

Local Use of Compost and Mulch Guide



Produced by
New Mexico Recycling Coalition



with the
New Mexico Organics Recycling
Organization



This guide is also available online at
www.recyclenewmexico.com

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ORGANICS RECYCLING OVERVIEW

New Mexico Recycling Coalition

The New Mexico Recycling Coalition (NMRC) is a non-profit statewide professional membership organization that has a mission to lead New Mexico to value waste as a resource. This goal is reached primarily through education and advocacy projects. With 250 recycling members, the organization supports itself from dues, trainings and conference revenue. Several special projects are funded by grants. Joining NMRC helps support efforts such as this, to educate professionals and the public about the value of recycling.

New Mexico Organics Recycling Organization (NMORO)

- ◆ NMORO is a project of NMRC that supports development of organics recycling via private business and municipalities by providing technical assistance.
- ◆ Creates resources for the organics recycling community.
- ◆ Ensures organics recycling is included in recycling efforts throughout the state and in NMRC's mission.

New Mexico Environment Department: Solid Waste Bureau

The New Mexico Environment Department (NMED) plays a critical role in organics management support with the development of content and instruction of the New Mexico Compost Facility Operator Certification Course. All composting facilities must register with NMED in order to operate.

Local Use of Compost and Mulch Applications

When collecting yard waste and organic materials, and then making the choice to mulch the material and to possibly compost it for diversion, knowing that the material will have practical uses locally is essential. The situation is similar to collecting any other recyclable item, you must know your markets and how local businesses, government and citizens can use this material. This guide will provide a variety of local uses for both mulch and compost.

Uses Outlined In This Guide Include:

- Parks and Recreation Uses
- Golf Courses
- Organic Farms
- Land Remediation
- Erosion Control
- Slope Stabilization

ORGANICS RECYCLING OVERVIEW

Managing Organic Material In the Rural Environment

Many rural communities are able to readily manage yard waste for diversion as a front-line tactic to reducing their waste stream entering landfills. The material is easier to sort at drop-off facilities in many cases where drop-off attendants can talk with each resident. Most rural communities either own or have access to a small chipper that can be used to reduce the material into mulch.

In fact, Harding County is able to recycle 21% of their waste stream through the wise management of recycling yard trimmings and scrap metal. The county does not currently have a collection program for “traditional” recyclables. From the two rural drop-off stations managed in the county, 104 tons of brush or green waste were recycled or beneficially used onsite and 11 tons of scrap metal, making the County’s diversion rate jump up to 29%.

State of Organics Management in New Mexico

According to information reported to the New Mexico Environment Department: Solid Waste Bureau in 2012, facilities that accepted brush and green waste managed 63,989 tons for onsite recycling or composting, 13,719 tons were recycled or composted offsite of the collection facility, 5,237 tons were beneficially used onsite and 174 tons were beneficially used offsite.

Why Divert Organics Material from Landfills

- To extend landfill life span. EPA estimates that almost 14% of the waste stream is green waste and almost 15% is food waste.
- To provide the public, local government and businesses with a valuable locally-generated and created product. The product is useful for landscaping projects at the community level, e.g. parks & recreation and golf courses.
- To serve as an effective soil erosion, roadside, roadway and soil/land remediation product.
- To create a beneficial product for use at the landfill (e.g. mortality or septage composting).
- To serve as a very effective tool to rapidly increasing diversion rates

Incentives to Recycle Organic Materials

In order to promote organics diversion in your community, choosing to set a lower tip fee than regular trash rates provides an incentive for customers to cleanly sort organic material for diversion and thus saves customers money by doing so. Educating customers on the process to keep the material clean of contaminants also reinforces clean material. The organics program benefits with high volumes of clean material. To ensure sustainability of your program, make sure that the tip fee for organic materials covers your operational costs, or on the flip side, charge an appropriate fee for processed material.

ORGANICS RECYCLING OVERVIEW

Challenges to Organics Recycling in New Mexico

Besides start-up costs of equipment purchase (if not already part of the solid waste management program), handling organic material is relatively cost efficient. A small yard waste mulching program could run smoothly with a safe storage location and a rented grinder a couple of times each year. As the material is handled locally, cost for transportation is minimal.

What About Greenhouse Gas Emissions and Composting?

Many times people have expressed the concern that composting organic material generates greenhouse gas emissions. When you use the EPA WARM calculator, organic material diversion shows an increase in emissions. But the emissions of organic material placed in a landfill (methane) is different and much more potent than the emissions created in the composting process (CO²).

Simply explained, one of the natural byproducts of decomposition is CO². That CO² is then absorbed by the trees and plants that need it for life, creating a "carbon neutral" situation. When 100 tons of yard waste are landfilled instead of composted, the waste decomposes under anaerobic conditions and produces methane, which is 21 times more potent than CO², thus equal to adding 84 cars to the road.

Regulatory Requirements for Organics Programs

All composting programs are required to submit a Notice of Intent to NMED and file a simple registration form with NMED: Solid Waste Bureau. If your program is only mulching material there is no registration requirement with NMED, however you must be sure your facility permit or registration's operations plan has been updated to include your organics diversion and mulching program (see page 21). It is also recommended to check your local ordinances, as well as NMED: Air Quality, EPA, Fire Department, OSHA and DOT to ensure compliance. NMORO can advise which entities are relevant for your operation.

