United States
Environmental Protection
Agency

Solid Waste
and Emergency Response
(5306W)

EPA530-F-97-046
October 1997
www.epa.gov

Innovative Uses of Compost

Reforestation, Wetlands Restoration, and Habitat Revitalization

The native plants that inhabit America's countrysides—from the sunflowers on the Great Plains to the oak seedlings in the Appalachians—are a source of great beauty. But the plants within a habitat contribute much more to their surroundings than mere beauty. They provide a vital food source for many members of the habitat. They enrich the air through the gases they produce and minerals they exchange. Even when plants die, they continue to support grasses, flowers, and trees by becoming part of the humus, or organic material in soil, that is so vital to living plants.

Unfortunately, much of the organic material in the soils in the United States has been stripped by natural and man-made stresses such as erosion, flooding, and logging. But barren soils can be restored with the help of compost. Compost adds the missing infrastructure, humus, and nutrients that plants need to re-establish themselves in decimated areas.

Organic matter in the soils of wetlands in the United States has decreased steadily over the last three centuries. According to Dr. Donald Hey, an expert in flood plain management, over 100 million acres of U.S. wetlands have been drained, and our watersheds now contain only about half the amount of organic matter they contained in the 17th century. As a result, annual floods have worsened, ground water quality has deteriorated, and wildlife diversity has declined. Compost, with its high organic content, can absorb up to four times its weight in water and can replace essential organic material in wetlands.

In addition to wetlands restoration, compost also can help restore forests and revitalize habitats. Compost can play an important part in reforestation efforts by providing an excellent growing medium for young seedlings. In the same way, compost can help to revegetate barren habitats, providing the necessary sustenance for native wildlife populations. By enhancing the chemical and mineral properties of soil, compost facilitates native plant growth, which provides food for native and endangered animal populations.

Reforestation:

Nantahela National Forest and the Qualla Cherokee Reservation

In 1996, the U.S. Forest Service, Bureau of Indian Affairs, Cherokee Tribal Council, and the U.S. Environmental Protection Agency (EPA) launched a 3-year, joint study (1995-1998) to test the effectiveness of straw

Photo courtesy of U.S. Forest Service

U.S. Forest Rangers and Cherokee cleared plots for the compost study.

compared to three different kinds of composts in stimulating tree seedling growth and reducing soil erosion. The three composts, made from yard trimmings, municipal waste water sludge (biosolids), and municipal solid waste (MSW), were used as a 2-inch mulch on white pine softwood, chestnut oak, and chinese chestnut hardwood seedlings.

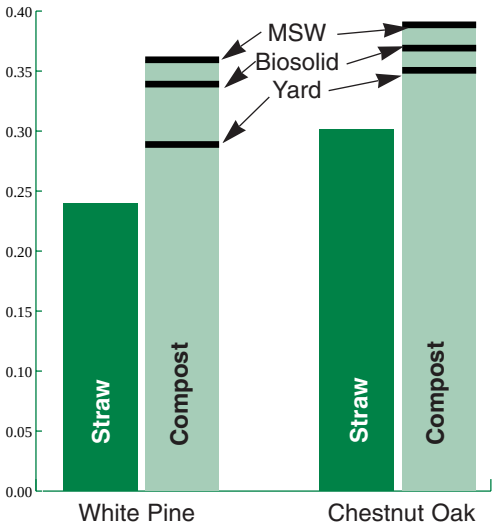
The project was carried out at three different sites within the Cheoah Ranger District, Nantahela Forest and the adjoining Qualla Cherokee Reservation at Cherokee, North Carolina. U.S. Forest Rangers and Cherokee workers cleared and planted the plots for this study. The study sites were chosen because they contained compacted, eroded areas or disturbed steep slopes. Each of the three composts and the straw were tested on two plots each, and the seedling types were grown on each plot.

After 20 months, results showed that height, diameter, and survival rates for seedlings planted in the composted test plots exceeded the straw test plots. In addition, volunteer revegetation by herbaceous plants was remarkable in the composted plots. After 30 months, erosion was evident in the straw plots but not in the composted plots.

