Cover Crop

Georgia

Conservation Practice Job Sheet – 340 (10/15)

Producer _____ County _____ Date_____

Farm # _____ Tract # _____ Assisted By _____

Cover Crop

Definition

The production of crops including grasses, legumes, forbs, or other herbaceous plants for seasonal cover and other conservation purposes

Conservation Management System

Rarely does one conservation practice satisfy a resource concern. A cover crop may be a component of a conservation management system. A conservation management system is a combination of conservation practices and management that achieves a level of treatment for our soil, water, air, energy, plant and animal resources. In addition to a cover crop, additional practices such as crop residue management (no-till planting), conservation crop rotation, deep tillage, nutrient management, pest management and structures are often needed.

Purposes and requirements

There are six purposes of this standard. However, one of the main uses of this jobsheet is to document the purposes of controlling soil erosion, promoting soil health, increasing soil moisture available to plants and controlling pests, especially weeds, in conservation tillage systems.

Add nutrient management to the purposes of planting a cover crop in conservation tillage and other crop production systems indirectly through the purpose of utilizing nutrients in the soil profile and protecting water quality (Table 4). This is possible by using UGA's Nitrogen Cover Crop Availability Calculator to determine the amount of nitrogen contributed by cover crops. The use of a cover crop for scavenging nutrients is still available through the purpose. However, scavenging is not usually among the primary purposes of planting a cover crop in conservation tillage systems because frequently the residual nitrogen is not adequate to produce the biomass needed to control weeds or satisfy the other objectives.

The general requirements for using cover crops are described in Appendix V. Use this table to view and compare some of the technical criteria of the purposes. Purposes may have similar or compatible requirements. For example, cereal rye is the primary winter cover crop in cropland because it is inexpensive, produces a large amount of biomass that smothers weeds when matted and controls weed seed germination by producing natural weed-suppressing compounds. However, scavenging nutrients with rye and other cereal grains will not always result in the production of a large amount of biomass needed to control weeds and conserve soil moisture.

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Planting legumes (bean and pea family) to reduce the application of fertilizer is a crop production issue. As a result, it has been deleted as a purpose from this version of the standard. However, using legumes, instead of cereal grains, to scavenge nutrients or to add diversity to a cover crop mixture that promotes soil health and the accumulation of organic matter is acceptable. Legumes will produce nitrogen when the soil nitrogen content is low.

Also, add legumes and brassicas (species in the cabbage family) to a cereal grain cover to benefit pollinators. However, legume seed is expensive and they may be more difficult to establish than cereal grains or brassicas. Also, at times, it is difficult to plan effective strategies for terminating mixes of cover crops and managing their seed, if they are allowed to reproduce.

The effects of popular cover crops grown under conservation tillage systems on disease, insects, nematodes and weeds are described in Appendix VII. Seed during the appropriate window at the recommended rate to obtained the desired biomass to suppress weeds. Also, consider adding nitrogen fertilizer to fields low in residual nitrogen to obtain the desired biomass.

Seeding rates and dates for annuals species are available in Appendix I. A general time line for planting dates for annuals and perennials is illustrated in Appendix III. Considerations for selecting species for cover crop mixes are described in Appendix II. They include dominance by height, seasonal growth patterns and the effects of soil nitrogen content on the competition between legumes and cereal grains as mentioned above.

Average values of biomass obtained from the literature for common cover crops in the Southeast are found in Appendix VI. Those values are applicable to the three regions of Georgia. Use these values to estimate whether the desired biomass (dry weight lbs./ac. Appendix VIII) is likely to be obtained with a cover crop species. For example, the amount of residue needed to control weeds in a conservation tillage system ranges from 6,500-10,000 lbs./ac. according to UGA specialists. However, this amount is greater than the average rye cover production of 3,900 and 6,300 lbs./ac. reported in the Coastal Plain and Piedmont of the Southeast, respectively. Timely planting at the recommended rate is needed to obtain high yields of biomass needed to document the practice. The application of nitrogen to cereal grain cover crops may also be required as mentioned above.

Terminate cereal grain and legume cover crops in conservation tillage systems as described in Appendix IV.

