NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

COVER CROP
(Acre)
CODE 340

DEFINITION

Grasses, legumes, forbs, or other herbaceous plants established for seasonal cover and conservation purposes.

PURPOSE

- Reduce erosion from wind and water
- Increase soil organic matter
- Manage excess nutrients in the soil profile
- Promote biological nitrogen fixation
- Increase biodiversity
- Weed suppression
- Provide supplemental forage
- Soil moisture management

CONDITIONS WHERE PRACTICE APPLIES

On all lands requiring vegetative cover for natural resource protection.

CRITERIA

General Criteria Applicable to All Purposes

Cover crop species, seeding rates, and seeding dates for Louisiana are listed in Table 1 of this standard.

The species selected will be compatible with the Nutrient Management and Pest Management components of the conservation plan.

Cover crops can be broadcast, drilled, or conventionally planted. Species such as crimson clover, ryegrass, vetch, and singletary peas can be broadcast in row crops without seedbed preparation if moisture is adequate. Cover crops can be seeded directly into rice stubble if drainage is adequate. If seedbed preparation is necessary, select an implement which leaves as much residue on the soil surface as possible.

If fertilizer is needed for cover crop establishment and growth, nutrients should be applied according to soil test analysis and Louisiana Cooperative Extension Service (LCES) recommendations contained in the nutrient management component of the conservation plan. Fertilizer is usually not needed on alluvial soils or following a well fertilized crop.

Additional Criteria to Reduce Erosion from Water

Cover crop establishment in conjunction with residue management practices will be timed so that the soil will be adequately protected during the critical erosion period (late winter – early spring).

All plant species of cover crops for Louisiana listed in Table 1 of this standard will, under normal weather conditions, provide adequate protection if planted during the optimum planting dates.

Where additional cover is needed to meet

erosion reduction goals, the amount of cover needed shall be determined using Revised Universal Soil Loss Equation (RUSLE).

Additional Criteria to Promote Biological Nitrogen Fixation

The specific Rhizobia bacteria will either be present in the soil or the seed will be inoculated at the time of planting legumes.

If a field has a history of a particular legume species, inoculation will probably be unnecessary. If inoculation is needed, prepare a slurry of the inoculant with non-chlorinated water and sugar or cola. The addition of sugar to water or the use of cola to make the slurry helps the Rhizobia to adhere to the seed. Pour the slurry onto the seed, mix well to coat the seed, and allow to dry before seeding.

Legume cover crops have a tremendous potential to fix large amounts of nitrogen in the soil. Legume cover crops should be killed in the early to mid-bloom stage to maximize nitrogen fixation. Realistically, however, allowing legume cover crops to reach this stage will delay timely planting of the succeeding crop following their destruction. Nitrogen credits for several legume and non-legume cover crops are contained in Table 2 of this standard. The credits in Table 2 are based on cover crop research conducted at the LSU Agricultural Center's Rosepine and Idlewild Research Stations, personal communications with Agricultural Center specialists, and Cooperative State Research Education and Extension Service (CSREES). Additionally, Sustainable Agriculture Research and Education (SARE) programs use a rule-of-thumb to estimate availability. Total nitrogen production is divided by 2 if the cover crop is conventionally tilled into the soil or chemically killed and left on the surface in no-till systems in southern climates. The N credits in Table 2 were derived by dividing the total N values for various cover crops applying the rule-of-thumb.

Additional Criteria to Manage Excess Nutrients in the Soil Profile

Cover crops are an efficient means of removing excess nutrients from the soil profile. They remove excess nutrients from the soil for their own growth. They also use some soil moisture, reducing the amount of water available for leaching or runoff.

To achieve maximum efficiency, cover crops must be well established and actively growing prior to periods of high precipitation than can cause runoff and leaching.

Cereal grains, native, and improved grasses, with their extensive root systems are most efficient at removing excess nitrogen from the soil profile. Grass/clover mixtures are capable of removing significant amounts of phosphorus from the soil profile. Legumes alone use only moderate amounts of phosphorus because they are slower to establish and generally yield less than grasses. Legumes reduce phosphorus in runoff primarily by reducing erosion.

