

# Soil Amendments *Revitalize Damaged Land*

BY **LEN MINDES**

Photos courtesy: Quattro Environmental Inc

**A**s the flood waters recede in the Midwest and the wildfires fade in the West, officials begin to ponder how to protect their citizens and the land against similar future calamities. Now add to that the resultant threats of erosion and sediment flow of the newly bared plains and forests that heavily concentrated water flow creates. These disasters just created an additional burden on the states involved and the federal government.



The Hyundai Proving Track in the Mojave Desert sits on some of the poorest soil around. By amending the soil during preparation, the photo on the right shows the startling results.

In the Midwest, the rivers and streams that overflowed their banks dealt the area a heavy blow. It took out thousands of acres of excellent farmland by losing a great deal of topsoil to erosion—and what about the fires in the Southwest earlier this year, as well as the fires in Northern California presently? When the rains come to those areas, what will happen to the denuded ground?

We know from past history that unless we apply some sort of blanket or cover, in the rainy season these denuded areas will lose their topsoil. Equally as important, because fires are often in the hills and mountains, rain will carry that soil, along with its contaminants,

right down the slopes. This stormwater runoff will cause even more damage to the environment.

Here is where soil erosion contractors and soil amendments can take a leading role. They can be a major player in mitigating these effects at disturbed sites and alleviating them at contaminated sites. Amendments, for many sites, can be a very feasible procedure that is inexpensive and could produce amazing results.

Soil amendments have had success controlling erosion and its resultant sediment pollution, as well as aiding the best erosion inhibitor—vegetation. The Environmental Protection Agency (EPA) cites disturbed soil at con-

struction sites as one of the “four broad categories” where soil amendments could be used advantageously.

The Iowa Department of Transportation (Iowa DOT) funded Dr. Thomas Glanville, a professor at Iowa State University in the Department of Agriculture and Biosystems Engineering, to conduct a study to determine how compost blankets would control erosion and sediment runoff at highway embankment sites. The study compared subsoil compaction, a 6” topsoil cover, and a (2”–4”) compost blanket. “What we found in our study,” states Dr. Glanville, “was that highway embankments blanketed with com-



post stopped erosion to a significantly greater degree than the Iowa DOT's conventional methods of compacting the subsoil or adding topsoil."

Glanville tested three different compost blankets: one was composed of biosolids, another of yard waste and the third of bio-industrial by-products. All three of these compost products performed better at curbing erosion and decreasing the amount of runoff than the conventional methods. Considering

on the site again until April, when erosion might have created the need for costly repairs."

Peter McRae, president of Quatro Environmental, Inc., Coronado, California, agrees that compost blankets control erosion effectively; however, alone, they do not support continuous plant growth. According to McRae, "If the ultimate aim is to have a "pillowing effect" (mitigating erosion and runoff), then wood fiber, mulch, yard waste and biosolid composts

Composts that hope to support plant growth needs to incorporate certain elements and attributes in the right proportions. Among the things to consider are particle size, moisture content, carbon to nitrogen ratio, soluble salt, pH level, nutrient content and degree of stability. McRae says that any contractor responsible for re-vegetating a site should take the time to know the soil; more importantly the soil should be tested.

Testing the soil is a three-step process and represents a scientific means to this end. The first step is to take soil samples, then have them analyzed in a lab, and finally interpret the analysis. McRae calls the interpretive phase, "The art part of the science," explaining that, "there may be five different versions about how to address the same soil." In the end, the interpretation sets the company's game plan, and increases the chances for successful re-vegetation.

Considering that there are over 70,000 soils in the United States, a multitude of disturbed sites, and a varied range of climate and physical conditions, it is not surprising to find a myriad of soil amendment products on the market. These products include a gamut of items, such as soil binders, enzymes, bacteria, fungi, and other organic, pH and mineral amendments.

