



## Natural Resources Conservation Service

### CONSERVATION PRACTICE STANDARD

### COVER CROP

#### CODE 340

(ac)

#### DEFINITION

Crops including grasses, legumes, and forbs for seasonal cover and other conservation purposes.

#### PURPOSE

This practice is used to accomplish one or more of the following purposes—

- Reduce erosion from wind and water
- Increase soil organic matter content
- Capture and recycle, or redistribute nutrients in the soil profile
- Promote biological nitrogen fixation
- Increase biodiversity
- Weed suppression
- Provide supplemental forage
- Soil moisture management
- Reduce particulate emissions into the atmosphere
- Minimize and reduce soil compaction

#### CONDITIONS WHERE PRACTICE APPLIES

On all lands requiring vegetative cover for natural resources protection and/or improvement.

#### CRITERIA

##### General Criteria Applicable to All Purposes

Utilize methods consistent with approved local criteria and site conditions for all plant species, seedbed preparation, seeding rates, seeding dates, seeding depths, fertility requirements, and plantings.

Select species compatible with other components of the cropping system.

Terminate cover crops by harvest, frost, mowing, tillage, grazing, crimping, and/or herbicides in preparation for the subsequent crop. Terminate the cover crop at or before the time periods specified in the Natural Resources Conservation Service (NRCS) Cover Crop Termination Guidelines.

Use herbicides compatible with the subsequent crop.

Avoid using plants that are on the state's noxious weed or invasive species lists.

Cover crop residue burning is not allowed.

### **Additional Criteria to Reduce Erosion from Wind and Water**

Time cover crop establishment, in conjunction with other practices, so the soil is adequately protected during the critical erosion period(s).

Select plants for cover crops with the physical characteristics necessary to provide adequate protection.

Determine the amount of surface and/or canopy cover needed from the cover crop using current erosion prediction technology.

### **Additional Criteria to Increase Soil Organic Matter Content**

Select cover crop species on the basis of producing high volumes of organic material and/or root mass to maintain or improve soil organic matter.

Use the NRCS Soil Condition Index (SCI) value, located in the current water and wind erosion technology, to determine the amount of biomass required for a positive trend in the soil organic matter sub-factor.

Terminate the cover crop as late as feasible to maximize plant biomass production, taking into consideration the time needed to prepare the field for planting the next crop and soil moisture depletion.

Follow [Cover Crop Termination Guidelines, Version 3, dated September 2014](#) for termination dates.

### **Additional Criteria to Capture and Recycle Excess Nutrients in the Soil Profile**

Establish actively growing cover crops before the expected period(s) of nutrient leaching.

Select cover crop species for their ability to take up large amounts of nutrients from the rooting profile of the soil.

When used to redistribute nutrients from deeper in the profile up to the surface layer, kill the cover crop in relation to the planting date of the subsequent crop. If the objective is to best synchronize the use of cover crop as a green manure to cycle nutrients, consider factors such as the carbon/nitrogen ratios to kill early, and have a faster mineralization of nutrients to match release of nutrients with uptake by following cash crop. If the objectives are to use as a biocontrol and maximize the addition of organic matter, use a late kill. The right moment to kill the cover crop depends on the specific rotation, weather, and objectives.

### **Additional Criteria to Promote Biological Nitrogen Fixation**

Only establish legumes or legume-grass mixtures as cover crops.

At the time of planting, consider whether the specific Rhizobium bacteria for the selected legumes is present in the soil or if the seed is inoculated at the time of planting.

### **Additional Criteria to Increase Biodiversity**

Select cover crop species that have different maturity dates, attract beneficial insects, increase soil biological diversity, serve as a trap crop for damaging insects, and/or provide food and cover for wildlife habitat management.

### **Additional Criteria for Weed Suppression**

Select cover crops species for their chemical or physical characteristics to suppress or compete with weeds.

leave cover crop residues on the soil surface to maximize allelopathic (chemical) and mulching (physical) effects.

For long-term weed suppression, reseeding annuals and/or biennial species.

**Additional Criteria to Provide Supplemental Forage**

Select species with desirable forage traits, palatable to livestock, and do not interfere with the production of the subsequent crop.

Haying or grazing is allowed on forage provided by the cover crop as long as sufficient biomass is left for resource protection. Observe all label restrictions on grazing cover crops.

**Additional Criteria for Soil Moisture Management**

Terminate growth of the cover crop sufficiently early to conserve soil moisture for the subsequent crop. Leave cover crops established for moisture conservation on the soil surface.

In areas of potential excess soil moisture, allow the cover crop to grow as long as possible to maximize soil moisture removal.

**Additional Criteria to Reduce Particulate Emissions into the Atmosphere**

Manage cover crops and their residues so that at least 80% ground cover is maintained during planting operations for the following crop.

**Additional Criteria to Minimize and Reduce Soil Compaction**

Select and manage cover crop species that produce deep roots and large amounts of surface or root biomass to increase soil organic matter, improve soil structure, and increase soil moisture through better infiltration. Where surface compaction is identified as a resource concern, use species identified with a /1 in KS Table 1 of Form KS-ECS-6, Cover Crop Design. For subsurface compaction, Use species with a rating of Very Good or Excellent without the /1 footnote. All species in the mix have a rating of Very Good or Excellent, as defined in KS Table 1 of Form KS-ECS-6.

**CONSIDERATIONS**

Plant cover crop in a timely manner to establish a good stand.

Maintain an actively growing cover crop as late as feasible to maximize plant growth, allowing time to prepare the field for the next crop, and moisture depletion.

Use deep-rooted species to maximize nutrient recovery.

Use grasses to utilize more soil nitrogen, and legumes that utilize both nitrogen and phosphorus.

Avoid cover crop species that harbor or carryover potentially damaging diseases or insects.

For most purposes for which cover crops are established, the combined canopy and surface cover is at nearly 90% or greater, and the above-ground (dry weight) biomass production is at least 4,000 pounds per acre.

Use cover crops to improve site conditions for establishment of perennial species.

Use plant species that enhance bio-fuel opportunities.

Use plant species that enhance forage opportunities for pollinators by using diverse legumes and other forbs.

Use cover crops to break pest cycles.

Use cover crops to recycle nutrients in the soil.

Use a diverse mixture of 3 or more species to address multiple purposes.

## PLANS AND SPECIFICATIONS

Prepare plans and specifications for the practice site. Include the following in the cover crop establishment plans:

- Species or species of plants to be established
- Seeding rates
- Recommended seeding dates
- Establishment procedure
- Planned rates and timing of nutrient application
- Planned dates for destroying cover crop
- Other information pertinent to establishing and managing the cover crop

Record plans and specifications for the establishment and management of cover crops on job sheets, or on other forms.

## OPERATION AND MAINTENANCE

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

Control weeds in cover crops by mowing or by using other pest management techniques.

Control soil moisture depletion by selecting water efficient plant species and terminating the cover crop before excessive transpiration.

## REFERENCES

A. Clark (ed.). 2007. Managing Cover Crops Profitably. 3rd ed. Sustainable Agriculture Network Handbook Series; bk 9.

Hargrove, W.L., ed. Cover Crops for Clean Water. SWCS, 1991.

Magdoff, F. and H. van Es. Cover Crops. 2000. p. 87-96 *In* Building Soils for Better Crops. 2nd ed. Sustainable Agriculture Network Handbook Series; bk 4. National Agriculture Library. Beltsville, Maryland.

Reeves, D.W. 1994. Cover Crops and Erosion. p. 125-172 *In* J.L. Hatfield and B.A. Stewart (eds.) Crops Residue Management. CRC Press, Boca Raton, Florida.