

# Compost Use Best Management Practices Webinar Questions and Answers

Please note the views expressed in response to questions from the Compost Use Best Management Practices Webinar are those of the speaker and not, necessarily, of CalRecycle or Caltrans.

## General Questions

Q. If we have water use efficiency standards, should the state of California promote installation of lawns?

A. From ReScape - We are seeing an interesting and useful consensus emerge around this, the concept of 'functional lawn' vs 'non-functional'. There are some activities that are worth the water cost. Community field sports, park areas for informal frisbee or soccer, lounging next to a public pool or picnicking on a blanket should be taking place on a beautiful, well-maintained lawn. That is functional. The turf is serving a real purpose and earning its keep. In contrast, narrow turf beds (that are hard to irrigate and hard to use for anything) like medians, green strips in front of commercial business, or large mowed areas that are purely cosmetic are not very functional. They are just there for show. We can achieve a similar level of aesthetic satisfaction with low-water use plants in these areas. Nevada made a great video about this that shows how they are tackling this shift in perception. <https://www.youtube.com/watch?v=8BklQIKhClw>

Q. Does ReScape work with other non-profits or only with city/county/jurisdictions?

A. From ReScape - We work with everyone. We continue to collaborate with StopWaste.org and other non-profits with allied goals and resources. Milena can follow up if you would like to know more about our growing collaboration network. Email address for Milena Fiore - [milena@rescapeca.org](mailto:milena@rescapeca.org)

## Compost

Q. I have a question for Vic, the first presenter, he said that compost mainly retains water when it's wet, but I've been under the impression it helps the soil retain more water over time once it's assimilated with the soil, could you clarify?

A. You are correct. Compost has a great water holding capacity and it improves soil health. Healthy soils form soil aggregates which increase the infiltration and increase the water holding capacity of soil. For more information consider reading the research paper "[Changes in Soil Properties and Carbon Content Following Compost Application: Results of On-farm Sampling](#)" by Sally Brown and Matt Cotton.

Q. Why are low Carbon:Nitrogen (C:N) composts better as fertilizers? Could you provide a C:N range as reference?

A. Great question. For information on this subject, UCANR released the publication [Assessing Compost Quality for Agriculture](#) with a discussion on C:N ratios beginning on page 2.

Q. Is there a top end of % by volume for compost/organic matter (OM) in drier climate soils, is there any studies looking at hydrophobicity of OM when exposed to prolonged drought?

A. This will depend on a variety of land management practices. You may want to consider a small test plot to see how compost application affects your soil.

Q. Regarding screening to create different products, is unscreened backyard compost still a good product for home use?

A. Yes, unscreened backyard compost is typically a great product though, you do want to consider the application and make sure it is appropriate in your situation.

Q. How did you incorporate the compost to a depth of 8? Did you use a tiller?

A. From Zach Tanner - Typically yes, a rototiller is used. But the method can also vary depending on the size and scale of the project.

Q. Question for Zach: Can you elaborate a little on carbon sequestration credits for use of compost in landscaping projects? Is this a widespread project in carbon offset market?"

A. Caltrans currently is not taking credit for carbon sequestration for compost use on our projects. For more information on carbon markets consider reading the following Biocycle article. <https://www.biocycle.net/connections-is-compost-a-player-in-carbon-trading-markets/>

Q. To Zach. Would a compost sock along the roadside have helped the "washout" that occurred on the slope due to the focal, concentrated flow? (You showed a specific image...compost blanket with focal failure).

A. From Zach Tanner - The use of a compost blanket would likely have helped had concentrated flows been anticipated. We often use compost socks as a first line of defense to prevent the buildup of concentrated flows. In such situations, the site design needs to account for a slower discharge rate and should be comprehensively reviewed through a drainage plan.

Q. Caltrans sometimes runs into other agencies not allowing compost use hence we are limited in using compost. What can Caltrans do to get those agencies to give us the ok to use it?

A. From Michael Ferrara - Probably the best course is to find a way to be involved in the permit negotiations which is normally where the restrictions are settled on for the project.

A. From Zachary Tanner - More educational webinars and outreach.

Q. Do you use a thermometer on compost piles? How do you monitor heat and regulate it? Have you heard of putting a coil in the compost pile that heats up water in

the coil and then pump the hot water into a greenhouse to heat the greenhouse? This is an experiment my friend is conducting and I just wanted to put this out as a concept to folks.

A. From Hillary Nichols - For an in-depth look into this, the Research and Education Foundation has courses: <https://www.compostfoundation.org/Education/COTC> - Part 2 Absolutely! Popular in the permaculture community of horticulture. Here is a great book: <https://www.chelseagreen.com/2016/authors-shawn-jadrnicek-and-stephanie-jadrnicek-the-bio-integrated-farm/>

A. From Michael Ferrara - The supplier would be responsible for that quality check and required equipment in order to keep the General Contractor within compliance of the specification. – Regarding using compost to heat a greenhouse, haven't heard of this technique but it sounds interesting

Q. Do you have any tips for how to break out of a catch-22 where we have a lack of use and hesitation to call for compost BMPs (blankets, berms, etc.) in design b/c there is a lack of contractors with the needed equipment?

