

MULCH

A Landscaper's Guide to

M U L C H

**Save Money, Control Weeds, and
Create Healthy Landscapes**

Mulch

is any material spread evenly over the surface of the soil to enhance the growth of plants and the appearance of the landscape.

You can create beautiful, healthy landscapes that control weeds, conserve water, and reduce labor costs by using plant trimmings as mulch. Tree prunings, brush, grass clippings, and leaves that are chipped or shredded are called “green waste” mulch.

In nature, leaves and needles fall to the ground, creating an organic layer that protects and builds the soil. Local green waste mulch can offer the same advantage to the landscapes you maintain while increasing your profits. Using green waste mulch recycles plant material into a valuable tool for the professional landscaper.

Save Time & Money

Using mulch can simplify your maintenance operations by:

- Cutting weed growth, especially annuals by as much as 90 percent, significantly reducing labor costs.
- Decreasing the costs of buying and applying herbicides.
- Reducing the need for trimming grass around trees and poles.
- Conserving water and cutting the cost of irrigation.

Making your own mulch on site also saves the time and cost of trucking plant debris to the landfill as well as the expense of buying and transporting commercial mulches.

Create Healthy Plants

Mulch promotes healthy plants by:

- Reducing the competition from weeds.
- Keeping the soil moist and at an even temperature.
- Controlling erosion.
- Adding organic matter that feeds beneficial soil organisms.
- Preventing soil compaction.



In summer, 2 inches of mulch cuts water loss by 20 percent and lowers temperature in the top 4 inches of soil by 10 degrees. Young trees also establish themselves better and grow stronger roots under mulch than under bare ground.

Protect the Environment

Plant debris accounts for approximately 10 percent of what is thrown away annually in most areas. Much of that waste passes through the hands of professional landscapers. By using plant trimmings as mulch, landfill space is conserved, local soils are improved, and healthier landscapes are created, naturally.

Looking Good with Green Waste Mulch

Green waste mulch ranges from clean wood chips of a uniform size and color to mixed plant debris with particles of various sizes and colors. Many local parks are currently using mixed green waste mulch with success. It ages to a uniform silver color for a natural and attractive look. To get started, consider using mixed green waste to control weeds in less visible areas, such as behind buildings, or add a thin layer of a commercial mulch over green waste mulch to create a more uniform appearance.



Left: Designating a tree's dripline as a natural mulch repository can improve the health of the tree and create a dramatic design in urban landscapes.

Frank Ogawa Plaza, Oakland



“Green waste mulch is far less expensive than mulch from forest products.”

— Tom Del Conte, *President*
Del Conte's Landscaping
Fremont

Mulch Basics

1 Before applying mulch, remove weeds and water thoroughly.

You'll get the best weed control when you weed first, then spread the mulch. And it is often easier to wet the soil before applying mulch.

2 Replace grass with mulch under trees and around poles.

Mulching under trees to the drip line minimizes competition for water and nutrients from grass and mimics the way trees grow in nature. It simplifies mowing and can reduce trimming operations and labor. In addition, mulching around poles, tree trunks, and over surface roots prevents damage from mowers and weed eaters.

3 Keep mulch 6–12 inches away from the base of trees and shrubs.

Tree trunks are not suited to wet conditions. Placing mulch so that you can see the root flare keeps the trunk dry and reduces the risk of damage from disease, insects, and rodents.

4 Choose the application rate that will give you the best results.

- **General Use:** Apply a layer that settles to 2–4 inches deep. This is the best general application rate, especially for use in planting beds.

“Adding mulch to the bare soil helps the landscape professional delay the next irrigation cycle and meet plant needs.”

— David Langridge, *Water Conservation Representative*
East Bay Municipal Utility District

“Mulch at the base of trees is critical for healthy tree growth in turf areas.



Turf can rob trees of needed water, create shallow tree root growth, and mowers too close to the trunks can destroy the bark and kill the tree.”

— Lisa Caronna, *Director, Parks and Waterfront,*
City of Berkeley

“If you’ve got a mulch layer, you can just pick the weed out.



If there’s no mulch, you just snap the top off and the weed will come right back.”

