

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD**

COVER CROP

(Ac.)

CODE 340

DEFINITION

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

PURPOSE

- 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 and reduce energy use.
- Increase biodiversity.
- Suppress Weeds.
- Manage soil moisture.
- Minimize and reduce soil compaction.

CONDITIONS WHERE PRACTICE APPLIES

This practice is applicable to all lands requiring seasonal vegetative cover for natural resource protection and or improvement.

CRITERIA

General Criteria Applicable to All Purposes

Species selection, seedbed preparation, seeding rates, seeding dates, seeding depths, fertility requirements, and planting methods will be consistent with approved local criteria and site conditions.

Select species that are compatible with other components of the cropping system.

Herbicides used with cover crops must be compatible with the following crop.

Do not plant State-listed noxious weeds.

Do not burn cover crop residues.

In addition to other criteria for non-irrigated cover crop termination, the cover crop termination must be at or before the time periods specified in the attached: NRCS Cover Crop Termination Guidelines, Version 2 – Non-Irrigated Cropland.

For irrigated areas with consumptive use limitations, evaluate the cropping system mean-annual consumptive use with CO 449 Job Sheet 1 to estimate the amount of water available for cover crop use.

Additional Criteria to Reduce Erosion from Wind and Water

Establish cover crops prior to critical erosion period(s).

Plants selected for cover crops will have 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 that produce high volumes of organic material and or root mass to maintain or improve soil organic matter.

Use the NRCS Soil Conditioning Index (SCI) procedure to determine the amount of biomass needed to maintain a positive trend in the SCI soil organic matter sub-factor.

Plant cover crops as early as possible and terminate as late as feasible, to maximize plant biomass production considering crop insurance criteria, the time needed to prepare the field for planting the next crop, and soil moisture depletion.

Additional Criteria to Capture and Recycle or Redistribute Nutrients in the Soil Profile

Establish cover crops so they are actively growing prior to potential 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.

Terminate the cover crop as late as feasible to maximize plant biomass production considering soil moisture depletion and the amount of time needed to prepare the field for planting of the next crop.

If the objective is to synchronize the use of the cover crop as a green manure to cycle nutrients, kill early when carbon nitrogen ratios are low to optimize mineralization of nutrients for the following crop. Use a late kill if the objectives are to use as a biocontrol and maximize the addition of organic matter.

Additional Criteria to Promote Biological Nitrogen Fixation and Reduce Energy Use

Establish legumes or legume-grass mixtures only.

If the specific Rhizobium bacterium for the selected legume is not present in the soil, inoculate the seed with the appropriate rhizobium at the time of planting.

Additional Criteria to Increase Biodiversity

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

Additional Criteria to Suppress Weeds

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

Higher seeding rates can provide additional cover to help control weeds and eliminate or decrease herbicide use.

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

Kill late if the objective is to use as a biocontrol.

Reseeding annuals and/or biennial species are acceptable for long-term weed suppression.

Additional Criteria to Manage Soil Moisture

Terminate growth and transpiration of the cover crop sufficiently early to conserve soil moisture for the subsequent crop. Leave cover crop residues on the soil surface to minimize evaporation.

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

Additional Criteria to Minimize and Reduce Soil Compaction

Select cover crop species that will produce deep roots and large amounts of surface and root biomass to increase soil organic matter, improve soil structure, and increase infiltration potential.

CONSIDERATIONS

Establish a good stand by planting cover crops in a timely manner.

As applicable, ensure that cover crops are compatible with the client's crop insurance requirements.

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.

When used to redistribute nutrients from deeper in the profile up to the surface layer, consider killing of the cover crop in relation to the planting date of the following crop.

If the objective is to best synchronize the use of cover crop as a green manure to cycle nutrients, factors such as the carbon/nitrogen ratios may be considered to kill early and have a faster mineralization of nutrients to match release of nutrient with uptake by following cash crop.

The right time to kill the cover crop will depend on the specific rotation, weather, and grower objectives.

Use deep-rooted species to maximize nutrient recovery.

Use grasses to utilize soil nitrogen, and legumes to 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 percent or greater, and the above ground (dry weight) biomass production is at least 4,000 lbs/acre.

Cover crops can improve site conditions for establishment of perennial species.

Use plant species that enhance bio-fuels opportunities.

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

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

PLANS AND SPECIFICATIONS

Prepare plans and specifications for each field or management unit according to the Criteria and Operation and Maintenance sections of this standard.

As a minimum, specifications shall include the following information and describe the requirements for applying this practice to meet the intended purpose(s).

- Field number and acres
- Plant species to be established
- Seeding rates
- Recommended seeding dates
- Establishment procedure
- Planned rates and timing of nutrient application
- Planned dates and method to terminate the cover crop
- Other information pertinent to establishing and managing the cover crop

Record practice specifications in a Colorado Cover Crop 340, Conservation Practice Job Sheet.

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.

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.

REFERENCES

- A. Clark (ed.). 2007. Managing cover crops profitably. 3rd ed. Sustainable Agriculture Network Handbook Series; bk 9.
<http://www.sare.org/Learning-Center/Books/Managing-Cover-Crops-Profitably-3rd-Edition>
- Colorado Field Office Technical Guide, Section IV. Irrigation Water Management 449 Job Sheet No 1. 2009. USDA, NRCS, Denver, CO.
http://efotg.sc.egov.usda.gov/references/public/CO/CO449_JS_1.zip
- Hargrove, W.L., ed. Cover crops for clean water. SWCS, 1991.
http://www.swcs.org/en/publications/cover_crops_for_clean_water.cfm
- Magdoff, F. and H. van Es. Building soils for better crops. 3rd ed. 2009. Sustainable Agriculture Network Handbook Series; bk 10.
<http://www.sare.org/Learning-Center/Books/Building-Soils-for-Better-Crops-3rd-Edition>
- 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, FL.
- Attachment: NRCS Cover Crop Termination Guidelines, Version 2 – Non-Irrigated Cropland*
http://efotg.sc.egov.usda.gov/references/public/CO/NB-450-14-2_CCKillV2.pdf