Compost Facility Operator Certification Course

- ◆ Three-day training course held twice a year
- ◆ Hosted by NMRC and NMED
- ◆ All registered composting facilities are required to have a certified operator that has taken and passed the Compost Course test
- ◆ The best source of organics diversion training in the state
- ◆ More info at www.recyclenewmexico.com

ORGANICS RECYCLING OVERVIEW

The Case to Make Compost

In programs visited around the state, NMRC has found that entities that create compost generally do not have any issues giving away or selling their compost. In fact, many run out, wishing they had more. Programs that create mulch in smaller communities are able to create a high quality mulch due to manageable volumes – especially those that use a hand-fed chipper and can control contaminants. In programs that have a full-sized grinder, contamination control is essential at the drop-off gate. It is more challenge to find local uses for larger-sized chips as these are not as desirable as smaller chips or screened chips.

The case to make compost as a long-term programmatic goal is two-fold. First, you will create a valuable material that has high desirability and thus marketability. It also creates an opportunity to manage a higher volume and more diverse supply of organic materials, such as food waste for composting. The tools to transform a community’s mulch program into a compost program are provided in the Compost Facility Operator Training Course twice a year.

Material Type	Pros	Cons	Suggestions
MULCH	Simpler to manage	Harder to find end uses	Screening improves product
	Improves soil health	Contaminants can ruin equipment	Reduce tip fee rates to ensure clean product is brought to facility
	Retains moisture	Contaminants in final product reduce ability to sell or give away end product	Creating plan to help citizens load material on a fee-based schedule or for free will help move product
COM-POST	More end uses increased value	Increased management time	Screening improves product and provides for consistency
	Improves soil health	Odor and vector management	Compost can be sold as a valuable soil amendment
	Provides nitrogen to enrich soil	Best if water onsite	Compost piles can be statically or actively managed. Depends on ideal time frame to create product
	Retains moisture Effective for land remediation Adds value to wood chips - makes wood chips more useful		

ORGANICS RECYCLING OVERVIEW

The Next Frontier: Food Waste Diversion

Food waste consists of almost 15% of the waste stream. The first place to start in your community is to link up large generators of still-consumable food with a local shelter or food bank. Check out the New Mexico Association of Food Banks for information: www.nmfoodbanks.org. Currently there are only two private businesses in the state collecting food scraps for composting. If your community were to look at diverting food waste, please contact the NM Organics Recycling Organization to receive guidance on the how tos, dos and don'ts and challenges. Online guidance for all types of food waste management is at www.recyclenewmexico.com/foodwaste.htm

Benefits of Using Compost (Source: U.S. Composting Council)

- Improves the soil structure, porosity, and density, thus creating a better plant root environment.
- Increases infiltration and permeability of heavy soils, thus reducing erosion and runoff.
- Improves water holding capacity, thus reducing water loss and leaching in sandy soils.
- Supplies a variety of macro and micronutrients.
- May control or suppress certain soil-borne plant pathogens.
- Supplies significant quantities of organic matter.
- Improves cation exchange capacity (CEC) of soils and growing media, thus improving their ability to hold nutrients for plant use.
- Supplies beneficial microorganisms to soils and growing media.
- Improves and stabilizes soil pH.
- Can bind and degrade specific pollutants.



ORGANICS PLANNING WORKSHEET

Assessing The Launch or Expansion of Yard Waste and Organic Material Diversion Programs

Step 1 - Assess Situation

How Much Does It Cost You To Landfill Organic Material? \$ _____/ton

- ◆ Tip Fee: Include in the cost per ton items such as transport, labor, equipment, maintenance costs
- ◆ Costs if Landfill Owner: Assess all costs, including labor, equipment, overhead, insurance, compliance, long-term landfill costs (air space), etc.

What is Your Cost of Operation if Operating a Transfer Station to Manage Materials? \$ _____/ton

What is Your Cost to Handle Biosolids/Waste Water Sludge? \$ _____/ton

What is Your Cost to Haul Waste from Transfer Station to Landfill? \$ _____/ton

Managing organic material for recycling saves landfill air space, reduces methane creation, creates a valuable resource and in most cases is cheaper per ton to recycle it.

Determine All Organic Materials To Be Managed – Check All That Apply & Include Estimated Annual Tonnage/Cubic Yards of Material:

- | | |
|-----------------------------------|----------------------|
| ◆ Yard Waste _____ tons or cu yds | ◆ Scrap Lumber _____ |
| ◆ Forest Slash _____ | ◆ Biosolids _____ |
| ◆ Agricultural Waste _____ | ◆ Manure _____ |
| ◆ Food Waste _____ | ◆ Septage _____ |
| ◆ Animal Mortality _____ | |

Will You Mulch or Compost the Material? _____

Mulch can be created with an exclusive yard waste/scrap lumber/forest slash collection program or a mixture of appropriate feedstocks for composting.

