

**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

All lands requiring vegetative cover for natural resource protection and or improvement.

CRITERIA

General Criteria Applicable to All Purposes

Plant species, seedbed preparation, seeding rates, seeding dates, seeding depths, fertility requirements, and planting methods will be consistent with approved local criteria and site conditions. See [Appendix A Seeding Tables](#) located in the electronic Field Office Technical Guide (eFOTG) Section IV, Appendices for seeding information.

The species selected will be compatible with other components of the cropping system.

Ensure herbicides used with cover crops are compatible with the following crop.

Ensure that plants are not listed as noxious weeds or invasive species for a particular state.

Cover crops may only be grazed in a manner that retains or enhances the desired benefit(s) for the intended purpose(s).

Cover crops will be terminated by frost, mowing, tillage, crimping, and/or herbicides in preparation for the following crop. Herbicides used with cover crops will be compatible with the following crop. Cover crop residue will not be burned.

For all situations where a subsequent spring crop is to be planted, termination will be **planned**:

- 1) After adequate growth has occurred to accomplish the intended benefit, and
- 2) Prior to potential detriment to the subsequent crop, and
- 3) Prior to risk for excessive soil moisture depletion.

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Spring termination and grazing will also follow the additional criteria for the stated purpose and comply with other USDA policies where applicable.

All management of cover crops must be adaptive to seasonal climate variations and cropping conditions.

Ensure that plants are not listed as noxious weeds or invasive species for Ohio. Seed will be labeled according to Ohio Department of Agriculture seed regulations.

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 – Non-Irrigated Cropland. (See Attached).

Additional Criteria to Reduce Erosion from Wind and Water

Time cover crop establishment in conjunction with other practices, so that the soil will be adequately protected during the 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.

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

Where a spring cash crop is to be planted spring termination will be **planned**:

- 1) After adequate growth has occurred to provide enough biomass to protect the soil surface, and
- 2) Not later than 2 weeks past the optimum planting date for the subsequent crop and
- 3) Prior to risk for excessive soil moisture depletion.

Additional Criteria to Increase Soil Organic Matter Content

Cover crop species will be selected on the basis of producing high volumes of organic material and or root mass to maintain or improve soil organic matter.

The NRCS Soil Conditioning Index (SCI) procedure will be used to determine the amount of biomass required to have a positive trend in the soil organic matter subfactor.

The cover crop shall be planted plant as early as possible and be terminated 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.

The cover crop will be planted as early as possible and be terminated as late as feasible to maximize plant biomass production.

Spring termination will be **planned**:

- 1) After adequate growth has occurred to optimize root growth and above ground biomass, and
- 2) Not later than 2 weeks past the optimum planting date for the subsequent crop, and
- 3) Prior to risk for excessive soil moisture depletion.

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

Cover crops will be established and actively growing 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.

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

When used to redistribute nutrients from deeper in the profile up to the surface layer, the cover crop will be terminated in relation to the planting date of the following crop. To best synchronize the use of cover crops to cycle nutrients, factors such as the carbon/nitrogen ratios of selected species/mixes, and time of termination, will be used to match release of nutrients with uptake by the following crop.

Spring termination will be **planned**:

- 1) After adequate growth has occurred to sequester nutrients,
- 2) Not later than 2 weeks past the optimum planting date for the subsequent crop, and
- 3) Prior to risk for excessive soil moisture depletion.

Prior to growth stage having potential to cause excessive nutrient immobilization (tie up).

Additional Criteria to Promote Biological Nitrogen Fixation and Reduce Energy Use

Use legumes or legume-grass mixtures to establish cover crops.

The specific Rhizobium bacteria for the selected legume will either be present in the soil or the seed will be inoculated at the time of planting.

Additional Criteria to Increase Biodiversity

Select cover crop species to achieve one or more of the following: species mix with different maturity dates, attract beneficial insects, attract pollinators, increase soil biological diversity, serve as a trap crop for damaging insects, and/or provide food and cover for wildlife habitat management.

Management to increase biodiversity may include grazing livestock as a tool to increase soil biodiversity, soil micro-flora, and soil function, but will be managed in a manner to reduce soil compaction and provide for stable or increased soil organic matter.

Spring termination will be **planned**:

- 1) After adequate growth has occurred to accomplish the intended benefit,
- 2) Prior to potential detriment to the subsequent crop, and

Prior to risk for excessive soil moisture depletion.

Additional Criteria for Weed Suppression

Species for the cover crop will be selected for their chemical or physical characteristics to suppress or compete with weeds.

Higher seeding rates to provide additional cover will help control weeds to eliminate or reduce herbicide use.

Cover crop residues will be left on the soil surface to maximize allelopathic (chemical) and mulching (physical) effects.

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Cover crop residues will be left on the soil surface to maximize allelopathic (chemical) and mulching (physical) effects.

Spring termination will be **planned**:

- 1) After adequate growth has occurred to provide enough surface biomass to cover/mulch the soil surface, and
- 2) Not later than 2 weeks past the optimum planting date for the subsequent crop. and
- 3) Prior to risk for excessive soil moisture depletion.

A late termination may be used if the objectives are to use as a biocontrol. For long-term weed suppression, reseeding annuals and/or biennial species can be used.

Additional Criteria for Soil Moisture Management

Terminate growth of the cover crop sufficiently early to conserve soil moisture for the subsequent crop. Cover crops established for moisture conservation shall be left 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.

Spring termination will be **planned**:

- 1) After adequate growth has occurred to provide enough surface biomass to cover the soil surface to conserve moisture, and
- 2) Not later than 2 weeks past the optimum planting date for the subsequent crop, and
- 3) Prior to risk for excessive soil moisture depletion.

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

Additional Criteria to Minimize and Reduce Soil Compaction

Select and manage cover crop species that will 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.

Spring termination will be **planned**:

- 1) After adequate growth has occurred to optimize root growth and above ground vegetation is sufficient for active transpiration and photosynthesis , and
- 2) Not later than 2 weeks past the optimum planting date for the subsequent crop, and
- 3) Prior to risk for excessive soil moisture depletion.

Grazing will be limited to only times with ideal soil conditions.

CONSIDERATIONS

Plant cover crops in a timely matter to establish a good stand.

When applicable, ensure cover crops are managed and are compatible with the client's crop insurance criteria.

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 moment 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 more soil nitrogen, and legumes 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 may be used to 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 2 or more species to address multiple purposes.

PLANS AND SPECIFICATIONS

Plans and specifications will be prepared for the practice site. Plans for the establishment of cover crops shall include:

- Field number and acres
- Species or species of plants 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.

Plans and specifications for the establishment and management of cover crops may be recorded in narrative form, 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.

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.
- 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, MD.
- 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 – Non-Irrigated Cropland

Conservation practice standards are reviewed periodically and updated if needed. To obtain the current version of this standard, contact your Natural Resources Conservation Service [State Office](#) or visit the [Field Office Technical Guide](#).