Removal of the above ground biomass is required for maximum nutrient removal efficiency.

Additional Criteria to Increase Soil Organic Matter

Cover crop species that are woody or more fibrous (non-legumes) will promote more stable organic matter resulting in better soil physical condition, increased nutrient holding capacity, and a higher cation exchange capacity. Legumes are rich and succulent and break down rapidly but leave behind little in the way of long-term organic matter.

The Soil Conditioning Index or SCI (sciver17LA.xls) shall be used to determine the amount of biomass required for a positive SCI value.

Cover crops should be terminated as late as feasible to maximize biomass production and still allow ample time for seedbed preparation for the succeeding crop.

Additional Criteria for Weed Suppression

Cover crops vary in their ability to suppress weeds. Some species compete with weeds for nutrients and sunlight. Others produce allopathic chemicals that inhibit weed seedling growth. Some species, such as cereal rye, suppress weeds both physically and chemically.

Leave cover crop residues on the soil surface, with the plant tissue left intact, to maximize chemical and physical weed suppression.

For long-term weed suppression, biennial and perennial species should be used.

Additional Criteria to Increase Biodiversity

Cover crops add biodiversity to agricultural landscapes. In Louisiana, cover crops often serve as wildlife habitat in addition to their traditional roles of erosion control and soil improvement. Certain cover crop species are excellent sources of food and cover to both upland and wetland species of wildlife.

Small grain and legume species are generally considered to have more wildlife value than other cover crop species. For example, a wheat/clover mixture produces late winter and spring green forage, grain, nesting and brood habitat in late spring and early summer, and forage and loafing areas throughout the remainder of the summer. Additional information on cover crop species that are beneficial for wildlife can be found in the conservation practice standards Upland and Wetland Wildlife and Wildlife Habitat Management (645 and 644 respectively).

Additional Criteria to Provide Supplemental Forage

Cover crops shall not be hayed or grazed lower than 4 inches. Livestock should be removed soon enough to prepare a seedbed for the succeeding crop. If the succeeding crop is to be no-tilled, avoid grazing during wet periods to prevent compacting and rutting the soil surface.

Grazed cover crop species should be tolerant of grazing and palatable to livestock.

Additional Criteria for Soil Moisture Management

Growing cover crops may consume soil moisture needed by the subsequent crop. Terminate the cover crops 2 – 3 weeks prior to planting the next crop.

When cover crops are grown for moisture conservation, leave killed cover crop residues on the soil surface until the subsequent crop has established a stand or throughout the growing season if moisture is a limiting factor.

Where excess soil moisture is a problem, allow cover crops to grow as long as practical to optimize excess moisture removal.

CONSIDERATIONS

Terminate cover crops as late as possible to maximize their production and still allow adequate time for seedbed preparation of the succeeding crop.

Deep rooted species should be considered when cover crops are grown for nutrient removal. Grasses will remove more soil nitrogen while grass/legume mixtures will use both nitrogen and phosphorus.

Avoid cover crop species that attract damaging insects. For example, cutworms are attracted to legume cover crops and can cause damage to no-till cotton seedlings.

Maximum cover crop benefits are realized when the species selected provide at least 25 stems/sq.ft., 60% canopy cover and above ground (dry wt.) biomass of 2700 lbs/ac.

Consider using cover crops to improve site conditions for the establishment of subsequent crops. Selected cover crop species can provide weed suppression, conserve soil moisture, or loosen compacted soil layers.

PLANS AND SPECIFICATIONS

Plans and specifications will be prepared for each site and recorded in narrative statements in the conservation plan. Specifications shall include as a minimum recommended species, planting date and rates, nutrient requirements, seedbed preparation methods (if not drilled or overseeded) and establishment information.

OPERATION AND MAINTENANCE

Cover crops shall not be terminated before March 1 in south Louisiana or March 15 in north Louisiana.

