

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

MULCHING
(Acre)
CODE 484

DEFINITION

Applying plant residues, by-products or other suitable materials produced off site, to the land surface.

PURPOSES

- Conserve soil moisture
- Moderate soil temperature
- Provide erosion control
- Suppress weed growth
- Establish vegetative cover
- Improve soil condition and increase soil fertility

CONDITIONS WHERE PRACTICE APPLIES

On soils subject to erosion; on areas where traffic may cause airborne emissions, where conserving soil moisture is desirable, on soils that may realize improved quality from a surface cover of organic materials, and where it is desirable to achieve weed control with little or no cultivation or herbicide use.

CRITERIA

General Criteria Applicable To All Purposes

The selection of mulching materials will depend primarily on site conditions and the material's availability. Mulch materials shall consist of natural and/or artificial materials such as plant residue, wood bark or chips, by-products, gravel, plastic, fabric, animal manure, rice hulls, and materials from food processing plants or other equivalent materials of sufficient dimension (depth or thickness) and durability to achieve the intended purpose for the required time period. Mulching is generally performed after grading, soil surface preparation and seeding and plantings are

complete. Soil surface shall be prepared in order to achieve the desired purpose.

The mulch material shall be evenly applied and anchored to the soil. Tackifiers, emulsions, pinning, netting, crimping or other acceptable methods of anchoring will be used if needed to hold the mulch in place for specified periods.

Manufactured mulches shall be applied according to the manufacturer's specifications.

Mulching operations shall comply with federal, state and/or local laws and regulations during the installation, operation and maintenance of this practice.

Mulch material shall be relatively free of disease, noxious weed seeds, and other pests and pathogens.

All straw mulch materials will be acceptable to the County Agricultural Commissioner, per California Food and Agriculture Code Section 5101 and 5205.

When mulching with straw, use at least 2,000 pounds of cereal grain straw or grass hay per acre evenly distributed over the area to be treated and anchored sufficiently to hold it on the site

When mulching with other wood products (chips, bark, shavings) or other material, they must be applied in an amount that will provide at least 80 percent ground cover.

When mulching with gravel or other inorganic material for permanent erosion control, they must be applied in sufficient amounts to provide 90 percent ground cover.

When using materials with potential to pollute surface waters (animal manures, sewage sludge, wastes from food processing, other similar materials) care will be taken to assure that runoff from the area will not enter streams, lakes, ponds,

or reservoirs and that nitrate leaching will be considered in the plan. Measures will also be taken to prevent mulch from washing away due to concentrated flows, rainfall, or irrigation.

Additional Criteria To Conserve Soil Moisture

Mulch materials applied to the soil surface shall provide at least 60 percent cover to reduce potential evaporation.

Mulch material shall be applied prior to moisture loss. Prior to mulching, ensure soil under shallow rooted crops is moist, as these crops require a constant supply of moisture.

Additional Criteria To Moderate Soil Temperature

Mulch materials shall be selected and applied to obtain 100 percent coverage over the area treated. The material shall be of a significant thickness to persist for the period required for the temperature modification.

Additional Criteria To Provide Erosion Control

When mulching with cereal grain straw or grass hay, apply in sufficient amounts to provide 70 percent ground cover. When mulching with wood products such as wood chips, bark, or shavings or other wood materials, apply to a 2-inch thickness if the soil is not well-drained, and to a 3- to 4-inch thickness if drainage is good. More finely textured mulches, which allow less oxygen penetration than coarser materials, should be no thicker than 1 or 2 inches. The mulch material shall provide no greater than 80 percent ground cover in order to ensure adequate air drainage.

Mulch rate shall be determined using current erosion prediction technology to reach the soil erosion objective, where appropriate. When mulching with straw, use at least 4,000 pounds of cereal grain straw or grass hay per acre evenly distributed over the area to be treated and anchored sufficiently to hold it on the site. When mulching with wood fiber, use at least 2,000 pounds of wood fiber mulch per acre.

Gravel or other inorganic material shall be applied approximately 2 inches thick and shall consist of pieces 0.75 to 2 inches in diameter. The mulch

material shall provide no more than 90 percent ground cover in order to ensure adequate air drainage.

Additional Criteria To Suppress Weed Growth

The thickness of mulch will be determined by the size of the plant being mulched. Small plants must not be smothered. Mulches shall be kept clear of the stems of plants where disease is likely to occur. Mulches applied around growing plants or prior to weed seedling development shall have 100 percent ground cover. Thickness of the mulch shall be adequate to prevent emergence of targeted weeds. Plastic mulches may be used.

Additional Criteria To Establish Vegetative Cover

Mulch shall be applied at a rate that achieves 50 percent ground cover to provide protection from erosion and runoff and yet allow adequate light and air penetration to the seedbed to ensure proper germination, emergence, and disease suppression.

Additional Criteria To Improve Soil Condition And Increase Soil Fertility

To increase soil fertility, apply mulch materials with a carbon to nitrogen ratio (C:N) less than 30 to 1 such as animal manure, bio-solids, food processing wastes, or similar materials. Apply other practices such as contouring, filter strips or riparian forest buffers to assure that runoff from the mulched areas will not transport mulching materials to sensitive waterbodies. Do not apply mulch with C:N less than 20:1 to the area of designed flow in watercourses.