Evaluating Site Needs for Mulching and Composting

- ◆ Does site have water source? Can it be trucked in to add to compost mix and/or prevent fire?
- ◆ Does your entity own a grinder or chipper? Can your entity purchase, rent or borrow a grinder or chipper?
- ◆ Do you have space to collect the material safely? Estimate space needed by assuming 50% of organic matter now landfilled will be diverted to composting/mulching area.
- ◆ Do you have access to a front loader?
- ◆ For composting, do you have access to wet material, water or biosolids?
- ◆ For composting, do you have space for windrows or other method? Have you evaluated the time frame for material to complete process? Assume 10 ft² of windrow area for every cubic yard of material to be composted.
- ◆ If composting, have you planned outreach to neighbors to ensure they are informed and know about possible odor issues and neighbor issues?

ORGANICS PLANNING WORKSHEET

Evaluating Site Needs for Mulching and Composting

- ◆ Have you reviewed state and local solid waste ordinances in regard to mulching and composting?
- Will you charge a reduced fee for clean green waste in order to incentivize
- ◆ customers to bring in properly sorted green material? Ensure that you determine fees necessary to cover the organics operations' cost.
- ◆ How much will you sell the material for?

Step 2 - Determine Costs

Start-Up:

- \$ _____ Planning, Designing, Reporting and Registration of a Certified Composting Facility
- \$ _____ Property Improvement to Handle Organic Material Recycling
- \$ _____ Grinder /Chipper Purchase
- \$ _____ Grinder Rental (Consider quarterly or semi-annually)
- \$ _____ Grinder Borrowing (Estimate fuel and maintenance costs)
- \$ _____ Screen Purchase or Rental
- \$ _____ Windrow Turner Purchase or Rental (Note: Loader can be used for this purpose)
- \$ _____ Front Loader
- \$ _____ Water Line Installation or Water Trucked In
- \$ _____ Consider Replacement Cost for Equipment Per Life Span
- \$ _____ Consider Compliance Costs (Zoning, OSHA, Fire, EPA, DOT)

Ongoing Costs:

- \$ _____ Cost of labor to operate composting or mulching program
- \$ _____ Fuel costs for machinery
- \$ _____ Ongoing maintenance, repair, and supply costs for machinery
- \$ _____ If charging a reduced fee for organic material, will this reduce your program income?
- \$ _____ Cost of water and other supplies
- \$ _____ Depreciation & Overhead

ORGANICS PLANNING WORKSHEET

Step 3 – Benefits

Diversion Benefits:

Annual Amount of Material Entering Landfill or Transfer Station

_____ Tons/Cu Yards

National Averages Predict the Following:

13.5% of Waste is Represented in Yard Trimmings

6.3% is Wood Scrap

14.5% is Food Waste

Estimate the % of Material You Expect to Divert with your Organics Program

(Note: You can use a baseline of 50% of organic material now landfilled that will then be diverted)

_____ %

Avoided Material Entering Landfill in Tons

(multiply annual tons/cu yds before organics program by percentage)

_____ Tons/Cu Yards

Environmental Benefits:

- ◆ By reducing organic material in our landfills, a major source of methane is reduced. Methane is a greenhouse gas that is 21 times more potent than CO₂.
- ◆ Landfill life can be greatly expanded by reducing a bulky item.
- ◆ Valuable End-Product – If Used by Community for Landscaping = Cost Saving to Community by Avoidance of Mulch/Compost Purchase, And value of implementing erosion control practices, water savings, electrical/heating savings, etc. Sales prices range from \$5/yd³ to \$40/yd³ (depending on market).



MULCH—OVERVIEW

Mulch Overview

The US EPA defines mulch as a layer of material (wood chips, straw, leaves, etc) placed around plants to hold moisture, prevent weed growth, and enrich or sterilize the soil. Mulch is a readily available material that can be easily generated and applied.

The application of mulch provides numerous benefits to soil including (Sources: EPA & US Composting Council):

- Water conservation
- Improved irrigation efficiency
- Suppressed weed propagation
- Moderated soil temperature
- Soil improvement by decomposing into humus, which has higher water holding capacity and more nutrients than bare soil. This can lead to a reduction in the amount of fertilizers required.
- Improved soil's biological activity
- Shielding of soil particles from the erosive forces of raindrops and runoff.
- More evenly distribute soil moisture throughout the soil

Communities create mulch by grinding and screening yard waste and tree trimmings. Mulch does not include the addition of organic, nitrogen rich materials such as biosolids, manure or food wastes.

Special Considerations for the Rural Environment

Rural communities may generate limited quantities that can easily be distributed to citizens for agricultural or landscape use. However, any excess mulch can be applied to parks and recreation or slope stabilization projects.

Depending on the volume of material managed, rural communities may want to consider collecting yard waste from the public and renting a grinder as needed as opposed to owning and maintaining a chipper.



Left: Mulch created at Buckman Road Recycling & Transfer Station in Santa Fe & Applied Under a Tree at UNM

MULCH—APPLICATION & USES

Mulch Application

Erosion control is protecting the soil from the power of water – the impact of the raindrop, and the velocity and depth of runoff and concentrated flow. Mulch is an excellent tool to do this as it capitalizes on water’s cohesive (water is attracted to water) and adhesive (water is attracted to other substances) properties.