A. From Hillary Nichols - Many composters have application equipment. Also, equipment manufacturers have lists of authorized equipment operators for their machines. The US Composting Council and I would like to gather info on equipment and how to find equipment, and post it on this page.

<https://www.compostingcouncil.org/page/CompostUseEquipment>

Support would be appreciated! Let us know if you have anything to add.

A. From Michael Ferrara - Lack of equipment is not normally a big consideration for Caltrans projects, however, in remote areas it certainly happens. Remote areas are a challenge for a pool of contractors and for many of the products that we would normally expect to use because a lot of the supply of product and labor is near the population centers and transportation of them can be very expensive.

Q. If you are using a compost sock on a pervious surface or for a temporary use at a construction site, what do you do with the socks when finished?

A. From David Franklin - For conventional pollutants such as sediment, the sock can be cut open and the compost can be repurposed on site during the landscaping/stabilization phase. The outer sock material can be disposed.

Q. Cary what was your application rate? 1/3 in/cubic foot?

A. From Cary Roulet - Correct.

Q. What kind of compost was used in Mecca? Please provide the contact information for Mr. Garcia.

A. From Miguel Garcia - Unfortunately, I don't have detailed information about the compost but I know the main thing we were looking for was that the carbon to nitrogen ratio of the compost was higher than 11. The compost was purchased at the nearest facility in Coachella but I don't remember the name. My contact info below, feel free to share with anyone interested: [miguel@naparcd.org](mailto:miguel@naparcd.org)

Q. Can someone comment on BMPs with respect to siting in Environmental Justice (EJ) communities and BMPs to mitigate odors, tracking out, noise, truck traffic, etc...? How can composting facilities be beneficial to EJ communities instead of being potentially detrimental?

A. From David Franklin - Generally, I view compost-based practices as performing better compared to the more common practices when targeting pollutants such as Sediment, Oil & Grease, Metals, Bacteria, and Nutrients etc. To answer the second part of your question - Eating organic vegetables grown in locally sourced compost made with green waste diverted from a landfill is good for everyone.

Q. What is biggest barrier to adoption by conventional farms in adopting compost as an essential tool in creating soil health?

A. From Judith Redmond - This is a question that has been the topic of various research efforts over time so if you are really interested in the answer, it would be wise to do a bit of a literature search. From my own point of view, I know that many farmers of all different scales and sizes use compost, but they have to be farmers who are truly connected with their farms because it is primarily a long-term soil-health building tool. In terms of plant nutrition, it is valuable as well, but so much easier and less expensive for a farmer to simply apply fertilizer, than to apply compost.

Q. Recommendation for "re-wetting" dry compost?

A. I would recommend incorporating compost and then adding water to soil, since the compost will increase water holding capacity for intended plantings. Not sure how to do this for compost windrows that are managed by compost producers.

## **STA Compost Program**

Q. Are contractors aware of quality standards and how to determine what they are?

A. From Hillary Nichols - a. From what I've heard, many need more education. Quality is in the eye of the consumer. The Seal of Testing Assurance (STA) Program helps you make the best decision for your application by providing test results with consistent lab methods. Here is more from the US Composting Council on quality standards:

<https://www.compostingcouncil.org/page/BuyCompost> b. Compost use and selection decisions consider many factors, and therefore are not one-size-fits-all. Here is more from the US Composting Council on what test result is best for which use:

<https://www.compostingcouncil.org/page/HowUseCompost> c. Here is information on using compost in general: <https://www.compostingcouncil.org/page/UseCompost>

d. Videos: <https://www.youtube.com/playlist?list=PLlotznzK3pON-Mn7hd-nFU0ps2eooBVxU>

e. One of my jobs is to educate contractors, and those who can reach out to contractors. If you have ideas on how to improve this, please let me know: Hilary Nichols email [hnichols@compostingcouncil.org](mailto:hnichols@compostingcouncil.org)

A. From Michael Ferrara - Yes, it is common for Contractors to bid and construct more than one project with Caltrans. Often the Contractors do not have many different

sources to choose from for their compost supply given the transportation cost limitations to the construction site.

Q. Is the ash content of compost measured/reported? Would this be whatever isn't organic matter? Thanks!

A. From Hillary Nichols - a. Yes, ash is the difference from organic matter and contains all the nutrients, metals, soil, etc... Here is more on our STA test results:

<https://www.compostingcouncil.org/page/UnderstandingCTDS>

Q. On the locally produced compost issue. Are there testing protocols that will support 1383, to ensure that compost is of the quality that is safe to distribute locally?

A. Yes. The US Composting Council has created information on quality standards:

<https://www.compostingcouncil.org/page/BuyCompost>

Q. For any of your speakers, what are those opportunities for the use of high quality compost that are currently under-utilized?