Soil has four main components: mineral, structural, organic and biological. The way to choose a soil amendment is to know which soil component needs to be improved and then find a product that will do the job. For instance, Don Lester, product manager at JH Biotech, Ventura, California, suggests his company's product, Penex, as an amendment to change a soil's structure. "It helps break up the clay and alleviate puddling at construction sites." He feels Penex

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A leach pad on top of an old mine bearing gold ore in the Mojave Desert needed to be brought back to its original condition. See photo on page 34

the high concentration of metals and nutrients found in the composts, the reduced harmful sediment runoff was surprising.

Glanville interprets his findings, "Compost blankets are another tool to mitigate erosion and improve runoff quantity and quality, but not the only method. In particular, they are effective and cost efficient for situations when the work is not finished in time for the growing season, leaving the site with no cover. For instance, in Iowa road builders sometimes build right up to the month of November, and then they aren't able to work

work well; however, if the ultimate aim is to grow plants there are other considerations."

The first consideration should be to apply soil amendments to revitalize a sterile soil or even "design" one to foster plant growth on that site. McRae inveighs against the diminutive role of soil in the past, "Historically, our industry looked upon dirt as dirt. The prevailing idea was that if you want to grow carrots in a desert, throw some water on the seeds and they will grow. However, if the soil is sterile, the highest quality seed will give disappointing growth."



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could also evolve into a product that helps control erosion at sites that have high clay content.

McRae considers the balancing of all four soil components necessary. He credits his attentiveness to the soil for his company's success in establishing native plants at the Hyundai Mojave Desert site. "We hydroseeded the Hyundai site with a slurry mix that included our Kiwi Power, a product that contains a complex of enzymes and bacteria. We also added our Fertil-Fibers NutriMulch to the mix as a nutrient packet to sustain the bacteria. Additionally, our slurry also included soil binders as a holding component and humate substances as a buffering agent."

Re-vegetating a site is a holistic process, not a one-size-fits-all approach. Your vegetating success boils down to the soil. If you want good results, you better amend your soil properly, whether you're dropping seeds into holes or hydroseeding. McRae argues the point like this, "The shortcomings of hydroseeding are a myth; it has more to do with conventional seeding design than seeding with a hydroseeder." His words apply equally to any seeding method. The bottom line for success is to create the right soil for your site's climate, slope or any other condition.

As for growing soil, humate substances, such as humic acid or fulvic acid, play an extremely useful role. Lester explains, "Humate substances break up the soil, freeing up nutrients so a plant can use them. For instance, if an aluminum molecule combines with a phosphorous one, the humate substance detaches the phosphorous, allowing it to be used by the plant. As a buffering agent, humic acid keeps the helpful nutrients

available to the plant longer."

Humate substances work symbiotically with another amendment readily available on the market: the fungi inoculant, mycorrhizal. Mycorrhizal helps the plant develop an extensive root system that is then able to take advantage of the nutrients freed by the humate substances. A more extensive root system also gives the plant more access to water.

Dr. Mike Amaranthus, president

ultimately, grow vegetation on a disturbed site. Adding them to your soil allows you to address mineral imbalances, to buffer for toxicity, to jumpstart and sustain microorganisms and to bind elements. In short, amendments allow a contractor to hold and build a disturbed site's soil components. Seeding is no longer just drop and douse, but pick and mix to find what works best. Even compost products that hope to help



After hydroseeding the gold mine with native plants (salt bush), these are the results three years later.

and chief scientist at Mycorrhizal Applications Inc., in Grants Pass, Oregon, used mycorrhizal to vegetate a previously logged site that had been bare for 17 years. Dr. Amaranthus explains his success with the fungi, "Plant survival at the logging site was around 20%; after we added mycorrhizal to the site, survival shot up to around 90% because the mycorrhizal extended the root systems, which extended the absorbing area for plants to access nutrients and water."

The use of soil amendments enables you to have fertile soil and

plants grow require the right blend of many characteristics, such as particle size, moisture content, carbon to nitrogen ratio, soluble salt, pH level, nutrient content and degree of stability.

As your knowledge of amendments increases, so will your ability to pinpoint which ones are necessary for your purposes. There should be no reason not to apply them in your re-vegetation efforts. Employing them will enhance your soil and ultimately, grow plants, boosting your reputation as a dependable, reputable, and accomplished contractor. 🌱