Credit nutrients applied with the mulch to the nutrient budget.

The Soil Conditioning Index may be used to assess soil quality impacts.

CONSIDERATIONS

Consider the effects of mulching on evaporation, infiltration and runoff. Mulch material may affect microbial activity in the soil surface, increase infiltration, and decrease runoff, erosion and evaporation. Increased infiltration may increase nutrient and chemical transport below the root

zone. The temperature of the surface runoff may also be lowered.

Mulched soil retains moisture, requires less watering and reduces the chance of water stress on plant materials. Mulch also minimizes evaporation from the soil surface and hence reduces losses from bare soil areas.

Clear and infra-red transmissible (IRT) plastics have the greatest warming potential. They are transparent to incoming radiation and trap the longer wavelengths radiating from the soil. Black mulches are limited to warming soils by conduction only and are less effective.

Clear mulches allow profuse weed growth and may negate the benefits of soil warming. Black mulches provide effective weed control. Wavelength selective (IRT) blends the soil warming characteristics of clear mulch with the weed control ability of black mulch.

Consider potential toxic allopathic effects that mulch material may have on other organisms. Animal and plant pest species may be incompatible with the site.

Consider the potential for increased pathogenic activity within the applied mulch material.

Keep mulches 3 to 6 inches away from plant stems and crowns to prevent disease and pest problems.

Deep mulch provides nesting habitat for ground-burrowing rodents that can chew extensively on bark on tree trunk and/or tree roots. Light mulch applied after the first cold weather may prevent rodents from nesting.

Common mulch materials available include barley oats, rice, and wheat straw. Rice straw tends to persist longer. Most hay will decompose faster than barley or wheat.

Steep farm roads may be mulched with straw at the beginning of the rainy season. Restrict vehicle traffic until risk of runoff is low.

Disturbed construction sites often use mulches to comply with regulation. Regulations may require a storm water pollution prevention plan, erosion control plan, or compliance with a grading ordinance.

Barley and wheat straw usually contains 10 to 15 pounds/acre of seed. The resulting green growth does not interfere with most intended uses or future landscaping.

Use of wheat straw usually results in less volunteer grain when compared to barley straw.

Rollers and crimpers can be pulled on slopes up to 3:1. Where there is access, equipment can be winched up and down steeper slopes. Tackifiers can be utilized to anchor when equipment cannot be used on the site.

The effective range for straw blowing equipment is about 75 feet.

The effective range for hydroseeders is about 125 feet. When using a 100-foot hose the range can be extended up to 200 feet.

Anchoring

Anchoring of mulches can be accomplished by using the following methods:

Netting, tackifiers, matting: hand, roller, or crimper punching and disk-type straw punchers.

Netting to anchor mulches is made from plastics, paper, jute, and burlap. They are anchored with staples of various materials.

Several liquid "tackifiers" that can be mixed with water and sprayed on fiber mulches to bind them together are available. These "tackifiers" will be compatible with the mulch applied and in sufficient amount to adequately bind the materials together for the intended life of the practice.

Endangered Species Considerations

If during the Environmental Assessment, NRCS determines that installation of this practice, along with any others proposed, will have an effect on any federal or state listed Rare, Threatened or Endangered species or their habitat, NRCS will advise the client 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 client selects one of the alternative conservation treatments for installation; or with concurrence of the client, NRCS initiates

consultations concerning the listed species with the U.S. Fish and Wildlife Service, National Marine Fisheries Service and/or California Department of Fish and Game.

Cultural Resources Considerations

NRCS policy is to avoid any effect to cultural resources and protect them in their original location. Determine if installation of this practice or associated practices in the plan could have an effect on cultural resources. The National Historic Preservation Act may require consultation with the California State Historic Preservation Officer.

<http://www.nrcs.usda.gov/technical/cultural.html> is the primary website for cultural resources information. The California Environmental Handbook and the California Environmental Assessment Worksheet also provide guidance on how the NRCS must account for cultural resources. The e-Field Office Technical Guide, Section II contains general information, with Web sites for additional information.

Document any specific considerations for cultural resources in the design docket and the Practice Requirements worksheet.

PLANS AND SPECIFICATIONS

Specifications shall be prepared for each site and purpose and recorded using approved specification sheets, job sheets, technical notes, and narrative statements in the conservation plan, or other acceptable documentation.

Documentation shall include:

- Type of mulch material used
- Percent cover and/or thickness of mulch material
- Timing of application
- Site preparation
- Listing of netting, tackifiers, or method of anchoring, and
- Operation and maintenance.

OPERATION AND MAINTENANCE

The owner or operator will be responsible for safe operation of equipment and maintenance of this practice.

NRCS, CA
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Mulched areas will be periodically inspected, and mulch shall be reinstalled or repaired as needed to accomplish the intended purpose.

Removal, incorporation, bio- or photo-degradation of mulch and associated materials shall be consistent with the intended purpose and site conditions.

Operation of equipment near and on the site shall not compromise the intended purpose of the mulch.

Prevent or repair any fire damage to the mulch material.

Properly collect and dispose of artificial mulch material after intended use.

Monitor and control undesirable weeds in mulched areas.

REFERENCES

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