A. From Hillary Nichols - a. The US Composting Council has recommended compost test results for each use, found here:

<https://www.compostingcouncil.org/page/HowUseCompost>

b. The Research and Education Foundation has recommended compost test results for each use, found here:

<https://www.compostfoundation.org/Return-on-Investment>

Q. How many commercial composting facilities utilize a tilted floor and covers within CA to capture the leachate to be recycled?

A. From David Franklin - I don't have this number. Based on observations, I suspect it will be the norm for future facilities.

Q. How is commercial composting (pre- SB 1383) used throughout CA?

A. It is used all over the state for a wide variety of projects from on-farm to roadside projects. See presentation from Hillary Nichols on the STA compost program.

## **Mulch**

Q. Do you use compost with composted mulch?

A. From ReScape - Yes, we recommend a layer of compost over finish grade and then topdressing with composted mulch. The quantities and precise applications will depend on your project and your soil test. You can fine-tune this, working with compost specialists from the supply side.

Q. How can cities determine max capacity and frequency for applying mulch for southern California cities (e.g. more urban environments)?

A. Local Agencies should not be applying mulch deeper than 4-6" inches at a time. For mulch, a maximum depth of 4-6" is recommended during reapplication. Depending on how the compost is decomposing and disappearing into the soil reapplication of compost can be scheduled for every other year.

Q. How much time is typically needed to convert fresh mulch to aged wood mulch?

A. From Sarah Gronquist with ReScape - I would check in with the folks at Greenwaste Recycle Yard in Richmond. They have been taking tree grindings from arborists and making them into composted mulch for many years now and are familiar with the process. Their product 'Mixed and Aged' has worked well on some of my projects. They compost it for several weeks. <http://www.greenwasterecycleyard.com/mulch.htm>. Other vendors that have composted mulch that we are aware of are Marin Compost and Vision Recycling. I think that many composters are unknowingly making composted mulch as well. The over screenings from compost is actually composted mulch but many of them grind it down and put it into the next batch of compost. If the facility only takes trimmings then there is a pretty good chance there will be little to no contaminants in it (plastics etc.).

Q. Did Miguel say he did 20 T/ac compost incorporated 6" and wood mulch to stabilize? If I heard that right, I'm wondering how close to existing plants the incorporation got and what thickness of mulch used was.

A. From Miguel Garcia - Yes, we applied 20 tons of compost/acre incorporated to 6". The compost was applied 2ft away from the palm trees. The mulch layer was 3 inches deep. These are in no way recommendations. We were just experimenting.

Q. What process have you used to introduce compost into contained existing landscaped areas (mature plantings) such as a parkway or median within roadway?

A. From David Franklin - Compost as a mulch (large screened particles) can be used to suppress weeds and retain moisture in areas with landscape shrubs etc. Compost that is more decomposed and screened to remove smaller particles can be used to top dress lawns etc. to provide low levels of available nutrients over an extended period of time and to help advance overall soil health. This can be applied with pneumatic (blower) applications or by hand and may be done in conjunction with an aeration (coring) or slicing process to the surface prior to application of compost. Knowing the type of plants factors in. Some plantings will not be receptive to having material (compost) applied around the trunk at any or at certain depths.

## **Fire**

Q. Could compost be used as a tool in wildfire management prevention?

A. From Hillary Nichols - a. Here is a good reference on coarse compost being less flammable than mulch: <https://ucanr.edu/sites/fire/files/294538.pdf>

A. From Michael Ferrara - Sure, certainly a case could be made in certain areas of the state. Most of these decisions regarding wildfire prevention would be made within Caltrans Maintenance Division.

Q. For fire control, regulations ensure mulch is tilled into soil within specified time periods. Should mulch be tilled in or left alone? Same question with compost. Should compost be tilled into the soil or left alone?

A. Depends on your situation. For assisting in control with noxious/invasive species, would recommend using a 2" thick compost blanket on top of the soil. For fire breaks, tilling or incorporating is not recommended unless you're looking to increase soil structure and nutrient content for future plantings.

Q. Do you know about biosolid use post fire, or for fire prevention? I'm looking at applying for a grant because we have a surplus of biosolids and we are looking for ways to use it locally rather than export.

A. Yes. Fire reclamation with biosolids was done successfully in the Colorado Rockies in the 1990s. The study is discussed in Meyer VF, Redente EF, Barbarick KA, Brobst R. Biosolids applications affect runoff water quality following forest fire. See below for photo comparison of two different treatments vs the control. Further research into the results can be found at the following link - [https://www.hcd.ca.gov/community-development/disaster-recovery-programs/ndrc-application-documents/docs/meyer\\_et\\_al\\_buff\\_ck\\_2004.pdf](https://www.hcd.ca.gov/community-development/disaster-recovery-programs/ndrc-application-documents/docs/meyer_et_al_buff_ck_2004.pdf)



## Emissions

Q. How does composting differ in terms of gases in the atmosphere and organics in landfills?

A. The research available to date shows that composting dramatically reduces methane emissions as well as other greenhouse gases. [This study](#) released by the US Environmental Protection Agency in 2006 provides an in depth life cycle assessment of emissions and sinks from various waste management options including landfilling and composting.