Optimum mulch depth is approximately 10 centimeters (McMillen, 2013). A mulch layer of 5 cm (approx. 2 in) reduced surface evaporation by 40% and increased mulch depth to 10 cm (approx. 4 in) further improved soil moisture by 10%. Increasing the depth to 15 cm (approx. 6 in) didn’t significantly reduce evaporation any further (McMillen, 2013).

Mulched soil demonstrated the highest rates of water retention following full saturation (McMillen, 2013). This means that mulch is highly effective in keeping the moisture from intense precipitation in the soil.

Mulch can be applied with a loader and basic hand tools, such as shovels, wheelbarrow, buckets and rakes.

Erosion control practices with mulch involve applying mulch to the surface, along with creating micro relief environments with features such as swales and berms located strategically along contour lines. A berm is a narrow shelf, path, or ledge typically at the top or bottom of a slope, while a swale is a low, usually moister, place in a tract of land. A contour line is a line joining points of equal elevation on a surface.

A berm applied at the top of a slope to reroute water before it gains velocity and travels down the slope is called “top-dressing.” Top-dressing essentially creates a dam in which water is stopped from flowing over the edge of the slope. When water flows over the edge of the slope it is called “over-topping.”

Location of berms and swales for erosion control purposes depends on the anticipated velocity of precipitation. Factors to be considered include soil and vegetation type, complexity of the slope, steepness and rainfall intensity.

The following case studies can be applied to any steep slope area, including rural landfills and transfer stations, roadside applications or public parks.



Photos courtesy of Soilutions: Mulch applied with loader & basic hand tools

MULCH CASE STUDIES

Slope Stabilization

Project Details

Location: Las Cruces—I-10 & University Blvd

Project: Soilutions, Inc & NM DOT

Contact Person: Jim Brooks, Soilutions

Phone/Email: 505-281-8425, jim@soilutions.net

Issue to address: Long simplified slope with high degree of erosion including deep rills. Slope ratio is approximately three to one.

Erosion Control Method: Approximately 2 inch layer of 4" screened mulch application. Mulch only applied.



Top: Untreated, unstable eroded slope

Middle: Mulch is applied on one section while the other section is left bare.

Below: This same area 1.5 years later. Note that vegetation regrowth is stronger on the mulched side and that rills are pronounced on the un-mulched side. Without contouring and top-dressing, the mulched side will create rills eventually.

All images courtesy of Soilutions

MULCH CASE STUDIES

Mulch for Contouring

Project Details

Location: Calle Nopal, Santa Fe Area

Contact Person: Jim Brooks, Soilutions

Phone/Email: 505-281-8425, jim@soilutions.net

Issue to address: Rampant sheet erosion, maintenance crews kept having to clean eroded dirt off of the road.

Erosion Control Method: Approximately 2 inch layer of 4" screened mulch applied and contours created. Mulch applied to a 4000 ft² slope and 6000 ft² hilltop



Top: The problem to be addressed. Steep slope, deep rills

Middle: 1.5'-2' wide by 6-8" tall swale & berm contour line created with mulch and shovels at the base of the steepest part of the slope. 18" berms created along road to slow water runoff.

Bottom: Small mulch berms tamped in with foot with small overflow channels throughout slope.

Treatment applied in 2004 with no maintenance to date. Zero erosion or wash out has occurred and native vegetation is established



All images courtesy of Soilutions

MULCH CASE STUDIES

Mulch for Stabilization & Ridgetop Control

Project Details

Location: Ridgetop Near 599, Santa Fe Area

Contact Person: Jim Brooks, Soilutions

Phone/Email: 505-281-8425, jim@soilutions.net

Issue to address: Unstable slope with rills and excessive erosion

Erosion Control Method: Approximately 2 inch layer of 4" screened mulch applied and motor grader cut 18" deep x 24" wide swale



Top: Large swale cut into slope along a contour line. Swale works to shorten slope length.



Middle: Following rain swale with mulch applied is not full of dirt.



Bottom: Following rain in the untreated area notice the degree to which debris has filled in the swale and deposited on the highway

All images courtesy of Soilutions

MULCH CASE STUDIES

Ridgetop Continued

Lessons Learned

Observation is important. If a treated area generates rills after the first rain storm, determine where the water is coming from. Most rill sources can be easily remedied by creating berms either at the hilltop or along the slope.



Above: After a rainfall, overtopping occurred to create a rill in the mulched area



Above: Source of the overtopping is a small depression at the top of the slope. A top-dressing, a small berm created with a shovel and mulch, would remedy this issue.

MULCH CASE STUDIES

Mulching Under Trees

Project Details

Location: UNM—Albuquerque

Contact Person: Bryan Suhr

Phone/Email: 505-269-5583,
bsuhr@unm.edu

Application: Both Mulch & Compost
Used



USE OF MULCH:

How do you use the mulch on campus?

We try to use mulch wherever we have exposed soil. In nature the soil is almost always clothed either in vegetation or in mulch. We try especially to mulch around newly planted trees or those that are aging or stressed. I often tell people that trees are mostly recently removed from the forest, in the forest the soil is covered in the naturally occurring mulch. This is the decomposing parts of the tree (s) and other matter that has collected under them. This is what I call the “tree friendly” environment.

Photo: Mulch applied under trees

What is the application rate? Depth, Width, etc?

