value must be 0 or greater and have a positive trend in OM sub factor over the life of the rotation.

**Benchmark Management SCI = \_\_\_\_\_, Benchmark Management OM sub factor = \_\_\_\_\_**

E340E - Use of soil health assessment to assist with development of cover crop mix to improve soil health	September 2023	Page   6
---	----------------	----------



# CONSERVATION STEWARDSHIP PROGRAM

Planned Management SCI = \_\_\_\_\_,

Planned Management OM sub factor = \_\_\_\_\_

- Prior to implementation, if livestock are included in the system verify a grazing plan has been developed.
- During implementation, evaluate planned adjustments in cover crop selected, timing in crop rotation, management, or field operations to verify the new system meets the enhancement criteria.
- After implementation, evaluate the applied crop rotation or management using information provided from the participant, if any variation to planned evaluation, then calculate SCI values to document that the applied rotation met the enhancement criteria.

Applied Management SCI = \_\_\_\_\_, Applied Management OM sub factor = \_\_\_\_\_

- After implementation, if livestock are included in the system review grazing plan and forage utilization records to verify additional criteria of the enhancement were met.
- After implementation, review soil health assessment results and any documentation of changes made to verify implementation of the enhancement.

### **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

**ALABAMA – E340E Supplement- Use of soil health assessment to assist with development of cover crop mix to improve soil health**

**Requirements:**

- Applicable where three species or less of cover crops have been planted in the past and a soil health assessment has not been completed. Cover crops must be grown during all non-crop periods and shall not be harvested.
- Complete soil health assessment in a minimum of the first and third years from the initial year planned in addition to planting a cover crop. Must begin no later than the third year of the contract. A cover crop must be planted all three years. The soil health assessment (such as the Haney test, others may be approved by the state agronomist) should be completed early enough in the year before planting the cover crop to allow time for evaluation of mixes and ordering seed. The final soil health assessment should be taken after termination of the third cover crop. The minimum number of tests is one per field or at least every 40 acres or where management practices are significantly different.
- Crops planted following the cover crop must be no-tilled or strip-tilled.
- Calculate before and after soil loss for the field. There must be a reduction in soil loss and must not exceed the soil loss tolerance level (T). SCI must be zero or higher and have a positive trend in the organic matter subfactor over the life of the rotation.
- increase seeding rates by 30% if aurally applied.
- Cover crops should be planted as early as possible and terminated as late as practical for maximum biomass production. Do not terminate greater than 30 days prior to crop planting. Refer to Alabama Guide Sheet AL340A, Cover Crop Termination Timing.
- Minimum requirement is a **four species mix** that includes a small grain, legume, and brassica. Radish provides excellent early fall growth if planted timely. Ryegrass may not be used. Austrian winter pea does not germinate well unless drilled.
- Complete the tables on the national jobsheet for documentation. In addition, receipts, copy of seed tags, weight tickets, etc. are needed. Photographs should be taken immediately prior to termination.
- Follow planting guidelines according to NRCS Conservation Practice Standard 340-Cover Crop or plant according to the table below. Other mixes may be approved by the state agronomist.

	Minimum lbs./ac
<b>Examples</b>	
4 species- 2 small grain, crimson clover, radish	20 lbs. + 20 lbs. + 10 lbs. + 3 lbs.
4 species-small grain, vetch, radish, turnip	40 lbs. + 12 lbs. + 2 lbs. + 1 lb.
4 species-small grain, crimson clover, vetch, turnip	40 lbs. + 8 lbs.+ 10 lbs. + 1.0 lb.
4 species- 2 small grain, winter pea, radish	20 lbs. + 20 lbs.+ 20 lbs. + 2 lbs.

\*small grains- rye, wheat, oats, barley, and triticale  
 Legumes-crimson clover, vetch, Austrian winter pea  
 Brassicas-daikon radish, turnip, rape



### **Additional criteria when livestock are included in the system**

**1.** Written conservation plan that includes producer goals, objectives and resource concerns. Plan map will show and label all fences, feeding/watering areas, and sensitive areas. Livestock should be restricted from sensitive areas.