— Stephen Williams, *Owner,*
Stephen Williams Landscaping,
Piedmont

“Coarse mulch gives you the best weed control. For nutrient supply, fine material works best.”



— Mitch Matsumoto,
General Manager
Vision Recycling
Fremont

“Heavy mulching lasts longer than herbicide treatment and can be applied with low-cost labor. Herbicides must be applied more frequently and by highly trained, licensed personnel.”



— Richard Applebaum, *President and General Manager*
East Bay Landscaping Co., Inc.

“You always hear that mulch from raw green waste has a nitrogen drag. In my personal experience, that’s just not true. I’ve personally seen great success with putting raw chipped trimmings back into the landscape as mulch.”

— Tom Del Conte, *President*
Del Conte’s Landscaping
Fremont

- **Fine Mulch:** Apply no more than 2 inches. Thin layers of fine mulch (particle size of half-inch or less) are less likely to impede air and water. Fine mulches decompose more quickly and need to be replenished more often than coarse, woody mulches.

- **Coarse Mulch:** Use 4–6 inches or more to control weeds in open spaces. Coarse mulch is best for weed control; it prevents annual weed seeds from germinating. Weeds that do sprout are easier to remove. For maximum weed control, replenish mulch once a year.

- **You can have too much of a good thing:** Use lesser amounts of mulch on poorly drained soils.

5 Keep mulch on top of the soil to prevent tying up nitrogen.

Any woody material that is incorporated into the soil will temporarily inhibit the soil’s ability to supply nitrogen to the plants. However, according to research, mulch only uses nitrogen at the soil surface, and not from the root zone. If you do not turn mulch into the soil, you’ll prevent nitrogen drag.

HOW MUCH MULCH TO BUY OR MAKE?

- *One cubic yard covers 108 square feet, 3 inches deep.*
- *Six cubic yards cover 1,000 square feet, 2 inches deep.*

LOCAL GREEN WASTE LANDSCAPES



Campanile, UC Berkeley. Trees beneath the Campanile on the UC Berkeley Campus are mulched with mixed green waste.



Mulch made on-site from trees infected with Pine Pitch Canker at East Bay Recreation and Park District Headquarters, Oakland.

Open space in Fremont is enhanced with mulch made on-site using mixed green waste.



Locally produced wood chips are used in the beds and paths at the Chancellor's home, UC Berkeley.



GREEN WASTE MULCH TYPES

And How to Use Them Successfully

Mulches created from plant materials have the advantage of decomposing and adding organic matter to feed beneficial organisms and improving the soil structure. There are many types of organic mulches that vary in cost, appearance, and longevity.

Bark has long been sold commercially and is made from lumber and paper mill by-products. Bark tends to have a uniform size and appearance, but does not readily supply nutrients; it also comes from distant forests and is relatively expensive.

Green waste mulch is becoming more readily available, is locally produced, and is less expensive to purchase. It can be produced on-site and can sometimes be obtained free from arborists, utility companies, or parks. It tends to be less uniform in appearance but supplies a broader array of nutrients to the soil.

Here are some common green waste mulches and recommendations for using them with success. Consider that sometimes blending two or more products provides you and your clients with the benefits of each.



Chipped or Shredded Wood Waste from used pallets or used lumber is an attractive mulch on paths and picnic areas. The nails and other metal are removed and the pieces can be colored to look like pine, hardwood, or cypress. When waste wood breaks down, it releases insignificant amounts of nutrients to the soil.

Longevity: Long

Recommendations:

- Use on paths or at construction sites to reduce compaction from heavy foot traffic or heavy equipment.



Wood Chips and Shavings can be made from many kinds of trees and make excellent mulch. They are attractive and stay in place, but may turn silver on the surface more quickly than bark. Wood chips are sometimes available free, usually in large quantities, from utility or tree companies, but not always on a regular basis.

Longevity: Medium Long

Recommendations:

- To keep wood chips looking best, rake every year and add a new layer every 2–3 years.
- Before you buy, determine how the chips have been stored and check for a sour smell that signals chips haven't been stored properly.



