NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

MULCHING

(Ac.)

CODE 484

DEFINITION

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

PURPOSE

1. Conserve soil moisture
2. Moderate soil temperature
3. Provide erosion control
4. Suppress weed growth
5. Facilitate the establishment of vegetative cover
6. Improve soil condition
7. Reduce airborne particulates

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to all lands where mulches are needed. This practice may be used alone or in combination with other practices.

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 that are environmentally safe such as plant residue, wood bark or chips, gravel, plastic, fabric, rice hulls, or other equivalent materials of sufficient dimension (depth or thickness) and durability to achieve the intended purpose for the required time period.

Prior to mulching, the soil surface shall be prepared in order to achieve the desired purpose.

The mulch material shall be evenly applied and, if necessary, 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.

As a minimum, 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, pesticides, chemicals, noxious weed seeds, and other pests and pathogens.

Additional Criteria to Conserve Soil Moisture

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

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 at a rate to achieve a

minimum 70 percent ground cover. Mulch rate shall be determined using current erosion prediction technology to reach the soil erosion objective.

When mulching with wood products such as wood chips, bark, or shavings or other wood materials, apply a minimum 2-inch thickness if the soil is not well drained and 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.

When mulching with gravel or other inorganic material apply a minimum 2 inch thickness 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. 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 a minimum of 70 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 and emergence.

Additional Criteria to Improve Soil Condition

Apply mulch materials with a carbon to nitrogen ratio (C:N) less than 30 to 1 so that soil nitrogen is not immobilized by soil biota. Do not apply mulch with C:N less than 20:1 to an area of designed flow in watercourses.

Use the Soil Conditioning Index to assess soil quality impacts and to determine the type and rate of the mulching material.

Additional Criteria to Reduce Airborne Particulate Matter from Wind Erosion

Mulch rate shall be determined using current wind erosion prediction technology to reach the soil erosion (movement of particulates offsite) objective.

CONSIDERATIONS

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

Mulch material used to conserve soil moisture should 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.

Mulch materials with a high water holding capacity and/or high impermeability to water droplets may adversely affect the water needs of plants.

Fine textured mulches (e.g. rice hulls) which allow less oxygen penetration than coarser materials should be no thicker than 1 or 2 inches.

Organic materials with C:N ratios of less than 20:1 will release nitrate-nitrogen which could cause water quality impairments.

Mulching may also provide habitat for beneficial insect and provide pest suppression.

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) plastic provides

the soil warming characteristics of clear mulch with the weed control ability of black mulch.

Low permeability mulches (e.g. Plastic) may increase concentrated flow and erosion on un-mulched areas.

Consider potential toxic alleleopathic 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 mulch 3 to 6 inches away from plant stems and crowns to prevent disease and pest problems. Additional weed control may be needed around the plant base area.

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

Some mulch material may adversely affect aquatic environments through changes in water chemistry or as waterborne debris. Consider placing mulch in locations that minimizes these risks.

PLANS AND SPECIFICATIONS

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

Documentation shall include:

- Purpose of the Mulch
- Type of mulch material used
- The 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.

GENERAL

Mulch is essential on steep, erosive sites.

Mulch should be used on all critical areas where slopes are steeper than 3 percent.

Mulch is desirable on constructed waterways, outlets and shaped natural waterways. Waterways and areas where water concentrates should be lined with jute lining, upholsters' burlap, excelsior blanket, fiberglass blanket, textile soil retention blanket or mulched with straw and tied down with poultry wire or commercial mulch netting.

Concentration of water from off-site areas, or water draining over cut banks, should be diverted by the use of temporary diversions, closed drains, ditches, lined waterways, or other erosion control methods. Cut banks and fill slopes should be graded uniformly enough so that runoff water does not concentrate. Loosen hard, compact soil with chisel plow or similar implement. This allows water to move into the soil and reduces runoff.

Mulch material should not contain seeds of competing plants. Areas mulched with hay, straw, wood chips or shredded plant residues should receive 20 – 25 lbs. per acre of nitrogen, in addition to the amount required for plant growth, to offset the tie-up of nitrogen by decomposition of carbonaceous materials.

