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.

PURPOSES

- 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

Plant species, seedbed preparation, seeding rates, seeding dates, seeding depths, and planting methods will be consistent with approved local criteria and site conditions.

The species selected will be compatible with the nutrient management and pest management provisions of the plan.

Cover crops will be terminated by harvest, frost, mowing, tillage, 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

Provide supplemental fertilization to account for expected crop need and considering existing fertility or nutrient deficits.

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 shall be determined using current erosion prediction technology.

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.

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

Additional Criteria to Manage Excess

Nutrients in the Soil Profile

Cover crops will be established and actively growing before expected periods of high precipitation that can cause leaching.

Cover crop species will be selected for their ability to absorb large amounts of nutrients from the rooting profile of the soil.

The aboveground biomass will be removed from the field for maximum nutrient removal efficiency.

Additional Criteria to Increase Soil Organic Matter

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

Where applicable, the NRCS Soil Conditioning Index (SCI) procedure will be used to determine the amount of biomass required.

The cover crop will be terminated as late as feasible to maximize plant biomass and still prepare the seedbed for the subsequent crop.

Additional Criteria to Increase Biodiversity

Cover crop species shall be selected that, have different maturity dates, attract beneficial insects, serve as a trap crop for damaging insects, and/or provide food and cover for wildlife habitat management.

Additional Criteria for Weed Suppression

Species for the cover crop will be selected for their chemical or physical competition 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, perennials and/or biennial species can be used.

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 shall 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 optimize soil moisture removal.

CONSIDERATIONS

The cover crop should be terminated as late as feasible to maximize plant growth and still prepare the seedbed for the subsequent crop.

Deep-rooted species provide maximum nutrient recovery.

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

Avoid cover crop species that attract potentially damaging insects.

Seek cover crop species that support beneficial insects.

Acceptable benefits, for most purposes, are usually accomplished when the plant density is at least 25 stems per feet, the combined canopy and surface cover is at least 60 percent, and the above ground (dry weight) biomass production is at least 2700 lb/acre.

Cover crops may be used to improve site conditions for establishment of perennial species.

Cover Crop - Mowed

Plants provide long-term cover and are managed by mowing to maintain at least 60 percent ground cover during the erosive period. Mowing to a 3-4 inch height at the beginning of the frost season can reduce cold temperature damage in orchards and vineyards. Mowing intervals must allow adequate seed production by annual species. Tree and vine rows are generally kept weed free with herbicides or other means to minimize competition and allow soil warming. Selected plants need to complement the Integrated Pest Management (IPM) program being used. Mowed cover crops greatly reduce dust during harvest operations, especially almonds and walnuts, and improve the infiltration rate of water.

Cover Crop - Disked

Plants provide long-term cover and are managed by disking after seed production to maintain at least 60 percent ground cover during the erosive period. Mowing at the beginning of the frost season may be performed to a 3-4 inch height to reduce cold temperature damage in orchards and vineyards. Tree and vine rows may be kept free of plants with herbicides or other means to reduce competition and allow soil warming.

Cover Crop - Unmowed and Nondisked

Plants provide long term cover on lands left idle for several years and are managed as natural stands without mowing or tillage to maintain at least 60 percent ground cover during the erosive period.
Firebreaks shall be considered and mowed firebreaks used where feasible. Wildlife needs shall be considered when selecting plants. Control of noxious weeds may require mowing parts of the field for a few seasons.
The horizontal indentations left by tracked equipment provides a suitable seedbed on steep slopes.
Control of noxious weeds by mowing should be evaluated as an alternative to use for herbicides.

Endangered Species Considerations

Determine if installation of this practice with any others proposed will have any effect on any federal or state listed Rare, Threatened or Endangered species or their habitat. NRCS's objective is to benefit these species and others of concern or at least not have any adverse effect on a listed species. If the Environmental Evaluation indicates the action may adversely affect a listed species or result in adverse modification of habitat of listed species which has been determined to be critical habitat, NRCS will advise the land user of the requirements of the Endangered Species Act and recommend alternative conservation treatments that avoid the adverse effects. Further assistance will be provided only if the landowner selects one of the alternative conservation treatments

for installation; or at the request of the landowners, NRCS may initiate consultation with the Fish and Wildlife Service, National Marine Fisheries Service and/or California Department of Fish and Game. If the Environmental Evaluation indicates the action will not affect a listed species or result in adverse modification of critical habitat, consultation generally will not apply and usually would not be initiated. Document any special considerations for endangered species in the Practice Requirements Worksheet.

Some species are year-round residents in some streams, such as, freshwater shrimp. Other species, such as steelhead and salmon, utilize streams during various seasons. Be aware that during critical periods, such as spawning, eggs in gravels, and rearing of young may preclude activities in the stream that may directly affect the stream habitat during those periods. For example there should be no disturbance of stream gravel beds that may have eggs in them. That could include any equipment in the stream or even walking in the stream or work upstream that may result in sediment depositing in the gravel beds. Document any special considerations for endangered species in the Practice Requirements Worksheet.

Water Quantity

The practice may decrease runoff and increase infiltration and available soil moisture because of the increased period of vegetation. Increased organic material may increase water-holding capacity. Transpiration may increase because of increased water use by vegetation. Soil moisture may increase because of an increased ability to trap snow where climatically feasible.

1. Effects on the water budget, especially on volumes and rates of runoff, infiltration, evaporation, transpiration, deep percolation, and ground water recharge.

2. Effects of vegetation on soil moisture.

Water Quality

Erosion, sediment and adsorbed chemical yields could be decreased in conventional tillage systems because of the increased period of vegetal cover. Plants will take up available nitrogen and prevent its undesired movement. Organic nutrients may be added to the nutrient budget reducing the need to supply more soluble forms. Overall volume of chemical application may decrease because the vegetation will supply nutrients and there may be allelopathic effects of some of the types of cover vegetation on weeds. Temperatures of ground and surface waters could slightly decrease.

1. Filtering effects of vegetation on movement of sediment, pathogens, and dissolved and sediment-attached substances.

2. Effects of growing and decaying vegetation on nutrients in the root zone.

3. Effects on erosion and the movement of sediment, pathogens, and soluble and sediment-attached substances carried by runoff.

PLANS AND SPECIFICATIONS

Plans and specifications will be prepared for each field and include seedbed preparation, date of seeding, seed mixture, fertilization, management, and time and manner of incorporating the crop into the soil.

When seed will be planted more than one inch deep, indicate the depth on the Practice Requirements sheet. When seeding on graded, irrigated fields will not be performed across the slope, indicate this on the Practice Requirements sheet.

Use aerial seeding on steep sites and on other sites where full coverage is needed.

On fields judged to contain a good seed supply of desirable species, do not specify any seeding mixture on the Practice Requirements sheet. Fertilizer must still be specified on the Practice Requirements sheet unless existing fertility of the field is judged adequate.

On Conservation Reserve Program fields in MLRAs and locations not restricted to perennials, specify Cover Crop - unmowed and non-disked. Also list the desirable resident species on the Practice Requirements sheet that will qualify as part of the minimum 60 percent ground cover. Do not list any noxious weeds.

OPERATION AND MAINTENANCE

Maintenance needed for this practice includes mowing at the beginning of the frost season to minimize danger to trees and vines, allowing long term cover crops to set seed, maintaining adequate vegetative cover during the critical erosion period, controlling noxious weeds, and timing operations to minimize impacts on wildlife.

Firebreaks will be installed each season to protect unmowed and nondisced long-term cover on lands left idle and managed as natural stands.