Q. Dr. Crohn said turning compost windrows causes CO<sub>2</sub> to escape. Adding compost to soils sequesters CO<sub>2</sub>. What is the ratio of escaping CO<sub>2</sub> to sequestered CO<sub>2</sub> and is that an issue of concern? (How can escaping CO<sub>2</sub> be captured in order to keep it from going into the atmosphere? Tarped piles?) Do you foresee CA regulating more stringently the amount of CO<sub>2</sub> (and other VOCs) coming off compost?

A. Significantly more CO<sub>2</sub> can be sequestered than typically escapes from the compost pile during turning, and the CO<sub>2</sub> escaping is much less damaging to our climate than the methane that would be generated if the organic material were landfilled instead of

composted. Compost pile emissions can be controlled by a number of control measures such as a biofilter. For more information on this subject please consider reading Biocycle article “Regulatory Landscape For Composting And VOC Emissions” <https://www.biocycle.net/regulatory-landscape-for-composting-and-voc-emissions/>

## Specifications

Q. Are Caltrans specs available to the general public?

A. From Michael Ferrara - Yes, the latest that have been published for public use are at <https://dot.ca.gov/programs/design> or at [www.dot.ca.gov](http://www.dot.ca.gov) under "contractor's corner" and click on "construction contract standards".

### [California Department of Transportation | Caltrans](#)

Caltrans announced today it is expanding the Clean California incentive program statewide and offering up to \$250 per month to Adopt-A-Highway volunteers who pick up litter along state highways.

[www.dot.ca.gov](http://www.dot.ca.gov)

### [Design | Caltrans](#)

The Division of Design provides policies, procedures, guidance, technical assistance, training and equipment needed to develop and maintain a safe, sustainable, integrated and efficient transportation system.

[dot.ca.gov](http://dot.ca.gov)

Q. The fact that Caltrans utilizes compost and has it in its specifications will incentivize the industry to utilize it more.

A. From Hillary Nichols - a. Yay! Absolutely. Here are specifications in other regions (soon to be updated with 60 more specs):

<https://www.compostingcouncil.org/page/SpecifyCompost>

A. From Michael Ferrara - Yes, Caltrans has been a big buyer for many years. However, agricultural use of compost is many times greater than transportation use.

Q. Does Caltrans sample and test compost being used for QA?

A. From Michael Ferrara - Caltrans has language in the Standard Specifications stating an inspector can test or sample anything used for construction at any time. However, there is not specific language requiring the contractor to provide a sample of compost for testing. The inspectors generally rely on the US Composting Council's Technical Data sheet of test results as discussed in the presentation.



Q. There is still an issue that certain Caltrans regions don't like compost and don't spec it. The central office has been great showing how well it works (in for instance erosion control) but some still don't believe that it works, so they don't spec it.

A. From Hillary Nichols - a. I'd like to connect with folks to help with this: Hilary Nichols [hnichols@compostingcouncil.org](mailto:hnichols@compostingcouncil.org) b. General info on using compost:

<https://www.compostingcouncil.org/page/UseCompost> c. Videos on using compost: <https://www.youtube.com/playlist?list=PLlotznzK3pON-Mn7hd-nFU0ps2eooBVxU>

A. From Michael Ferrara - Not sure that we would find large differences between Caltrans District offices, however, Designers (with manager oversight) are the decision makers regarding compost use to help resolve the design problem for that particular project.

Q. For Michael Ferrara - Through our franchise agreement, my jurisdiction has access to thousands of tons of compost each year-much more than we could give away to residents. Could a city, JPA, or County bid to provide Caltrans with compost for their projects? Our priority would be utilizing the compost to meet our 1383 procurement target. We would likely only need compensation for transportation and/or application costs. If possible, I would love to follow up with you on this.

A. From Michael Ferrara - Potentially yes, if the supply meets the specification. All the work at Caltrans (other than what our Maintenance Division may do) is publicly bid. Therefore, a General Contractor (GC) will win the bid in which there is compost needed for construction and that GC will be the person for which to establish a business relationship. Information on what projects are bidding in your area and who is bidding the work can be found at [www.dot.ca.gov](http://www.dot.ca.gov) under "work with Caltrans" or this link <http://ppmoe.dot.ca.gov/des/oe/bid-pub-info.html>

### [DES-PPM&OE - General Bidding and Publications Info](#)

General Bidding & Publications Info. To order a Bid Book, create and log in to your Caltrans Bidding Connect account, then find the project you would like a Bid Book for on the list of projects currently advertised, and select the "Order Bid Book" link from your selected project. Electronic bidding has begun on selected highway construction projects.