Ideally we maintain a 2”-4” layer of mulch over as large an area as possible. The root zone of a healthy tree can extend a radius two or more times the height of the tree. In the perfect world this would all be mulched.

How do you apply?

We haul it to the site and spread it to the depth and width that we want.

Pro's?

Mulch helps to create a “tree friendly” root environment. It adds organic matter that aids in nutrient recycling. It eases/reduces soil compaction from people pressure and moderates soil temperatures. Helps support those many living organisms that create/maintain a healthy rhizosphere (area around roots that is the site of much biological/life activity).

Cons?

When applied too deep it might increase the irrigation budget. The typical rain in Albuquerque is less than a ¼” (my estimate), too much mulch might interfere with rain/irrigation reaching the soil.

MULCH CASE STUDIES

Mulching Under Trees Continued:

Why do you use mulch? It is just good sense.

Savings? (water, fertilizer)

Yes but it will vary from site to site and is dependent on the type of mulch used.

Source of mulch, how do you create, do you screen it?

I prefer to use the material that we chip on-site, which would be debris from our tree pruning and removal activities. Most published information supports this as the premier mulch material. Our department does purchase bark mulch, pecan shells and some shredded mulch materials. I would prefer tree trimming (chipped) mulch material.

How long have you been using mulch?

As long as I've been here (19 years), it did increase about 10 years ago.

USE OF COMPOST:

Do you use any compost on campus? If so, how do you use it?

Yes we do use some compost on campus, mostly in new plantings as a soil amendment.

How do you apply?

As needed spread and incorporate in the soil as a pre-plant.

Pro's?

By adding a biologically active product it helps support many living organisms that create/maintain a healthy rhizosphere (area around roots that is the site of much biological/life activity).

Cons?

Unknown, but it might not be completely composted and contain materials of unknown origin.

How long have you been using compost?

As a planting amendment I have always tried to incorporate some, my "biologic jumpstarter."

MULCH CASE STUDIES

Mulch for Mortality & Septage Composting

Project Details

Location: Estancia Valley Solid Waste Authority

Contact Person: Joseph Ellis

Phone/Email: 505-384-4270 or josephe@lobo.net

Materials Accepted: Large & small animals, butcher waste, cow & horse manure, septage accepted only at septage facility

End-Products: Compost for use at the landfill

Drop-Off Cost: Free for green waste, \$25 for large animals, \$5 for small animals, and \$45/ton for manure

Material Pricing: Not for sale. Used beneficially at landfill.

Equipment: Caterpillar Loader and Compost Thermometer



Photo courtesy of Estancia Valley SWA

Mortality Composting

The program was launched November 2009 to save landfill airspace. Green waste is mulched and laid into a bed 12' X 50' and 18" deep. Animals are laid in place as they come into the landfill for disposal, and are covered with more mulch. Two tiers of animals are laid in and covered to form a static pile. Water is added as needed to facilitate the composting process. It is anticipated that finished compost will be generated in about a year.

Septage Composting

The septage facility began initial operations in 2012. Rather than managing the challenges of septage through a wastewater treatment plant or discharging on a field, Estancia Valley developed a facility that allows the solids and inorganics to be filtered from the liquids for separate processing. This processing takes place in a composite lined lagoon filled with wood chips, which act as a bio-filter to remove the solids. An underdrain under the mulch at the bottom of the lagoon serves to allow the filtered liquids to be removed. The recovered liquids are used to enhance the composting. When the wood chips become saturated with solids, they are removed for composting, as well.

The facility provided a cost effective alternative to hauling the septage waste across the mountains to a wastewater treatment plant. This innovative alternative provides an environmentally-sound and controlled alternative to discharging and disking the septage directly into the soil and it effectively utilizes readily decomposable solids. Regional septage collectors were so receptive and supportive of using this facility, the Authority plans to add a second dewatering lagoon to significantly increase the facility capacity. Estancia Valley worked closely with the NM Environment Department and has registered the facility as a composting operation.

COMPOST—OVERVIEW

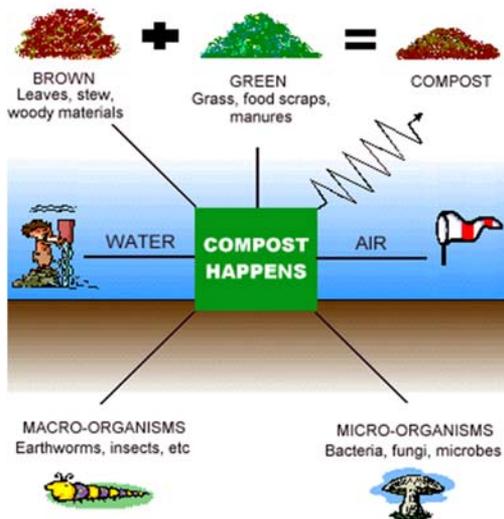
Compost Overview

Compost is defined as organic material that has undergone a controlled process of biological decomposition and pathogen reduction, and has been stabilized to a degree that the final product is potentially beneficial to plant growth and can be used as a soil amendment, growing medium amendment or other similar use.

