

**NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD
VARIANCE**

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.
- Increase biodiversity.
- Pest 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 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.

Refer to the Washington and Oregon Guide for Conservation Seedings and Plantings, USDA-NRCS, September 1999 or other approved Extension guides to select plant species and seeding rates.

The species selected will be compatible with other components of the cropping system including Nutrient Management (590) and Pest Management (595) practices.

Cover crops will be terminated by harvest, 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.

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

Cover crop residue will not be burned.

Additional Criteria to Reduce Erosion from Wind and Water

Cover crop establishment, in conjunction with other practices, will be timed 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.

The amount of surface and/or canopy cover needed from the cover crop will be

determined using current erosion prediction technology.

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 will be terminated as late as feasible to maximize plant biomass production, considering the time needed to prepare the field for planting the next crop and 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.

Cover crop species will be selected 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, the cover crop will be killed 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 ratio may be considered to kill early and have a faster mineralization of nutrients to match release of nutrients with uptake by the following cash crop. A late kill may be used if the objectives are to use as a biocontrol and maximize the addition of organic matter. The right moment to kill the cover crop will depend on the specific rotation, weather and objectives.

Additional Criteria to Promote Biological Nitrogen Fixation

Only legumes or legume-grass mixtures will be established as 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.

Nitrogen credits from legume cover crops will be accounted for in the nutrient management plan.

Additional Criteria to Increase Biodiversity

Cover crop species will be selected 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 Pest Suppression

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

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

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

Nematode Suppression. Use species that suppress nematode populations, or that are non-hosts or poor hosts for nematodes.

Additional Criteria to Provide Supplemental Forage

Species selected will have desired forage traits, be palatable to livestock, and not interfere with the production of the subsequent crop.

Forage provided by the cover crop may be hayed or grazed as long as sufficient biomass is left for resource protection.

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 will be left on the soil surface until the subsequent crop is planted.

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 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.

CONSIDERATIONS

Plant cover crop in a timely matter 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 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 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

PLANS AND SPECIFICATIONS

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

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

Plans and specifications for the establishment and management of cover crops will be recorded on Oregon's Cover Crop job sheet, or on other forms that meet the above criteria/

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; Book 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.

Using Cover Crops in Oregon, Oregon State University Extension Publication, EM8704, October 1998

Cover Crops Oregon Orchards and Vineyards, Oregon-NRCS, JS-OR-190-11-12, February 1991

Nitrogen Scavenging: Using Cover Crops to Reduce Nitrate Leaching in Western Oregon, Oregon State University Extension Publication EM8728, October 1999

Columbia Root-Knot Nematode Control in Potato, Using Crop Rotations and Cover Crops, Oregon State University Extension Publication, EM8740, November 1999

Planting Dates for Fall Cover Crops in Irrigated Regions of Eastern Oregon, Oregon-NRCS, Agronomy Technical Note No. 9, October 2000

Vineyard Cover Crops, Oregon NRCS, Agronomy Technical Note No. 55, October 1986.

Cover Crops as a Floor Management Strategy for Pacific Northwest Vineyards, Washington State University Extension Publication, EB2010, August 2006

Management of Residual Nitrogen with Cover Crops, Oregon-NRCS, Agronomy Technical Note No. 38, November 1999

Cover Crop Dry Matter and Nitrogen Accumulation in Western Oregon, Oregon State University Extension Publication EM8739, October 1999