[ppmoe.dot.ca.gov](http://ppmoe.dot.ca.gov)

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[www.dot.ca.gov](http://www.dot.ca.gov)

Q. You mentioned soil health is a priority for Caltrans... How do you assess soil health?

A. From Zach Tanner - Prior to a project beginning, an agronomic soils suitability test is sometimes conducted to assess the baseline composition of the soil. Per the findings,

recommendations are made to prepare the soils for optimal growing conditions. Ongoing maintenance and storm water management efforts also help assess the baseline conditions present on a site.

A. From Hillary Nichols - a. The US Composting Council considers healthy soil to have at least 5% organic matter:

[https://cdn.ymaws.com/www.compostingcouncil.org/resource/resmgr/documents/compost\\_use/Increasing-the-OM-in-Soil-7-.pdf](https://cdn.ymaws.com/www.compostingcouncil.org/resource/resmgr/documents/compost_use/Increasing-the-OM-in-Soil-7-.pdf)

A. From Michael Ferrara - Caltrans has a soil test specification that a Designer may use on a project that has any grading. Designers can also order with a service contract some soil tests for landscaping projects before design begins.

Q. Does Caltrans have on staff a specialist solely dedicated towards Compost BMP's?

A. From Michael Ferrara - No, but there are Engineers and Landscape Architects in Headquarters and in the Districts who spend considerable time on Stormwater BMP's including those that would use compost.

Q. What screen size is used to gain the finer compost for quicker nitrogen release?

A. Fine compost would be better in this type of situation. The particle size for fine, medium, and coarse compost must comply (using the TMECC 02.02-B test method) with the requirements shown in the following table:

Quality characteristic
Fine compost (dry weight): 2-inch sieve 3/8-inch sieve Max particle length: 2"
Medium compost (dry weight): Pass 2-inch sieve Pass 3/8-inch sieve (min 25% retained) Max particle length: 6"
Coarse compost (dry weight): Pass 2-inch sieve Pass 3/8-inch sieve (min 60% retained) Max particle length: 6"

## Biochar

Q. Is biochar a scalable solution to facilitate improved nutrient uptake for the woody material?

A. This is unknown at this time though there is a lot of research currently underway to better understand biochar impacts on soil health and the processes to create it. Hopefully we'll know more in the next few years.

Q. Have you considered incorporating biochar into your soil either directly or pre-mixed with compost? If so, have you seen any benefits, if not why not?

A. From Miguel Garcia - I didn't get a chance to work with biochar in the Coachella Valley but I have helped establish a couple of trials in Napa. What we have seen thus far is that both compost and biochar have the potential to benefit soil health but when you apply them together, the benefits are greater than the sum of its parts. The main benefits I have seen so far are improved soil water holding capacity and better nutrient cycling/retention.

A. From Cary Roulet - We did consider biochar but it was out of scope for this project. I think Calcium will be beneficial as well. I will do both in the near future.

## California Natives

Q. Most native plants don't like nutrient rich soils while invasive annual weeds that can be easily ignitable do. Are there areas where we shouldn't be spreading compost?

A. Compost application rates are site specific and performing a soil test can help you identify the correct volumes of compost that are best suited for the particular site conditions.

Q. For Cielo, thanks for mentioning the issue with natives and compost. I've been designing gardens with CA native plants for about 25 years and have noticed that where I use moderate amounts of compost, I eventually get more annual weeds, and while sometimes I get faster growth, I've noticed that many natives have shorter lifespans in these composted soils. Experts from the native plant industry agree with your assessment that this is because many native shrubs have evolved in low Nitrogen or lean soils. My question is, are there specifications for the volume of compost you should incorporate based on soil type, compaction, and plant types in landscapes? Also, can you share the names of materials suppliers you've found where you can specify a low N compost? I've never seen it specified or marketed that way.

A. From Cielo Sichi with ReScape - I find that many of the shrubs from the soft chaparral and oak woodland communities do not like organic matter or nitrogen. Some of them are nitrogen fixers which have symbiotic relationships with bacteria in soil that convert air nitrogen to plant usable nitrogen. This is why in chaparral we often see very little to no annual grasses emerge under shrubs like Ceanothus for instance. Generally, these soils are thin and young and absolutely, the lifespans will be more limited. In terms of specifications or recommendations.... That's tough. If you are trying to create a native landscape then the best thing to do is to try to use plants that would have existed in that location pre-urbanization. If I am familiar with the area then I can generally figure out which plant community would have occupied the area. If I am new to the area or just to be sure, I use the Plant Comm. by Zip code through Las Pilitas Nursery: <https://www.laspilitas.com/comhabit/zipcode.htm>. In an ideal world, the soil in that location is somewhat similar to the native soil. Sometimes it isn't though and that is where our problem solving skills come into play. I often say that the blessing and the curse of being in the landscape industry is that there is never the same problem to be solved so blanket solutions are challenging. I know that I am not answering your specific questions, but the reality is that it takes a lot of knowledge, thought, research

and question asking to determine if adding a low N compost or not at all is the best choice given the particular situation.