Pine Needles are attractive. They don't pack down to form mats and they resist decomposing. Pine needles are light and usually weed-free. Although pine needles don't absorb water, they let it trickle through to reach the soil surface. Pine needles have a low pH and are traditionally used around acid-loving plants even though they don't tend to significantly impact the soil's pH.

Longevity: Medium Long

Recommendations:

- Spread 3 inches deep around evergreens, azaleas, and other acid-loving plants.

Mixed Green Waste Mulch provides a broad range of nutrients and trace elements essential to build healthy soil. It can be any combination of the materials listed above, plus chipped brush and other plant trimmings. You can produce it on-site with a chipper/shredder. It settles more quickly than pure bark or wood because the leafy material breaks down rapidly. This decomposition allows nutrients to be recycled back into the soil.

Longevity: Medium

Recommendations:

- Use mixed green waste mulch where generated to minimize the spread of weeds and diseases.
- Ask your source if the mulch has been composted and for how long. Composting green waste mulch at high temperatures destroys weed seeds and disease-causing organisms.
- For best color and maximum weed control, replenish every year.
- Sift out fines for better weed control and air movement to the root zone, or leave them in for nutrient and organic matter additions to the soil.



Compost is plant and other organic matter that has gone through a controlled decomposition process. It provides many valuable nutrients and improves soil structure. Used as a mulch, it may not control weeds because seeds can germinate and grow in the compost. This is especially true in windy areas where weed seeds can blow onto compost and grow.

Longevity: Medium

Recommendations:

- Apply a layer of coarse, woody mulch on top of the compost for better weed control.
- Around new plants, use composts with salt content less than 3dS.
- Select particle size for aesthetics.
- Replenish annually.



Leaves are plentiful and readily break down, creating natural mulch that contains valuable trace elements. Leaf drop is nature's way of returning nutrients and organic matter to the soil. However, leaves can be carried away by heavy rain or wind.

Longevity: Short

Recommendations:

- Let oak, beech, and sycamore leaves lie where they fall to return nutrients to the soil.
- Chop other kinds of leaves with a mower—especially maple, birch, or elm leaves, which tend to form a mat that blocks air and water. Distribute chopped leaves 2–3 inches deep, mixed with grass clippings and other trimmings, if you have them, under a tree's dripline.
- Replace every year.
- If a lawn is covered with a light layer of leaves, mow over the leaves to chop and distribute with clippings between the blades of grass as a mulch.



Grass Clippings are a good source of nutrients, including nitrogen, because they decompose rapidly. Leaving the clippings on the lawn is the best use. They can be used as mulch when they are too long to leave on the lawn; if applied too thick they can form a mat.

Longevity: Very Short

Recommendations:

- Hide clippings under a broadleaf ground cover such as ivy. Evenly disperse clippings over the canopy, then rake lightly so they settle to the soil surface.
- Mow before weeds have gone to seed.
- Avoid using clippings from invasive turf species, such as kikuyu.
- Avoid using pesticides that make clippings undesirable as mulch. As found by the U.S. Environmental Protection Agency, picloram and clopyralid are especially resistant to decomposition and can contaminate compost or mulch made from grass treated with these products.



Applying Mulches

Spreading mulch is often a hands-on task. Use a front-end loader whenever possible to move and spread mulch or to make small piles that are then spread out by raking.



- **Volunteers.** The City of Livermore has had success attracting 200 volunteers to an Earth Day event to help spread mulch and plant 100 trees along a bike path. This approach could be used with other civic events such as Arbor Day or cleanup days.

Additional options for applying mulch include:

- **Pneumatic Blowers.** For large jobs that don't have dense plantings, mulch can be applied through a blower system. This works best for coarse materials, since using a blower with fine mulch or compost can create a lot of dust.



- **Mulch On-Site.** When chipping materials on site, the chipper may be moved and directed to blow the chips in the area where the mulch needs to be spread. This works best in open areas vs. near buildings and planting beds. Block off a generous application zone to prevent workers or passersby from being injured.