**2.** Before cover crops are grazed, they must have produced enough biomass to allow for grazing while maintaining soil health benefits. Cover crops that are planted in late fall typically will not be well enough established for grazing. Livestock dry matter needs will be balanced with available forage without deficiency for the grazing period. The Forage/Animal Balance Worksheet will be completed to document. Utilization will be less than 50% of the available cover crop forage. Grazing should begin at 10 inches not to be grazed lower than 5 inches. Cattle must be removed to allow adequate time for regrowth before cover crop termination. Grazing shall not occur during wet conditions.

**3.** Livestock will be rotated to facilitate prescribed grazing. Fences and water sources should be in place so that trails do not occur and concentrated livestock areas are minimized. Electrified polywire should be used to create paddocks if livestock cannot be rotated out to permanent pasture frequently. Permanent pasture adjacent to cropland will be labeled on the conservation plan map.

**4.** Livestock shall be removed during periods of extended wet weather.

**5.** Maintain grazing records to include pasture or field number, acres, forage type, animal type and number, forage height in and out-with dates. Grazing will be managed according to the Prescribed Grazing (528) Standard.

## Grazing Management Records

Keeping accurate records is a continual and critical process in effective pasture and livestock management.

Pasture ID		Pasture acres	Forage type				
Soil test date		Lime/ Fertilizer rate	Lime/ Fertilizer type		Date applied		
Livestock		Date in	Forage height	Date out	Forage height	Notes (fertilizer applied)	
Type	Number						

Pasture ID		Pasture acres	Forage type				
Soil test date		Lime/ Fertilizer rate	Lime/ Fertilizer type		Date applied		
Livestock		Date in	Forage height	Date out	Forage height	Notes (fertilizer applied)	
Type	Number						

**TABLE 1. PLANTS COMMONLY USED FOR COVER CROPS IN ALABAMA**

Forage Crop	Seeding Rate (lb/A)	Seeding Depth (in.)	Planting Date			Remarks
			North	Central	South	
<b><u>Warm Season Annual Grasses</u></b>						
<b>Millet, Browntop, Proso, &amp; Foxtail</b>	Drill 20 B-Cast 30	½ - ¾	May 1–Aug 1	Apr 1-Aug 15	Apr 1-Aug 15	Well drained, productive soils.
<b>Millet, Pearl</b>	Drill 15 B-Cast 30	½ - 1½	Apr 20-Jul 1	Apr 15-Jul 1	Apr 1-Jul 15	Adapted to clay and loam soils with good summer moisture. Avoid calcareous Black Belt soils.
<b>Sorghum-Sudan Hybrids</b>	Drill 25 B-Cast 35	½ - 1	May 1–Aug 1	Apr 15-Aug 1	Apr 1–Aug 15	Well drained, productive soils.
<b>Sorghum, Forage</b>	Rows 5 B-Cast 20	1	Apr 20-May 15	Apr 20-May 15	Apr 20-Jul 1	Well drained, productive soils.
<b>Sudangrass</b>	Drill 25 B-Cast 35	½ - 1	May 1-Aug 1	May 1-Aug 1	May 1-Aug 1	Light sandy to heavy clay soils.
<b><u>Cool Season Annual Grasses</u></b>						
<b>Small Grains (Oats, Rye, Wheat, Barley, Triticale)</b>	90-120	1 – 2	Sep 1–Nov 1	Sep 15–Nov 1	Sep 15-Nov 15	Rye is better adapted to well drained, sandy to loam soil and is more tolerant of soil acidity than wheat or oats; Oats are cold sensitive & subject of winter kill, especially in the northern half of Alabama; Wheat more tolerant of heavy wet soils.