Documentation

Complete Table 1 for all purposes. Also, the first three purposes for planting a cover crop listed in the first paragraph of the purposes on the previous page are also included in the no- or strip-till Residue Management (329) standard in a conservation tillage management system. As a result of these common purposes, provide the required information once in the tables of this jobsheet and/or a RUSLE2 printout. Select the other tables according to the purposes of implementing the practice, especially in conservation tillage systems.

Use the remaining tables to document the other purposes. Documentation usually occurs after the cover is seeded and terminated as mentioned in the tables.

Frequently, deep tillage (Code 324) is used in conservation tillage systems with cover crops and no-till residue management. Use Table 7 in this jobsheet to document the use of cover crops to fracture a restrictive layer in the soil. A list of deep-rooted cover crops is available in Appendix IV.

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Many of the requirements of the standard are explained in this jobsheet, the O&M section of the standard (found below) and the statement of work. Also, see 2014 NRCS Cover Crop Termination Guidelines for Risk Management Agency (RMA) insurance rules, for cover crops planted for all purposes. These rules apply especially to non-irrigated fields.

Managing and grazing cover crops
Do not harvest a cover crop for seed or burn cover crop residue in any tillage system.

Conservation tillage systems. Methods of terminating a winter cover crop in conservation tillage systems include rolling/crimping and/or the application of herbicides in preparation for planting the cash crop. Mowing is appropriate for small farmers who can make sure that the mat produced will cover the soil surface. Terminate cover crops at other times of the year by frost or natural termination. Haying and grazing are not permitted in a conservation tillage system.

Conventional tillage systems. Terminate a cover crop in a conventional crop production system by grazing, haying or other means after documenting that the purposes of the cover have been satisfied. Begin grazing when the cover crop reaches 12-18 inches tall and actively growing. Remove no more than 90% of the biomass dry weight (Appendix VIII). Consider the forage quality when grazing and haying.

Other General Information

- Proper selection of the cover crop is essential. Plants will be selected on the basis of species characteristics, site and soil conditions, planned use, method of planting, time of the year to be planted, and the needs and desires of the land user. Plants that also benefit wildlife species are recommended.
- Lime and fertilizer applications will be based on soil test recommendations and a nutrient management plan.
- Good seed are needed. Follow recommended planting rates and optimum planting dates.
- Prior to planting, inoculate all legume seed with the proper strain of bacteria if the legume cover has not been planted previously in the field.
- Conventional planting and no-till seeding may be used. However no-till is used in a conservation tillage system.
- Operation and maintenance are very important. Manage cover crops in accordance with the conservation plan.

Lifespan 1 year

For More Information
Contact your local NRCS Office and Soil and Water Conservation District.

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Table 1. General cover crop planting information for all purposes.

Tract & Field	Species & Inoculant	PLS[1] Seeding and Rates of Fertilizer (lbs./ac.)	Seeding Rate, Date and Depth	% Stand	Termination Method and Date[2]

[1/]PLS represents Pure Live Seed. To calculate PLS, multiply the purity % times the germination %. Then divide the recommended seeding rate by the PLS to get the actual seeding rate.

For example: Rye seed has a purity of 90% and germination of 85%.
Step 1: The PLS = 0.90 X 0.85 = 0.77. (Only 77% of the material in the sack of seed is seed that will germinate.)
Step 2: Divide the recommended seeding rate (60 lb. in this example) by 0.77 to get the actual seeding rate of 78 pounds per acre that is needed in order to be planting 60 pounds of good seed.
Note: The use of seed with a low PLS usually has low vigor and will not grow satisfactorily.

[2] See Georgia Cover Crop (340) Standard Technical Information Appendix IV for termination time to obtain maximum biomass and 2014 NRCS Cover Crop Termination Guidelines for the purposes of crop insurance. Note grazing practices that occur conventional tillage systems.

Table 2. Documentation of cover crop established for the purpose of reducing soil erosion during a critical period of the rotation when the cover crop is growing and protecting the soil.

Field	Date	Cover (%)[1]	Soil Loss (tons/ac.) for Rotation [1]			
			Current	Planned Minimum	Obtained	

[1] The critical season soil cover and/or canopy and soil loss tolerance value (T) values obtained from the NRCS RUSLE2, or current soil erosion prediction software (required by the Cover Crop Standard). Also, note amount of soil disturbance in addition to the amount and time of residue placement (required by the Residue Management Standard), if applicable. Record information in this table or attach a RUSLE2 printout.