Photos courtesy of U.S. Forest Service

Seedlings planted in compost mulch flourish and show greater growth than seedlings planted in straw mulch.

Average Seedling Diameter
(inches after 20 months)



Habitat Restoration:
Patuxent Wildlife Research Center Project

Dr. Matthew C. Perry, a habitat management scientist at the Patuxent Wildlife Research Center in Maryland, in cooperation with the EPA, is leading a 2-year study (1996-1998) to show the value of using composts to restore wildlife habitats. Past military and farming operations at Patuxent degraded native plant populations, resulting in a serious decline of many animal populations in the area. The aim of the new study is to revegetate a 4.8-acre site with native plants in an effort to restore the food sources for indigenous wildlife populations, including songbirds, game species, small mammals, amphibians, reptiles, and insects.

The study is comparing the effectiveness of two compost materials, one made from municipal wastewater sludge (biosolids), and the other made from yard debris. These two soil treatments, with two types of controls, were randomly assigned to eight plots and replicated twice. Control plots received no compost and were of two types: one that was planted with a hand-collected mixture of native grasses and legumes and one that was not planted. Plots with compost were also planted with the native plant mixture.

Preliminary results, in the late fall of 1996, indicated the greatest revegetation of plots occurred in areas treated with compost made from yard debris; but, all of the plots with compost had superior growth compared to the control plots.

Photo courtesy of the Patuxent Wildlife Research Center

Piles of compost await spreading on a degraded area of Patuxent Wildlife Research Center.

Regaining Wetlands:
Clean Washington Center Project

At a site in Everett, Washington, the Clean Washington Center sponsored a 2-year project, from 1994-1996, to test two types of compost in the restoration of damaged wetlands. The restoration site consisted of two large wetlands joined by a culvert 550 feet long and 18 inches deep. Decades ago, a sawmill sat in the sandy area between the wetlands. Once the mill was torn down, the area was left relatively barren, which made the railroad tracks and bike path adjacent to the upper wetland prone to flooding. The project utilized compost extensively to keep the adjacent railroad tracks and bike path from flooding.

The project's construction team deposited a yard debris compost and a mixed compost made of biosolids and yard debris into 14 separate test plots. A control plot containing no compost was also developed. Workers then introduced a selection of indigenous wetland plant species into each plot and monitored the growth of the plants every six months, through 1996.

The project showed that the compost enriched soils closely mimicked the natural wetland substrate. In addition, the plants in both compost test plots exhibited 20 percent more growth, and a 10 to 15 percent higher survival rate than the control plots. The site also handled the flow of 1996's heavy winter rains quite well, and the railroad tracks and bike path did not flood.

Photo courtesy of the Clean Washington Center

Damaged wetlands near railroad tracks in Everett, Washington, flooded the tracks constantly. Restoration with compost prevented flooding and helped support the native beaver population.

Des Plaines River Flood Plain

Dr. Donald Hey, an expert in flood plain management, tested the value of using compost to restore 37 acres of wetlands in a project he conducted on the banks of the Des Plaines River in northern Illinois. He and his staff used compost to encourage the growth of native plants in four marshes. One portion of the marshes, functioning as a control, was not treated with compost.

Positive results were observed within 2 years of incorporating compost into the soil along the river. Flood storage of the area—the ability of the soil to absorb and contain the excess water from floods—had improved dramatically compared to the control area. River water quality also improved significantly, with reduced nitrogen values and fewer suspended solids in rehabilitated areas of the river. In fact, the revitalized soil and plant life removed 90 to 95 percent of the nitrogen and suspended solids from the water.

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For More Information

This fact sheet and other information about solid waste issues are available in electronic format on the Internet at http://www.epa.gov/osw; select "Reduce, Reuse, Recycle." Use Internet e-mail to order paper copies of documents. Include the requestor's name and mailing address in all orders. Address e-mail to: rcra-docket@epamail.epa.gov.

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