That being said, now I will give it a shot:

1. My suggestion would be when you are working on a project in a particular area and trying to match a particular plant community, go find an existing native plant community of similar composition nearby and grab a soil sample for analysis. Analyze the soil on your site and see what, if anything you might need to add or modify. It is usually easier to tailor the plant list to the soils rather than try to change the soil's underlying character. For highly disturbed soils, like pavement that is being transformed into a median or raingarden, we usually just excavate to a depth of 3' and bring in new soil.

2. Compaction: If you are dealing with compacted soils, then following steps that we discussed in the presentation can help but again... it is all going to depend... Is there life in the soil? - fracture, add moisture and topdress (possibly with some gypsum added depending on clay content). If soil is dead, till in and treat it nicely with some amendment (if needed) and a protective topdressing of comp and mulch. Cover crop? It is going to take time to solve these problems.

3. Plant types in landscapes - Check out the Plant Comm. by zip code and see what would have been and make the best decision based on current site conditions to figure out how to make adjustments in order to replicate the natural environment that community would have been.

Re: Low N compost vendors: The only one I have used is Marin Compost. I checked producers in your area, and it doesn't look like there is anyone producing it. If I were in your position, I would reach out to a few producers in your area and ask them if they can custom make a Low N compost for you. It is not a huge deal to do it. It is just higher carbon over N for the process. You could also reach out to Marin Compost to see if they know of anyone else producing Low N Compost.

## **Invasive species and Weed Seeds**

Q. For Zach Tanner, are you using native seed on your project sites? Many Caltrans projects on Hwy 1 now have pampas grass as a predominant species. How do you ensure you aren't introducing invasive species, or high nutrient soils that favor invasive species, in your compost blankets?

A. From Zach Tanner - "Yes, we primarily use native seed in our erosion control applications. On occasion, our erosion control mixes will also use non-native seed where permitted. The use of non-native seed within erosion control mixes is limited to non-invasive species and only includes a select number non-natives that perform specifically well in erosion control applications.

From Zach Tanner - Pampas grass is problematic on several stretches of Hwy 1, both within and outside of our right of way. In our experience, the pampas grass is taking hold wherever there is disturbance, including sites composed of predominantly mineral soils as well as sites composed of more nutrient rich soils. We try to remove it to the best of our abilities.

To ensure that we do not introduce invasive species through the use of our compost blankets, first, we only specify certified compost that has been processed to eliminate

any weed seed. Our projects also employ invasive plant management requiring the contractor to manage the site for both invasive and non-invasive weeds as well as sometimes implementing controls during construction, like truck washing, covering compost/topsoil piles, & sourcing of local materials to the extent possible. Managing invasives along the highway roadsides is very challenging, given the scale of the projects, the steepness of some slopes and the amount of seed traveling through highway corridors."

Q. So, we should put mulch over compost to prevent weeds?

A. That may be an option.

Q. Have there been any issues of non-native and invasive plant seeds or roots remaining in the compost material and spreading in areas where the compost has been applied? If so, how is this managed or mitigated?

A. From Zach Tanner – "To my knowledge and from my experience, the issue of non-native and invasive plant seeds or roots remaining in the compost has not been an issue. Much of that concern is removed by specifying certified compost that has been processed to eliminate any weed seed.

From Hillary Nichols - Generally, when composts pass pathogen testing expectations, weed seeds and roots are destroyed. The Seal of Testing assurance program requires and enforces that all compost products in its program pass pathogens to the level required by the EPA 503 rules, no matter the feedstock or local rules, and no matter the end use.

From Michael Ferrara- Not many problems with this issue because the compost is quite mature (per quality requirements and the seeds therefore have been killed in most cases).

Q. How do you eliminate the invasives because especially star thistle will be in the seed bank? Also, does the nitrogen in the compost actually help the invasives, so how do you outcompete the invasives? My application is with native grasses and they often have hard time competing with star thistle.

A. This is a large subject. The short answer is compost can help the native grasses establish and out compete the invasive like star thistle. An adaptive management program to control star thistle using compost, native seeding, fire, herbicides (e.g. Transline) and hand pulling can eventually lead to a beautiful stand on native grasses and forbs.

## **Pathogens**

Q. For Hillary: Recent research suggests that pathogens like coliform bacteria, fecal coliform, E. coli and salmonella can survive many composting processes, does the Composting Council have or will they be coming up with recommendations for pathogen testing protocols for certain uses? And who will enforce this, each agency?

A. From Hillary Nichols - a. The Compost Research and Education Foundation's Standards and Practices Committee keeps the TMECC test methods that the US Composting Council's Seal of Testing Assurance Program is based on, up-to-date.

a. There is a current task force of researchers examining the pathogen lab methods for updates. Cary Oshins is the staff liaison for this pathogen group, and I am the staff liaison for the overall committee.

b. The Seal of Testing assurance program already requires and enforces that all compost products in its program pass pathogens to the level required by the EPA 503 rules, no matter the feedstock or local rules, and no matter the end use. The US Composting Council recommends that all agencies employ the STA program as the nation-wide compost labelling service (like the FDA is for food).  
<https://www.compostingcouncil.org/page/CertifiedCompostSTA>

c. The US Composting Council has recommended compost test results for each use, found here: <https://www.compostingcouncil.org/page/HowUseCompost>

Q. In urban and interface settings, how do we ensure that we are not spreading pathogens like phytophthora and anthracnose? Are those killed by the composting process?