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Table 3. Documentation of the amount of cover crop produced for the purpose of increasing soil organic matter and promoting soil health.

				Dry Biomass (lbs./ac.)	
Field	**Date**	**Stand**	**SCI Soil Value = or >0** [1]	**Planned**	**Obtained**

[1] A positive Soil Condition Index (SCI) value obtained from the NRCS RUSLE2, or current soil erosion prediction software, indicates conditions for improving the soil organic matter content. Record information in this table or attach a RUSLE2 printout.

Table 4. Documentation of cover crop established for the purpose of utilizing excessive nutrients in the soil profile (nutrient scavenging) or estimating the amount of nitrogen provided to a cash crop (nutrient management).

Field	**Date**	**Cover Height and Approx. Growth Stage at Termination** [1]	**Notes on Plant Vigor** [1] **and Nitrogen Availability** [2]

[1] Note the plant condition when the purpose is to scavenge nutrients.
[2] Determine the amount of nitrogen provided to the cash crop or nutrients scavenged by the cover crop using UGA's Nitrogen Cover Crop Availability Calculator http://aesl.ces.uga.edu/mineralization/, or current laboratory method, in the Nutrient Management Standard (590) Appendix Table 2 http://efotg.sc.egov.usda.gov/toc.aspx?CatID=2918 .

Table 5. Documentation of cover crop established for the purpose of suppressing weeds by noting the condition of the cover biomass mat on the soil surface and degree of weed control.

		Dry Biomass (lbs./ac.) [1]		% Weed Pest Suppressed or other Description of Weed Control [2]
Field	Date	Planned	Obtained	

[1] UGA recommends at least 6,500 lbs./ac. of dry biomass (Appendix VIII) in a mat to control weeds. A portion of the mat should be present until canopy closure in row crops or until vegetables are harvested.
[2] Estimate weed control in conventional crop production at planting, laybay herbicide application and harvest. Estimate weed control in organic systems at planting and 45 and 90 days after planting. Compare the number of weeds/acre, or the observed weed control, to conditions in similar fields without cover crops.

Table 6. Documentation of cover crop established for the purpose of conserving soil moisture with a mat of biomass is created on soil surface after the cover crop is terminated.

		Dry Biomass (lbs./ac.) [1]		Compliance with USDA Risk Management Agency Guidelines for Non-irrigated Cropland (NRCS, 2014), if Applicable
Field	Date	Planned	Obtained	
		.		

[1] Maintain minimum of 2,000 lbs./ac. (Appendix VIII) or 60% of field surface through the year when a cover crop is required in the No-till Residue Manage Standard (Code 329). The minimum requirement in the Reduced-till Residue Management Standard (Code 345) is 60% cover throughout the year on at least 50% of the field.
However, the goal for the Cover Crop Standard is to produce at least 6,500 dry lbs./ac. in a mat to control weeds (Table 5). Some of the mat should be present at canopy closure in row crops or until vegetables are harvested. Use this stricter requirement for conserving moisture in a conservation tillage system.

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Table 7. Documentation of management of restrictive a soil layer using deep rooted crops after they are mature.

Date	Depth (Inches) [1]		Soil Moisture (% Field Capacity and Method)
	Before	After	

[1] Depth of wire penetration or penetrometer value
[2] The soil moisture content should be less than 30-50 percent of field capacity, according to the results of the "feel test" https://prod.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs144p2_067795.pdf.

Record field operations that affect amount of residue (dry lbs./acre) for each crop and soil disturbance for the entire rotation needed for RUSLE2.

Provide the results of soil loss or SCI in previous tables or in an attached printout.

Operation and Maintenance (Georgia Cover Crop Standard October 2015)

Evaluate the cover crop to determine if the cover crop is meeting the planned purpose(s). If the cover crop is not meeting the purpose(s) adjust the management, change the species of cover crop, or choose a different technology.

Date	Operation and Management Notes

Jobsheet Certifications

Prepared by

_____**Title**_____**Date**_____

Approved by

_____**Title**_____**Date**_____

Installation Meets NRCS Standards and Specifications

Certified by

_____**Title**_____**Date**_____

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