There are only four things needed to make compost: Carbon, Nitrogen, Water and Oxygen. Carbon sources are typically your dry and brown organic materials (wood chips, straw, etc.) and provide the energy for the microbial activity to decompose the organic material. Nitrogen sources are usually green and moist organic materials (grass clippings, fresh leaves and crop residue, food scraps, biosolids, etc.) and provide the building blocks for the microbial organisms to multiply for faster decomposition. Water can be directly applied or can come bound in nitrogen sources (food waste, biosolids) for slow release and is required by the microbial organisms for life. Oxygen is required for aerobic decomposition and is achieved by having bulky carbon sources (woodchips).

Constructing a compost pile is like following a recipe. You need the right ratios of carbon to nitrogen and water to oxygen to facilitate decomposition. There is no one “right mix”, but will vary between each community based on their available feedstocks.

There is minimal equipment needed to compost. These include: a hand fed chipper or grinder is needed for size reduction of your brush and green waste; a front end loader or windrow turner to mix your materials and incorporate water and oxygen into your pile; a thermometer to monitor temperature to ensure optimal conditions for microbial activity; a pen or pencil and paper to keep records of your mix, dates and temperatures; a device to add water (water truck, fire hose, sprinkler, etc.) and finally a screener to create a uniform end product.



COMPOST—OVERVIEW

Special Requirements for Bio-Solid Composting:

Bio-solids are the treated “human manure” at a waste water treatment facility. Disposal of bio-solids can be very expensive and composting is a very economical and beneficial way to manage this material. However, there are strict federal EPA regulations known as 40 CFR part 503 guiding the safety and use of this material. There are two classes of composted bio-solids, Class A and Class B. Both have process and use requirements/restrictions. Along with the below time and temperature requirements, all bio-solids must show that pathogens and heavy metals have been reduced (lab testing) and that vector attraction has been reduced.

Class A Bio-Solids require that windrow piles must be maintained at a minimum temperature of 55 degrees Celsius for 15 days with 5 turns. Along with these requirements and pathogen and vector reduction, Class A bio-solids has no restrictions on use and application.

Class B Bio-Solids require that the compost pile be maintained at a minimum of 40 degrees Celsius for at least 5 days. During that five day period, the temperature must rise above 55 degrees Celsius for at least 4 hours. Along with these requirements and pathogen and vector reduction, Class B bio-solids have strict buffer, public access and crop harvesting limitations and restrictions.

Co-composting bio-solids with wood chips is highly recommended compared to composting bio-solids alone. This is due to the fact that wood chips act as a bio filter to reduce odor and vector attraction during the composting process. The wood chips also work to absorb excess moisture in the pre-composted bio-solids. Finally wood chips make for a better smelling final product and a final product that is higher in humus, or organic matter, which increase the beneficial characteristics of compost.



COMPOST—OVERVIEW

New Mexico Regulatory Requirements

All compost facilities in New Mexico must be registered with the NM Environment Dept: Solid Waste Bureau, and must have at least one certified operator.

New Facilities: Before operations begin, communities must fill out a Notice of Intent (NOI) with the NMED: Ground Water Quality Bureau to determine if a groundwater discharge permit is needed. None have been required from any compost facilities in New Mexico to date. Once you receive your approval letter from the NMED: Groundwater Quality Bureau, submit that letter with a Compost Facility Registration to the Solid Waste Bureau. This registration requires site maps, detailed description of your feedstocks, compost methods, record keeping plans, and use of the final product to include a detailed operations plan. For bio-solids and mortality/offal composting, an advanced registration is required.

Existing Solid Waste Facilities: If you want to start a chipping/mulching or composting program at your existing facility, you must amend your current ops plan with the Solid Waste Bureau to include your proposed operations. A good guide would be to use the compost facility registration form in order to give the Solid Waste Bureau all the information they require. However, this will not be a “new facility” but an approved operation at your current facility.

All composting facilities must have at least one certified operator at the facility. The Solid Waste Bureau teaches the Compost Operator Certification Course twice a year and is a three day/24 credit hour course.

Any facility that sells compost must also register with the New Mexico Department of Agriculture. There is a \$5 per year registration fee, and a 0.35 cent a ton fee on all compost sold paid to the New Mexico Department of Agriculture.



COMPOST CASE STUDIES

Golf Course & Athletic Field

Project Details

Project Name: City of Truth or Consequences Parks & Rec. Dept

Contact Person: Howie Tucker (Golf Course) or Peter & Jesus Parks Dept

Phone/Email: Howie Tucker 575-894-2603 Peter 575-740-0988 Jesus 575-740-2277

Materials Accepted: Green waste collected at convenience centers & landfill. Horse bedding is also accepted.



Compost Applied to Truth or Consequences' Golf Course

What fields do you apply compost to? Baseball field and golf course.

How many times a year do you apply compost? They prep the fields in the spring by applying compost on bare spots to cover grass seeds on the baseball field before practices start. Compost is used in the same way in the spring and ongoing at the golf course.

What is the application rate? Light coat that covers soil

How do you apply? Top-dress then apply water to soak it in to ensure no burning of soil

Equipment used to apply/incorporate? Applied with a fertilizer spreader and then mow grass with a lawn mower.

Pro's? Works great to grow new grass. They receive a report from compost supplier outlining what the chemical breakdown of the compost is. This is to make sure that it's not too hot for the grass (different grass species require different nutrients).