Reducing the Spread of Plant Diseases

- Keep mulch away from tree trunks or the crowns of woody ornamentals.
- Keep mulch on the soil surface. This reduces direct contact between disease organisms and plants.
- Consult an arborist who can help you diagnose problem trees or shrubs before you chip.
- In general, if trees are clearly diseased, avoid using their prunings for mulch unless they are composted to kill disease-causing organisms.
- Special notes for trees infected with:

Pine pitch canker. In order to help prevent the spread of the disease, it is best not to transport infected tree prunings. A recommended practice to reduce infection risk is to chip infected materials and spread the mulch on or near the site of origin. Chips should be spread in a thin layer to promote rapid drying.

Sudden Oak Death. Avoid cutting diseased oaks from mid-October to the end of April. Chip the branches and use the chips on-site as mulch. Split the wood for firewood and leave it on-site as well. Promote drying by placing it in a sunny location. Do not grind the stump; tightly cover it with clear plastic to kill the fungus and insects. Avoid transporting chips or firewood as it contributes to the spread of the disease.

Dutch Elm disease. Prune infected trees only from November to early March. Pruning at other times of the year, when the beetle that carries the disease is active, leaves wounds on the tree that attract the beetle and thus spreads the infection.

Any diseased material that is removed from a site should be tightly covered with a tarp during transit and taken to the nearest compost or disposal facility for prompt chipping and composting, burial, or burning. Tools and machinery used to prune, cut, or chip diseased trees should be cleaned and sterilized before use on uninfected trees or in uninfested areas.

For more information, visit the websites listed in “Other Resources” on the back of this guide.

“In runoff areas, I layer mulch on top of gullies. And there are no more gullies.”



— Greg Harrington, Gardener
University of California
Berkeley

“We replenish mulch annually during December and January, when we’re cutting all the plants back and we have easy access.”

— Stephen Williams, Owner
Stephen Williams Landscaping
Piedmont

“We try to chip what we prune directly back into the landscape, right where we take it out.”



— Mike Perry, Groundskeeper III,
Landscape Maintenance
City of Livermore

“Weed cloths and plastic work for a time, but in the end, they’re not worth it and they create waste disposal problems. It’s better to use locally-produced, organic materials.”

— Lisa Caronna, Director, Parks and Waterfront
City of Berkeley

REDUCE & RECYCLE PLANT TRIMMINGS

Generate Less

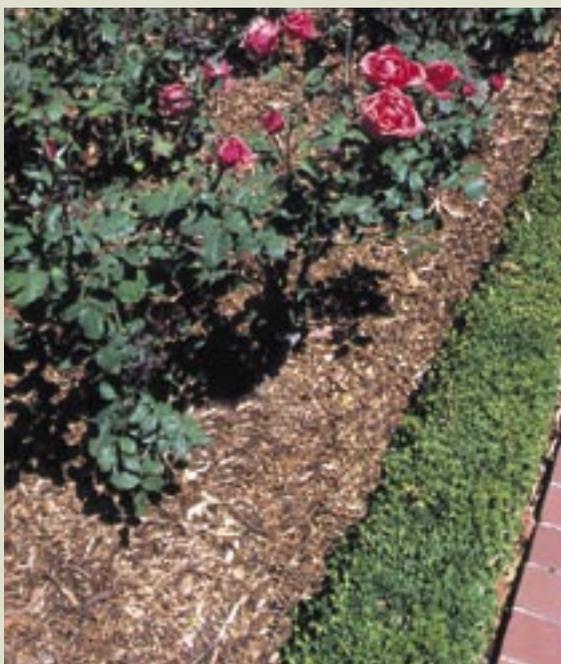
- Give plants only the water and fertilizer they need; overwatering and overfertilizing creates excess plant growth and promotes plant diseases.
- Group plants that have similar watering needs to prevent overwatering and excessive plant growth.
- If you are designing the landscape or can influence its design:

Avoid overplanting. Allow enough room for the plants to grow to their mature size, eliminating the need to continually prune or remove excess plants later.

Plant the right plant for the microclimate. Consider the amount of light, temperature range, and water provided by the site and select plants accordingly. Healthy plants won't need removing and replacing.

Suggest the use of more native plants, which are naturally adapted to local climates and soils, and fewer exotic plants.

Do not plant invasive plant species such as Scotch, French, or Spanish broom, or pampas grass.



Replace sheared bushes with plants that naturally grow to the desired size without shearing. Your clients' landscape will generate less waste and you will significantly cut your labor costs for maintenance.