A. Pathogens due to feedstocks are destroyed during the composting process in a permitted facility. To ensure you are buying quality compost it is recommended that the compost undergo the rigorous testing procedures of the STA program. (See presentation from Hillary Nichols on the STA compost program.)

Q. For Judith, what testing has to occur to use animal/manure based composts to ensure pathogens are not present, or present in safe amounts dependent on the crops? Would we expect that all farms would test regularly and carefully?

A. From Judith - The manufacturer has to test for salmonella and E. coli. Our food safety auditor has required tests for E. coli O157 as well and we asked our source to include those tests in the future. It isn't the responsibility of the farm to do the test — just to keep records of the manufacturer tests.

Q. How about pet waste in municipal compost? Many homeowners don't want to put pet waste in their trash bins due to the smell. Are E. coli levels being monitoring in composting operations?

A. Animal waste is broken down during the composting process and any pathogens introduced are destroyed during the composting process at a permitted facility. To insure you are actually buying quality compost it is recommended that the compost undergo the rigorous testing procedures of the STA program. (See presentation from Hillary Nichols on the STA compost program.)

Q. Can you please expand on the impact of horse manure addition to composting?

A. Animal waste is broken down during the composting process. To ensure you are buying quality compost it is recommended that the compost undergo the rigorous testing procedures of the STA program. (See presentation from Hillary Nichols on the STA compost program.)

## **Salt/EC**

Q. As Dr. Crohn described there are many beneficial salts but yet Caltrans uses EC which counts the nutritive salts vs just specifying a sodium level which is not a detriment to plants? Will this change?

A. From Hillary Nichols - a. The Compost Research and Education Foundation's Standards and Practices Committee keeps the TMECC test methods that the US Composting Council's Seal of Testing Assurance Program is based on, up-to-date. I am the staff liaison for the overall S&P committee. One of the items the committee would like to tackle is assembling a task force of researchers to revise the EC lab methods for compost to discriminate between nutrient salts and table salt in lab results. Additional funding and staff would help speed this improvement. b. More detail on the issue of salts is provided by the Compost Research and Education Foundation.

A. From Michael Ferrara - If the designers need something better than the "standard" we are currently using, they talk to the headquarters office and change the specification to meet that need. Designers also have the option of requesting a "non-standard" edit on the specification for any project.

Q. Can Dr. Crohn speak to salt level variability with manure based compost?

A. See the STA testing results for your compost. Salt Levels will be in the testing results of the particular compost lot.

Q. Caltrans' compost spec limits EC to 10 EC5, as long as there's a high ag index in the compost, wouldn't a little higher EC limit be fine or even better for planting media?

A. From Hillary Nichols - a. The Compost Research and Education Foundation's Standards and Practices Committee keeps the TMECC test methods that the US Composting Council's Seal of Testing Assurance Program is based on, up-to-date. I am the staff liaison for the overall S&P committee. One of the items the committee would like to tackle is assembling a task force of researchers to revise the EC lab methods for compost to discriminate between nutrient salts and table salt in lab results. Additional funding and staff would help speed this improvement.

b. More detail on the issue of salts is provided by the Compost Research and Education Foundation.

Q. How does the use of salt based fertilizers impact the life of the soil food web? If compost is used to increase the soil food web structure, can fertilizers also be used?

A. Traditional salt based fertilizers are not recommended for revegetation projects.

## **Serviceware**

Q. Hilary Nichols - What do you see as the effects from food soiled paper and food serviceware on the quality of finished compost and its marketability?

Q. Can you address the effects on the composting process and marketability of finished compost and mulch from contamination from food soiled paper and food serviceware?

A. From Hillary Nichols - a. Source separation is important to reducing contamination. Where compostable and non-compostable items look alike, or are in close proximity to each other, there is a potential for contamination. Some contaminants can be screened out post-composting before sale. The US Composting Council has compiled recommendations for addressing reducing contamination in the Target Organics Hub of Resources. b. BPI compostability labels are extremely helpful when selecting compostable products to use. However, each composter's method of composting is different. Some composters are able to process compostable products that others are cannot. The Compost Research and Education Foundation has created a program to allow each composter to run an experiment to see what does and doesn't work for them, in real life.

Q. There seems to be a disconnect with the requirements of SB1383 in particular the collection and processing of food soiled paper and food serviceware with green waste and the amount of contamination limits for finished compost and mulch. It was stated by Peter Shultze- Allen that many organics processors sift out the compost and send the contaminants and the overs with it to landfill. Isn't this counterintuitive to the purpose of the SB1383 to keep organic material out of the landfill? Can someone from CalRecycle please address this issue?