Control excessive growth of cover crops to reduce competition from volunteer plants and shading of the succeeding crop.

Control undesirable weeds in the cover crop by mowing or herbicide application.

Table 1. Species, Seeding Date, and Rate of Cover Crops in Louisiana

SPECIES	SEEDING DATE	SEEDING Rate (lbs/ac)	Minimum Pure Live Seed (% PLS)
Austrian Winter Peas	September 1 – November 1	40 - 60	76
Southern Winter Peas (Singletary Peas)	September 1 – November 1	50 – 60 Unscarified	72
Cow Peas	April 15 – July 1	25-35 Rows 80-120 Broadcast	76 76
Subterranean Clover	October 1 – November 15	15-25	78
Crimson Clover	October 15 – November 15	15-25	78
'Tropic Sun' sunn hemp [1/]	April 15 – June 1	30 – 50 Drilled 40 – 60 Broadcast	72
Oats	September 1 – December 1	112-128	79
Ryegrass	September 1 – December 1	20-30	82
Wheat	September 1 – December 15	60-90	79
Soybeans	April 15 – July 1	35-60 Rows 90-120 Broadcast	78 78
Sweet Clover	September 1 – November 1	15-25	80
Vetch, Hairy	September 1 – November 1	25-35	76
Vetch, Common	September 1 – November 1	35-50	76
Cereal Rye	September 1 – November 1	74-112	76
Combinations			
Ryegrass and Hairy Vetch	September 1 – December 1	15-20 20-25	82 76
Ryegrass and Common Vetch	September 1 – December 1	15-20 25-30	82 76
Wheat and Hairy Vetch	September 1 – December 1	50-60 20-25	79 76
Wheat and Common Vetch	September 1 – December 1	50-60 25-30	79 76
Ryegrass and Austrian Winter Peas	September 1 – December 1	15-30 25-35	82 76

[1/] 'Tropic Sun' sunn hemp, Crotalaria juncea L., is an erect, branching summer annual capable of producing three tons of air dry biomass and 130 – 150 lbs. of N per acre in 60 days. It is non-toxic to poultry and livestock. It will not set seed consistently north of 28° N latitude and is not likely to become a weed problem. Its use in Louisiana should be limited to sugarcane fallow land.

Table 1. Species, Seeding Date, and Rate of Cover Crops in Louisiana (Continued)

SPECIES	SEEDING DATE	SEEDING Rate (lbs/ac)	Minimum Pure Live Seed (% PLS)
Wheat and Austrian Winter Peas	September 1 – December 1	50-60 25-35	79 76
Ryegrass and Singletary Peas	September 1 – December 1	15-20 20-25	82 72
Wheat and Singletary Peas	September 1 – December 1	50-60 20-25	79 72
Austrian Winter Peas And Hairy Vetch	September 1 – December 1	25-35 20-25	76 76
Austrian Winter Peas And Common Vetch	September 1 – December 1	25-35 25-30	76 76
Ryegrass and Wheat	September 1 – December 1	15-20 50-60	82 79

Table 2. Nitrogen Credits From Various Cover Crops in Louisiana

COVER CROP	N CREDITS (LBS/ACRE)
Arrowleaf Clover	68
Austrian Winter Peas	43
Ball Clover	55
Barrel medic	62
Berseam clover	60
Big flower vetch	48
Bur Clover (Circle Valley)	69
Bur Clover (Serena)	75
Common Vetch (Cahaba White)	53
Crimson Clover (Chief)	75
Crimson Clover (Tibbee)	66
Hairy Vetch	60
Lupin (Tifblue78)	72
Red Clover (Chesapeak)	66
Singletary Peas	65
Sour Clover	57
Subterranean Clover (Meteora)	48
Subterranean Clover (Mt. Barker)	59
Subterranean Clover (Woogenellup)	59
Soybeans (Grain)	20
Soybeans (Cover) Fallow	17
Ryegrass (Gulf)	25
Wheat	24