MULCH MATERIALS FOR ESTABLISHING VEGETATION

Use one of the materials listed below:

Material	Rate Tons per acre	Rate Lbs. per 1,000 sq. ft.
Hay or straw	1 ½ - 2	70 – 90
Sawdust-wood chips	4 – 6	185 – 275
Poultry litter or Manure	4 – 6	185 – 275
Shredded residues (leaves, crop residue)	1 ½ - 2 ½	70 – 115
Wood cellulose fiber	½ - ¾	24 – 34
Commercial mulch materials	Cover as specified by manufactures	
Upholsterer's Burlap	Cover as specified below	

Of the various kinds of hay and straw, grain straw is preferable. It spreads easier by hand and does not contain weed seed.

On areas where it is desirable to establish native vegetation, native grasslands cut and baled after seed are mature can be used to mulch the area without seeding. However, be sure that the soil surface is loose so seedlings can become established.

Plant nutrients necessary for establishment of the cover shall be applied according to specifications in the conservation practice standard, Nutrient Management (590).

Mulch shall be applied within 24 hours after seeding.

Straw or Hay

Straw or hay may be applied by hand or with a mulch blower. Straw or hay will be applied uniformly over the area, leaving about 25 percent of the soil surface exposed.

Mechanical Anchoring

If waterways or other areas where concentrations of water occur are mulched with straw or hay, the mulch in these areas will be tied down with commercial netting, poultry wire, or sprayed with asphalt emulsions. When poultry wire netting is used to anchor straw mulch, tie it down with wood stakes or heavy-duty 6-inch wire staples every 4 feet in all directions. Straw or hay mulch can be tied down by driving wooden stakes every 4 feet in all directions, tying jute string diagonally and in straight lines, and driving the stakes until the string contacts the ground. It is desirable to anchor straw or hay mulch on all areas. Asphalt sprayed uniformly on the mulch, as it is ejected form the blower is more effective than asphalt applied as a separate operation. Use 175 gallons of Emulsified Asphalt SS-1h or equivalent (Specification Section 1002 Louisiana Standard Specifications for Roads and Bridges 1982 edition) per ton of mulch. A disk harrow, or similar implement, with the disk set straight, may be used to press the mulch into the soil. Best results are obtained with discs 20-inches or more in diameter and 8 – 12 inches apart. The edges of the disc should be dull enough not to cut the mulch but to press it into the soil, leaving much of it in an erect position.

Natural Anchoring

Annual grasses can be planted in the fall or summer to anchor the mulch. Plant seeds, either broadcast or drilled before mulch is applied.

Species suitable for use along with planting rates and optimum planting dates are the same as the annual grasses listed for Critical Area Planting (342) contained in Appendix 1 Planting Rates for Louisiana by MLRA's.

Wood Waste and Shredded Residues

Wood waste mulch, sawdust, wood chips and bark, and shredded residues should not be used on slopes steeper than 3:1. On steep slopes, these materials can be moved by intense rain.

Wood Cellulose Fiber (Hydromulching)

Wood cellulose fiber mulch will be applied with hydraulic seeding equipment. Fertilizer, seed and wood fiber will be mixed with water to form homogeneous slurry and applied within one hour after mixing. Use the same rates of seed and fertilizer as in conventional methods.

Slurry will be sprayed to get uniform coverage on the soil surface.

Commercial Mulch Materials

Follow manufacturer's instructions for use of commercial mulch materials such as fiberglass, jute, textile, and excelsior soil retention blankets. Surface spray liquid emulsions will not be used unless their effectiveness has been verified by the State Resource Conservationist.

Upholsterer's Burlap

The surface shall be smooth and free of obstructions such as rocks, roots, clods or heavy grass residue.

Use erosion checks across the waterways. Erosion checks are trenches dug at least 4 inches deep. The material is cut and stapled in the bottom of the trench. The trench is backfilled and packed. The next length of material is applied at least 6 inches over the previous length. Maximum distance of erosion checks shall not exceed 50 feet on slopes up to 5 percent. On slopes over 5 percent, the maximum distance between erosion checks shall not exceed 35 feet.

Jute lining shall be laid loosely in contact with the soil surface. When more than one width of jute material is used lengthwise, overlap shall be at least 3 inches. Commercial 6-inche heavy duty, 11-gauge wire staples or staples cut and made from No. 8- or 9- gauge wire can be used. The material will be stapled at 12-inch intervals in erosion check trenches and across the end laps. Three feet intervals will be used along the edge and length-wise laps.

Mulch for Temporary Protection Without Seeding

Wood chips, sawdust or bark spread 1 to 2 inches deep can be used for temporary mulch protection without seeding. Wood waste should not be applied on slopes steeper than 3:1. No anchoring is needed.

OPERATION AND MAINTENANCE

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

Removal or incorporation of mulch 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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