**Table 1. (cont.) Plants Commonly Used for Cover Crops in Alabama**

Forage Crop	Seeding Rate (lb/A)	Seeding Depth (in.)	Planting Date			Remarks
			North	Central	South	
<b><u>Warm Season Annual Legumes</u></b>						
<b>Lespedeza, Annual</b>	30	¼ - ½	Feb 15-Apr 1	Feb 15-Apr 1	-	Needs good drainage; tolerant of drought; low fertility and soil acidity. Avoid lime soils of Black Belt.
<b><u>Cool Season Annual Legumes</u></b>						
<b>Austrian Winter Peas</b>	40	1-2	Sept 1-Oct 15	Sept 1-Oct	Sept 1-Oct 15	Best on well drained soils.
<b>Caley Peas</b>	50	½ - 1	Sep 1-Oct 15	Sep 1-Oct 15	Sep 1-Oct 15	Adapted to alkaline and moderately acid Black Belt soil. Seeds are toxic.
<b>Clover, Arrowleaf</b> <i>(see note "F" if seed is coated)</i>	6	0 - ½	Aug 25-Oct 1	Sep 1-Oct 15	Sep 15-Nov 1	Overseed 5 weeks later. Best on well drained soils. Avoid Black Belt soils.
<b>Clover, Ball</b> <i>(see note "F" if seed is coated)</i>	4	0 - ¼	Sep 1-Oct 31	Sep 1-Oct 31	Sep 1-Oct 31	Adapted to most soils. Reseeds well and tolerates wet soils and flooding.
<b>Clover, Crimson</b> <i>(see note "F" if seed is coated)</i>	25	0 - ½	Aug 25-Oct 1	Sep 1-Oct 15	Sep 15-Nov 1	Avoid high pH soils. Best on well drained soils. Overseed 5 weeks later.
<b>Clover, Red</b> <i>(see note "F" if seed is coated)</i>	Drill 8 B-Cast 15	¼ - ½	Sep 15-Nov 15 Or Feb 1-Apr 1	Sep 15-Nov 15 Or Feb 1-Apr 1	Sep 15-Nov 15 -	Fertile, well drained soils.

**Table 1. (cont.) Plants Commonly Used for Cover Crops in Alabama**

Forage Crop	Seeding Rate (lb/A)	Seeding Depth (in.)	Planting Date			Remarks
			North	Central	South	
<b>Clover, Subterranean</b> <i>(see note "F" if seed is coated)</i>	10	¼ - ½	Aug 25-Oct 1	Sep1-Oct 31	Sep1-Oct 31	Best on well drained, productive soils.
<b>Vetch, Common</b> <i>(see note "F" if seed is coated)</i>	35	1-2	--	Sep 1-Oct 15	Sep 15-Nov 1	Best on well drained soils. Certain varieties can freeze if planted late, especially in north Alabama. Nova II is the least cold tolerant.
<b>Vetch, Hairy</b> <i>(see note "F" if seed is coated)</i>	25	1-2	Sep 1 –Oct 15	Sep 1-Oct 15	Sep 15-Nov 1	Best on well drained soils.
<b>Brassicas</b> <b>Daikon radish</b> (Tillage radish)	5	0.25 – 0.5	Aug 30	Sept 15	Sept 20	Adapted to most soils.
<b>Rape/Canola</b>	5	0.25 – 0.75	Aug 15	Aug 30	Sept 15	Adapted to most soils.
<b>Turnip/Purple top</b>	5	0.25 – 0.75	Aug 20	Aug 30	Sept 15	Adapted to most soils.

**NOTES:**

- A. Drill = Drilled and B-Cast = Broadcast.
- B. Where legumes are seeded with grasses, use the seeding dates for the grasses.
- C. Where two or more grasses are used in a mixture, reduce the seeding rate of each by about one-third. Reduce the

seeding rates of legumes by about 50% when used in the mixtures of three.

- D. Seeding rates should be increased at least 30% when aerially seeded.
- E. Seeding rates for a cost-share program shall be the rate specified by the program.
- F. Consider the weight of the coated seed in your seeding recommendation to adjust for the proper PLS rate.

# GEOGRAPHICAL AREAS FOR SPECIES ADAPTATION AND SEEDING DATES

