



Targeted Constituents

● Significant Benefit		▸ Partial Benefit		○ Low or Unknown Benefit	
● Sediment	○ Heavy Metals	○ Floatable Materials	○ Oxygen Demanding Substances		
▸ Nutrients	○ Toxic Materials	○ Oil & Grease	○ Bacteria & Viruses	○ Construction Wastes	

Description Mulch is the application of shredded or processed material to the ground surface for the purpose of protecting vegetation. Mulch is used to temporarily or permanently stabilize cleared or freshly-seeded areas. Common types of mulches include organic materials, straw, wood chips, and bark or other wood fibers. Mulch is likely to create a significant reduction in sediment and a partial reduction in nutrients.

- Uses**
- Temporary stabilization of freshly seeded and planted areas, or during periods unsuitable for growing permanent vegetation.
 - Permanent stabilization around established plants, such as trees or shrubs, in order to prevent the growth of weeds and to maintain soil moisture conditions.
 - On poor or marginal soils, to add organic matter and retain moisture and fertilizer, as a strategy to speed establishment of permanent vegetative cover.
 - As a short-term ground cover on steepened slopes to reduce rainfall impact, decrease the velocity of sheet flow, and settle out sediment.

- Approach** The term “mulch” is commonly used to describe a variety of materials, such as:
- Grass clippings from lawnmowers (see AM-03)
 - Shredded tree bark and other woody materials, to protect trees and shrubs
 - Straw or hay, scattered across a slope or disturbed area
 - Peat mulch, used in planting trees and shrubs (see ES-10)

Grass Clippings

The disposal of grass clippings is also discussed in AM-03, Preservation of Existing Vegetation, and in Table AM-01, Quick Reference for Disposal Alternatives. Since grass clippings and other vegetative matter decompose quickly, these materials should not be disposed as municipal waste to be carried to a landfill. Mulching mowers are specifically designed to make short grass clippings that will remain on the ground surface and decompose quickly. The essential practice for protecting stormwater is to remove grass clippings from streets, driveways, ditches, stormwater channels, detention basins, slopes and any other areas subject to stormwater flow.

Grass clippings may also be composted, along with most types of non-acidic tree leaves. Consult the UT Agricultural Extension office or website for publications on mulching mowers, cutting height and frequency, composting and many other lawn care topics. The City Office of Solid Waste website also contains guidance for composting.

- Grass clippings can be left on lawns if the volume is small and the clippings have been chopped into small pieces. Remove grass clippings from paved surfaces and drainage channels.
- Remove only one-third of the total height of the grass blades at each mowing, these clippings can be left on the lawn and are unlikely to wash away.
- Mulching mowers work best when about one inch of grass is removed at each mowing. For actively-growing lawns, this equates to once a week (depending on the type of grass, amount of fertilizers, sun/shade, etc.).
- If two inches or more is cut at each mowing, mow more frequently or use a bagging-type mower to prevent accumulation of excess clippings on the lawn surface. Rainfall, temperature, and soil fertility may cause variations in the normal mowing interval for many homeowners.

General Description

Mulch is basically defined as a layer of material spread uniformly over a ground surface to prevent weeds and/or retain soil moisture. Mulch is usually an organic material such as shredded tree bark, hay, straw, sawdust or leaves. Mulch prevents erosion by protecting the soil surface from rain and runoff impact and fostering growth of new seeds or seedlings. The choice of mulch should be based on the size of the area, site slopes, amount of sunlight or shade, proximity to drainage features and natural streams, soil hardness and moisture, weed potential, and availability of mulch materials. Organic materials may also decompose and aid the soil in providing nutrients for vegetation.

Inorganic materials such as inert black plastic or manufactured landscaping fabric can also be used to prevent weeds and retain moisture, but are not considered as mulch. Newspaper is also commonly used to control weeds, but is subject to leaching of ink and chemicals. The use of newspaper within soil for weed control is discouraged.

Grass Vegetation

Mulch helps to establish temporary or permanent grass vegetation for disturbed soils after a construction project or land-use reclamation project. Straw and hay mulch are often selected due to the ease of application and good results. Alternatively, hydroseeding (including hydraulic application of mulch) is often performed, especially on steep slopes and locations which require quick establishment of grass.

Applying straw or hay mulch to a slope or hillside will require either physical measures (crimping, erosion control mats) or chemical binders (special asphalt emulsions) to keep the mulch from washing away or blowing away. The binder is also called a tacking agent or tackifier. A typical application rate might be 100 pounds of straw or hay mulch per 1000 square feet.