Cons? To avoid any odor issues, the baseball field is treated before players start using field. Because the compost is popular with area alfalfa farmers, the parks department will stockpile compost as it becomes available to ensure they have enough. They could easily use more material.

Why do you use it? It's a great nitrogen source to help grow new grass and encourage vigorous growth of existing grass.

Savings? (water, fertilizer) Reduced fertilizer needs

Source? T or C's wastewater treatment plant Class A compost. No charge.

How long have you been using compost? Seven plus years

COMPOST CASE STUDIES

Organic Farm

Project Details

Project Name: Mountain view Market Farm—Las Cruces, NM

Contact Person: Nicole Fuchs, Farm Administrator

Phone/Email: 575-520-0534, 575-523-0436, ocleyf@yahoo.com

MVM Farm has been using compost to amend our soil for the past three years. Staff applies a compost tea to our entire field at least once per month. Compost is also mixed with soil when growing starters from seed. We roto-till the compost into the row beds using a roto-tiller.

Some examples of the crops grown at MVM Farm are: melons, tomatoes, peppers, garlic, zucchini, summer squash, beans, collards, broccoli, lettuce, kale, eggplant, beets, carrots and swiss chard.

Using compost is a good way to amend our soil, as the soil has a good amount of clay in it. Adding compost improves the soil structure and allows the plant roots to more easily take up nutrients. Another pro of making our own compost out of food scraps, manure, yard waste and paper means that there are less of these entering our landfills and dump. MVM Farm uses compost because mixed with soil, it helps grow better crops.



Organic compost amends soil and retains water

We create our compost in “bins”. These are basically squared off areas made out of chicken wire. We pile up the compostable materials, water and stir...it takes several months for the process to be complete and create a compost that is broken down enough to be useable. MVM Farm also does vermiculture or vermicomposting. Vermicomposting uses worms to turn waste aka food scraps, manure, yard waste and paper into a nutrient rich fertilizer. MVM Farm uses red wiggler worms, a worm known best for composting or chewing through organic waste material and creating castings which make for a great fertilizer or component of “worm tea”. Worm castings are too nutrient rich to be used as a growing medium by themselves, they should be mixed with soil (1 part worm castings to 6 part soil).

COMPOST CASE STUDIES

Land Remediation

Project Details

Business Name: San Isidro Permaculture, Santa Fe

Contact Person:

Jeremiah kidd

Phone/Email: 505-983-3841, jeremiah@sipermaculture.com

What do you use compost for in your business? *We use it mostly for large applications such as reseeded and planting but not for veggie gardens.*

How many approx. acres have you applied compost to at one time? *Around 10-15 acres*

How much compost do you apply? *Around 10 dump truck loads, 120 cubic yards*

How many times a year do you apply compost? What times of year are best for your application? *It depends when the clients want it, usually between May-Oct, we use it most for reseeded which happens in the spring and fall.*

What is the application rate you apply at? *Usually for seeding at 1"-2" tilled in and as one third of the backfill soil for trees or shrubs*

How do you apply (top-dress, incorporate in the soil)? *Both*



Courtesy Photo: Above area treated with compost before and after. Note successful re-vegetation rate.

COMPOST CASE STUDIES

Land Remediation Continued

Equipment used to apply/incorporate: *Tiller and by hand when planting. We use a skid steer (bobcat) or backhoe for spreading larger amounts*

Specs on what type of compost (bio-solids/non bio-solids, particle size). *We usually use the screened compost from the water treatment plant*

Pros? *Cost and that it's recycled*

Cons? *A couple of times it wasn't finished so smelled a bit, the quality control at the plant is critical to kill pathogens and break down hydrocarbons and pharmaceuticals*

Why do you use it? *Cost and that it's recycled*

Savings? (water, fertilizer) *Yes, both. Helps hold water and shades the soil, mulch 2-4" on top of compost is best. Less fertilizer needed with the nutrients added with compost.*

Do you pay for compost or get it for free? *Pay for jobs, from the city and local providers and make it free at home. With vermi (worm) and thermal compost, I've made almost 5 cy at my house this year alone!*

How long have you been using compost on your projects? *20 years*

ORGANICS RESOURCES & REFERENCES

Technical Guidance Resources

NMRC Organics Recycling Organization webpage:
<http://www.recyclenewmexico.com/nmoro.htm>

Resources on this page include:

- ◆ Compost Testing Facilities
- ◆ NM Compost Facilities List
- ◆ Compost Mix Calculators
- ◆ Compost Thermometer Sources
- ◆ Grinder Rentals

NMED Solid Waste Bureau Composting Page:
<http://www.nmenv.state.nm.us/swb/compostingmulch.htm>

EPA Composting Page: <http://www.epa.gov/osw/conserve/rrr/composting/index.htm>

On-Farm Composting Guide: Available for purchase from NM Recycling Coalition and is provided as part of the Compost Certification class. Or you can purchase it online at www.nraes.org

City of Albuquerque Climate Action Plan: Organic Waste Management section (page 45) www.cabq.gov/cap

NM Organics Recycling Organization:
<https://www.facebook.com/nmorganicsrecycling>

The Effects of Mulch Type & Thickness on the Soil Surface Evaporation Rate, McMillen, Michael; Horticulture and Crop Science Dept: California Polytechnic State University, San Luis Obispo, June 2013