Recycle More

- Grasscycle by leaving grass clippings on the lawn.
- Compost or mulch plant trimmings on-site.
- Use compost or mulch. Compost builds healthy soil and reduces the need for commercial fertilizers.
- Avoid using pesticides containing clopyralid or picloram, which are especially resistant to decomposition and can contaminate compost or mulch made from grass treated with these products.
- Turn trees into lumber. Mill large trees that need to be removed.
- Get a "clean green" discount at local landfills and transfer stations by separating plant trimmings from trash at the point of collection.
- At large sites, dedicate a bin to plant trimmings only. It may be available from the hauler for a lower collection fee.

Mulch Application Guide

Throughout California, mulch materials are successfully being used in a variety of landscaping applications. This guide outlines major end uses, benefits, characteristics, application instructions, and some buying tips for bulk purchases. The focus of the guide is on mulch materials made from urban green waste sources like shredded or chipped wood waste (such as shipping pallets or used lumber), wood chips and shavings from woody tree prunings, and chipped or shredded brush and shrub trimmings.

Major Landscape Mulch End Uses:

- Water Conservation
- Weed Suppression
- Dust Control
- Mud Abatement
- Erosion Prevention
- Sediment Control
- Landscape Topdressing (and Lawn Alternative)
- Plant Protection and Enhancement
- Fire Suppression (over hillsides and around homes)
- Topsoil Production
- Urban Agriculture

Mulch Benefits for Landscape Plants:

- Retains moisture and rain runoff, reducing watering cost.
- Keeps soil temperature constant, reducing plant stress.
- Suppresses weeds, reducing the need for hand labor and herbicides.
- Gradually increases soil organic matter, attracting beneficial organisms that improve soil fertility and porosity.
- Increases disease and pest resistance, reducing chemical and pesticide usage.
- Protects soil from erosion and from compaction due to traffic.
- Protects roots from mechanical injury.

Matching Mulch Characteristics to End Use Application

Mulch users will get the best results by using mulch with characteristics best suited to the requirements of their particular end use. The main considerations are visible to the eye: particle size and consistency; lack of visible contaminants (like plastic or glass); color; and feedstock source such as bark chunks, shredded bark, wood chips, or shredded bush trimmings with leaves.

By requesting specific mulch characteristics rather than a particular material, it is usually possible to get material at lower cost, from a supplier closer at hand, and often with better qualities for your own particular use. Sometimes it is easier to simply specify a particular feedstock. Suppliers differ in the kind of product they make, and some blend feedstock materials as part of their service.

The following table lists the major end uses of mulch, along with associated benefits, preferred characteristics, and application instructions for each end use. This can be used as a basis not only for applying the material on-site, but knowing how much mulch to order.

End Use	Benefits	Characteristics	Application
Water Conservation	Used as a ground cover over bare soil and planting beds, helps reduce water evaporation and the need for frequent watering.	Fairly coarse particles from 2 to 4 inches in size. Use chipped or shredded tree bark or chips from prunings. Avoid treated lumber and green waste with disease organisms.	Spread 4–6 inches deep in planting beds and under trees at least out to drip line. Keep 6–12 inches away from stems and trunks to avoid disease or pest problems.
Weed Suppression	Applications to bare soil hinder weed seed germination and growth by blocking sunlight. The few weeds that grow can usually be pulled by hand.	Irregular-sized chipped or shredded woody materials from 2 to 8 inches in length. Use green waste feedstock materials that are free of seed contamination or a large quantity of leaves.	Spread evenly over ground after removing weeds. Spread 4 to 6 inches deep in large planting beds. Spread deeper in heavily weeded areas. Replenish annually.
Dust Control	Mulch materials applied over surfaces of dirt roads, trails, or open areas will reduce dust from traffic and wind.	Coarsely shredded or chipped mixed green waste materials 2 to 6 inches in size.	Spread a layer of mulch 2–3 inches deep over the surface of dirt roads, trails, or open areas.
Mud Abatement	Used as a ground cover over wet areas to soak up moisture, reduces slipping hazards, and provides foundation for foot or vehicular traffic.	Irregular-sized chipped or shredded woody materials from 2 to 6 inches in length.	Spread 3–6 inches deep over muddy ground to create temporary dry pathways around construction sites, parking lots, recreation areas, and roadways.
Erosion Prevention	Reduces soil erosion by cushioning impact of heavy rainfall on steep slopes and increasing soil water holding capacity.	Mixture of unscreened coarse and fine particles from 1 to 4 inches in length made from chipped or shredded bark, wood waste, and tree and yard prunings.	Spread 2–4 inches deep on gentle slopes in dry climates. From 5–8 inches on steep slopes in wet areas. <i>Place up to very top of slope to prevent washouts.</i>