Application *Vegetative Fibers*

Loose hay or straw are the most common mulch materials used in conjunction with direct seeding of soil. Straw mulch is preferable over hay mulch, which may contain weeds and other objectionable material. Straw mulch is the short-term protection most commonly used with seeding. Wheat or oat straw is recommended from the current season's crop (less than 12 months old). Average fiber length should exceed 6 inches.

Straw mulch is applied immediately after seeding, either by machine or by hand distribution. Anchor the mulch in place using a tacking agent, plastic netting, or punching into the soil mechanically. Plastic netting (see ES-11, Erosion Control Matting) requires wire staples, wooden stakes, or plastic stakes. If the slopes are too steep for netting, then tacking agents should be selected on the basis of longevity and ability to hold the fibers in place.

Shredded Vegetation

“Green” mulch is produced by recycling of vegetation trimmings such as grass, shrubs, and trees. Methods of application are generally by hand, although pneumatic methods are currently being developed. It can be used as a temporary ground cover with or without seeding. The green material should be evenly distributed at a depth necessary to prevent erosion. Anchor green mulch in place with a tacking agent on steep slopes and in areas where overland sheet flow is anticipated. The quality of green mulch may vary, and there is a strong potential for establishing unwanted weeds and plants.

Wood and Bark Chips

Wood and bark chips are suitable for landscaped areas that will not be closely mowed. Wood and bark chips should not be used on steep slopes and therefore do not require tacking agents. Wood chips may require nitrogen treatment (12 pounds/ton typical rate) to prevent nutrient deficiency. Bark chips do not require additional nitrogen fertilizer.

If there is a wood source near the project site, wood and bark chips can be very inexpensive. Caution must be used in areas of steep slopes, since both wood and bark chips tend to wash down slopes exceeding 6 percent. Wood and bark chips are also used around trees and shrubs, or in ornamental or landscape gardens. A typical depth is 2 to 3 inches.

Hydraulic Mulch

Hydraulic mulch can be made from virgin wood fibers or from recycled waste paper sources (newsprint, magazine). There are also mulches available which are a combination. In general, virgin wood fibers contain a longer fiber length than recycled paper mulch.

Hydraulic mulch is mixed in a hydraulic application machine (such as a hydroseeder or a mulch blower) and then applied as a liquid slurry. The hydroseeder slurry contains recommended rates of seed and fertilizer for the site, usually specified with a tacking agent. Slurry must be constantly agitated to keep the proper application rate and achieve uniform effective coverage.

Hydraulic application of seeding and other materials (hydroseeding) can be done quickly and efficiently with the correct equipment and ingredients. Also, hydraulic application must be done when no rainfall is expected, preferably within a 24-hour time period.

Virgin wood fiber mulch consists of specially-prepared wood fiber that does not contain any growth-inhibiting factors. The mulch is manufactured and processed so the fibers will remain in uniform suspension in water under agitation to form a homogenous slurry. The fiber lengths should be as long as possible to increase the effectiveness for erosion control. Wood fiber mulching should not be used in areas of extremely hot summer and late fall seasons because of fire danger. When used as a tacking agent with straw mulch, wood fiber mulches are good for steep slopes and severe climates.

A wood fiber mulch can be manufactured containing a tacking agent in each bag or specified without a tacking agent. A typical construction specification for wood fiber mulch is as follows:

- Composed of 100 % wood fiber.
- Moisture content (total weight basis) not to exceed 12%.
- Organic matter content (dry weight) = 99.3% minimum.
- Inorganic matter (ash) content (dry weight) = 0.7% maximum.
- Controlled pH values
- Water-holding capacity (dry weight) = minimum 1.2 gallons per pound.

A high-quality type of hydraulic matrix known as a Bonded Fiber Matrix (BFM) is generally manufactured for easy application by the appropriate equipment. It generally contains a tacking agent mixed with the wood fibers.

A combination mulch may include wood fiber and paper fiber, with a tacking agent. A hydraulic matrix can be formulated using varying quantities of these components. A typical mixture is as follows:

- 12 pounds per 1000 square feet wood fiber mulch.
- 24 pounds per 1000 square feet recycled paper mulch.
- 2 gallons per 1000 square feet acrylic copolymer (55% solids content).

Maintenance

- Avoid traveling on mulched and seeded areas. Maintain traffic barriers and fencing as necessary.
- Inspect mulched areas weekly and after rainfall for damage or deterioration. Replace as necessary. Continue inspections until vegetation is firmly established.

Limitations

- Organic mulches tend to lower the soil surface temperature, and may delay germination of some seeds. Organic mulches may also affect the pH of soil.
- The tackifier may lose adhesiveness during very cool weather or due to extreme temperature variations.

References

8, 9, 30, 31, 32, 33, 34, 35, 43, 114, 115, 123, 125, 126, 135, 136, 144
(see BMP Manual Chapter 10 for list)