Assistance to Implement an Organics Diversion Program

NMORO: Walter Dods (walter@soilutions.net or 505-877-0220), English Bird (english@recyclenewmexico.com or 505-983-4470), Tim Gray (tim.gray@state.nm.us or 505-827-0129)

NMSU WERC IEEE Pollution Prevention Program: Specially targeted at business diversion. Chris Campbell (chriscam@nmsu.edu or 505-843-4251)

Master Composters: Located in Bernalillo, Sandoval, Valencia, Cibola and McKinley Counties. Contact John Zarola at johnzarola@comcast.net

ORGANICS RESOURCES & REFERENCES

Technical Guidance Resources Continued

Training and Certification

NMRC and the New Mexico Environment Department host two Compost Facility Operator Training Courses annually. Cost is \$199 for members and \$299 for nonmembers. Go to www.recyclenewmexico.com/cert_classes.htm.

NM Organics Recycling Organization List Serve

Join the NMORO Listserve: email nmoro@googlegroups.com

U.S. Composting Council

The USCC is a national, nonprofit, trade and professional organization promoting the recycling of organic materials through composting www.compostingcouncil.org



APPENDIX A: POSITION STATEMENT

NEW MEXICO ORGANICS RECYCLING ORGANIZATION

ORGANICS POSITION STATEMENT

APRIL 27, 2010

ISSUE BACKGROUND

Organic materials comprise a significant portion of our waste stream and are one of the most readily diverted materials, with little processing expense and the ability to manage the material on a local level as two immediate benefits. In 2008, according to the New Mexico Environment Department Solid Waste Annual Report, 45,279 tons of brush and green waste were composted as well 6,488 tons of that material also being beneficially used (wood was chipped and used as daily landfill cover or landscaping). Using U.S. EPA figures, 12.4% of waste generated comes from yard trimmings, wood waste represents another 5.5% and 12.9% comes from food scraps. Yard trimmings typically take up a large volume of space with tree and limb trimmings. This of course varies slightly by site and state.

As stated in a 2010 report in response to SM 60, a memorial requesting the investigation of increased woody material utilization by state agencies, there are a myriad of benefits to diverting organic material waste.

"Enormous landfill and atmospheric benefits can be realized through utilizing wood chip resources by saving landfill space and reducing quantities of methane produced by the uncontrolled decomposition of the wood in landfills. Methane is an explosive gas and is 30-60 times more potent as a greenhouse gas than is CO₂. Numerous watershed health benefits can also be reaped by wood chip utilization.

Each organics recycling alternative approach offers benefits beyond the diversion of solid waste away from landfills. Horticultural reuse of stabilized organic matter improves soil stability, inhibiting erosion, and enhances soil fertility, reducing requirements for costly water, pesticides and fertilizers. Mulch is a commodity that can also be marketed with very limited processing costs for erosion control, weed control water retention, or beautification to generate direct revenue."

NMORO Position

The New Mexico Organics Recycling Organization encourages local communities to develop cost-effective programs to divert organic material (including yard, food, manure, mortality, agricultural and biosolids waste) from landfills. Removing organics from the waste stream has the following benefits: conserves landfill space, enables utilization of a valuable resource, and avoids greenhouse gas (methane) creation. These programs should consider the following components:

APPENDIX A: POSITION STATEMENT

1. Develop Local Ordinances to Encourage a Soft Ban Of and Provide Price Incentives to Reduce and Divert Organics From Landfills. A soft ban requests customers to voluntarily comply with a material ban. The ban can be written into local ordinance or simply added to signage and does not have penalties or enforcement. Price incentives would provide a reduced tip fee for sorted organic material.
 - a. Don't "Ban without a Plan" e.g. have a stable organics diversion program in place first
 - b. Reduce Organic Material Tipping Fees at Disposal Sites as an Incentive to Divert
 - c. Collaborate with public and private sector stakeholders to develop regional organics diversion plans that may include:
 - i. Identify Targeted Organics Types. Estimate Current Generation and Diversion Rates. Use the percentages above as baseline percentages of your waste stream to identify targeted organic materials.
 - ii. Encourage Homeowner Diversion Type Options (e.g. backyard composting). Refer to New Mexico Environment Department: Solid Waste Bureau brochure (online), Bernalillo County Extension Office Master Composter program (online)
 - iii. Identify and Develop Community Collection and/or Processing Centers (a complete list of currently registered Composting Facilities is located at NMED:SWB website)
 - iv. Identify and Develop Surrounding Composting Facilities (private and/or public)
 - v. Identify and Develop Public/Private Partnerships
 - vi. Develop Local End Use Programs
 - vii. Develop Public Outreach/Public Relations Program Regarding Reasons to Keep Organics out of Landfills (list existing web sites & Master Composters)
 - viii. Adopt "Best Management Practice" Guidelines (Refer to EPA Composting Website, On-Farm Composting book, and NMED/NMRC Compost Facility Operator Certification Course)
 - ix. Review and Update State and Local Solid Waste Ordinances, Registration Regulations and Zoning Requirements to Eliminate Obstacles to Composting (NMORO can assist with compliance issues)

NOTES