A. Thank you for your question regarding SB 1383 and products marketed as compostable. The SB 1383 regulations define organic waste as follows: California Code of Regulations Section 18982(a)(46): "Organic waste" means solid wastes containing material originated from living organisms and their metabolic waste products including, but not limited to, food, green material, landscape and pruning waste, organic textiles and carpets, lumber, wood, paper products, printing and writing paper, manure, biosolids, digestate, and sludges.

CalRecycle does not have the authority to dictate which materials must be accepted by compost facilities. Similarly, CalRecycle does not have the authority to dictate which materials a compost facility may not designate as contaminants. We have heard anecdotally that food soiled paper and food serviceware marketed as "compostable in industrial composting facilities" may not compost in timeframes similar to other common compostable feedstocks, and this is likely the reason these products may be screened out as overs.

## **Contamination**

Q. The larger plastics will continue to degrade into microplastics and microplastics can penetrate the root systems of plants and make their way to the edible part of the plant and are then ingested by humans/animals.

Q. What is the long term impact of film plastic in compost breaking down into the soil?

Q. With the increase of organic diversion with SB1383, you showed what 0.1% plastic contamination looks like. What effects would the breakdown of plastics into microplastic have in compost use if any?



A. The implications are unknown at this time. Please consider reading [Emerging Issues in Food Waste Management Plastic Contamination \(epa.gov\)](#) for more information on this topic.

A. Film plastics (0.1% plastic contamination) can be present in compost. If you don't want that you will need to specify that you do not want that material in your compost and then check with your local suppliers to make certain it is available.

Q. Given distribution of compost is now big business and placement is as important as collection, can you both share more about film/microplastics, and harmful bacteria due to feedstocks that contain animal waste? How do we ensure that we are not applying composts to areas where these plastics and pathogens could harm biodiversity, wetlands, wildlands, and watersheds?

A. Any potential harmful bacteria due to feedstocks that contain animal waste are destroyed during the composting process. To ensure you are buying quality compost it is recommended that the compost undergo the rigorous testing procedures of the STA program. (See presentation from Hillary Nichols on the STA compost program.) Film plastics (0.1% plastic contamination) can be present in compost. If you don't want that you will need to specify that you do not want that material in your compost and then check with your local suppliers to make certain it is available.

Q. What are some good practices in composting organics pulled from a single stream municipal solid waste (Dirty MRF transfer stations)? Big issue I've seen are shredded plastics along with the organics after going through processing in a transfer station.

A. From David Franklin - A facility in Nevada uses workers with blowers to separate the plastic bags, credit cards etc. It's labor intensive, but results in a much cleaner product.

Q. Back to the plastics in the compost - are you referring to certified compost?

A. From Cary – No, I was trying to warn about wide variables you may find when purchasing compost.

Q. You mentioned having issues with green waste compost containing plastics. Were you using OMRI/CDFRA compost when you found plastic content? And did you request the Lab Analysis prior to your purchase to confirm the content within in the compost?

A. From Cary Roulet- I was trying to warn about wide variables when purchasing compost. OMRI/CDFRA will always provide a lab data sheet. I don't see these compounds in my data test sheet.

Q. Regarding the contaminant rules Dr. Crohn spoke of, are there tests to determine those minimal rates that should be specified? Do soil labs now test for those items?

Q. You mentioned the compost specifications for contamination and films. Can you review that again, is that a new regulation for finished compost and is that intended to increase end use markets?

A. CalRecycle has established physical contamination standards for compost, 0.5% by dry weight for physical contaminants and 0.1% for film plastics. Caltrans has developed tighter specifications that many composters can meet as they discussed during their presentation.

Q. For Peter - Microplastics which can't be seen with the naked eye are also likely a problem in municipal composts. Is there an established monitoring and rating program or labs where you can send samples to understand the microplastic content of compost, before purchase?

Q. Unsure whether there is a commercial lab that test for microplastics. I've seen it done at universities 'in research'

Q. This question is for Hilary Nichols. Could you explain the issues with having so called "compostable" bio-plastics mixed in with organic material used to produce OMRI Certified compost? Thank you!

A. From David Franklin - Not sure on this.

A. We are not aware of a lab that is testing for microplastics in compost at this time.

A. From Hillary Nichols - a. Unfortunately I am not involved in OMRI decisions, so cannot comment on that. b. For STA Certified Compost, all composts must be labelled by both their ingredients (feedstocks) and their test results, which would include indicating a % of manmade inerts (uncomposted trash) in that material. Quality is in the eye of the consumer, and the consumer's intended uses.

Q. Any testing for per-and polyfluoroalkyl substances (PFAS) compounds in compost?

A. From Cary Roulet- I don't see these compounds in my data test sheet. I will ask.

A. For more information on this subject please consider reading the Biocycle Article "Managing PFAS Chemicals in Composting and Anaerobic Digestion"

<https://www.biocycle.net/managing-pfas-chemicals-composting-anaerobic-digestion/#:~:text=If%20you%20make%20compost%20from,are%20those%20for%20drinking%20water.>