End Use	Benefits	Characteristics	Application
Sediment Control	Mulch constructed as a raised berm on sloping land filters stormwater flows, contains soil erosion, and traps moving sediment.	Mixture of unscreened coarse and fine particles from 1/2 to 3 inches in length made from chipped, shredded, or ground bark, wood waste, or tree prunings.	Construct berm 1 1/2 to 2 feet high by 3–4 feet wide parallel to slope base on water runoff sites. Use material on landscape when no longer needed in be.
Landscape Topdressing	Provides decorative alternative to high maintenance groundcovers and turfgrass lawns on bare areas between new or established planting beds.	Use uniformly shaped small- to medium-sized particles from 1 to 3 inches in length. Natural or colored chips derived from bark, recycled wood products, or tree prunings.	Apply a 2- to 4-inch uniform layer on soil surface for an aesthetically pleasant finish to landscape.
Plant Protection & Enhancement	Helps insulate plant roots during drastic temperature changes, prevents certain fungal diseases, and reduces compaction from heavy traffic or in construction areas.	2- to 4-inch irregularly sized particles from chipped or shredded woody materials, tree prunings, or mixed green waste. Avoid treated lumber and urban wood waste.	Spread around base of plants and trees, taking care to keep mulch from touching stems or trunks. Spread mulch to a depth of 4–6 inches at least out to the drip line of plant.
Fire Suppression	Mulch spread over hillsides will reduce fire propagation and prevent erosion and grow-back of weeds and brush in cleared areas up to several years.	Coarsely chipped woody materials and prunings from on-site brush removals and vegetation clearing reapplied around hillside homes. Saves cost of removal, hauling, and disposal.	Apply 3 to 4 inches thick in landscape around home sites and 4 to 6 inches deep on hillside slopes. <i>Check local fire officials for vegetation removal requirements.</i>
Topsoil Production	Incorporated into topsoil mixes, organic mulches will act as a binding agent; increase water holding capacity, soil organic matter content, and porosity.	Finely screened 1-inch minus mulch fines from chipped, shredded or ground bark, wood, or landscape prunings with no contaminants. Avoid treated lumber and diseased green waste.	Mulch material is mixed into screened native soils from 10 to 30 percent by volume for most landscape topsoil blends.
Urban Agriculture	Mulching controls weeds, saves water, and increases nutrient uptake and soil fertility. Can reduce incidence of root-rot fungus (phytophthora) and nematodes in avocado and citrus trees grown in infected soils.	Irregular-sized chipped or shredded woody materials from 2 to 8 inches in length. Only use green waste materials that are free of seeds and disease organisms. Also avoid materials made from chemically treated lumber.	Spread around base of plants and trees taking care to keep the mulch material from touching the stems or trunks. Mulch to a depth of 3 to 5 inches around row crops and from 4 to 6 inches at least out to the drip line of trees.

How Much Mulch Do You Need To Buy?

Most bulk sales of mulch are usually measured in cubic yards (CY). This is a convenient measure for loading vehicles, without the use of truck scales. Use the following formula to calculate the volume required:

Area (in sq. ft.) x Depth (in ft.)/27 = Cubic Yards Required.

To illustrate the amount of mulch you'll need:

Cubic Yards (CY) Needed for Depth of Coverage

Square Footage	2" Layer	4" Layer	6" Layer	8" Layer
1,000	6	12	19	25
5,000	31	61	93	124
10,000	62	122	185	247
20,000	124	244	370	494
30,000	186	367	556	741
43,560 (1 acre)	269	532	807	1,076

You can scale these numbers up or down in proportion to your own site needs

Tips on Where and How to Buy Materials

Mulch is bulky and a large fraction of the purchase price may consist of shipping it to your site. So it pays to begin looking for supplies near to your own area. Most large cities in California now have mulch supplies close at hand. However, the closest vendors may not provide all the services or quality of materials you need for your application needs. In choosing a supplier, keep in mind that you need to weigh the following factors:

- Price of material FOB plus the cost of delivery (reflecting travel distance).
- Other specific services provided (delivery, spreading, technical assistance).
- Suitability of material for your own particular end use.
- Quality of material beyond the minimum requirements.

Most commercial vendors take pride in supplying a high quality product, because sales depend greatly on reputation and word of mouth among users who know the benefits of using mulch. Some characteristics to look for in a supplier:

- Good location and a neat, spacious site capable of stocking a good inventory.
- Guaranteed product availability, reliable delivery, and clear pricing schedules, including possible discounts for off-season or high-volume sales.
- Reputation and knowledgeable, friendly customer service, with staff who answer phone calls promptly, offer information, and take time to answer questions.



Health and Safety

Preventing Allergic Reactions

Always have your crew wear safety gear such as gloves, boots, and pollen masks when handling mulch. Loading, spreading, or turning mulch can trigger allergic reactions in people or cause serious injury. This is especially true with shredded redwood, mulch from sycamore trees, or mulch that has been stored too long. Keep your eye out for poison oak and do not use in greenwaste mulch.

Preventing Fire

- Storing mulch in piles less than 8 feet high and separating the fine material when possible helps prevent spontaneous combustion. Have a water source available in any case. Don't mistake steam from a pile that is composting as smoke.
- Shredded redwood bark (gorilla hair) ignites easily. Use it only in areas where people won't drop cigarette butts or matches.



SOURCES

for Green waste Mulch

- The California Integrated Waste Management Board maintains a voluntary listing of local businesses that market organic products including green waste mulch materials. Visit the Board's website at www.ciwmb.ca.gov/Organics/.
- For a list of urban wood waste and construction materials recyclers, processors, and receivers, see the C & D Debris Recyclers Database at www.ciwmb.ca.gov/Condemo/.
- Use CalMAX...a free service that helps businesses find materials that are usually discarded. The "organics" section in this database has listings for green waste mulch materials. see www.ciwmb.ca.gov/CalMAX/.
- Identify local sources of green waste materials with the help of city or county recycling coordinators. Contact CIWMB staff at (916) 341-6199 for the name and phone number of your recycling coordinator, or look in your telephone directory.
- To arrange for truckload quantities of free green waste mulch materials, contact tree care companies listed in your local yellow pages.



Other Resources

Helpful landscape information and related websites:

- * The California Integrated Waste Management Board's "Organics Outlook" website at www.ciwmb.ca.gov/Organics/Landscaping/ has more information and publications on resource-efficient landscape management practices for commercial landscapers.
- * Visit the Board's website at www.ciwmb.ca.gov/RCP/ for a Recycled-Content Product Database listing a multitude of products made from recycled-content materials used in buildings and landscapes. Products include edging, tree guards, irrigation equipment, benches, plastic lumbers, paving, fencing, decking, and many more items.
- * For the California Landscape Contractors Association booklet "Resource Recovery Handbook" contact Larry Rohlfes, phone (916) 448-2522, e-mail larryrohlfes@clca.org.
- * The California Urban Water Conservation Council's Web site focuses on water resource management issues and best management practices at www.cuwcc.org.
- * For information on water-wise gardens and sustainable landscapes, visit the U.S. Bureau of Reclamation's website at www.watershare.usbr.gov.
- * Visit the Irrigation Association website at www.irrigation.org, which covers conservation of quality and quantity of groundwater.
- * For more information on invasive plant species in California, visit the Cal Weed website at <http://endeavor.des.ucdavis.edu/weeds/>.
- * *Pine Pitch Canker* website: http://frap.cdf.ca.gov/pitch_canker/.
- * *Sudden Oak Death* website: <http://cemarin.ucdavis.edu/index2.html>.

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