

BIOSOLIDS NEWS

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Biosolids Forest Application

A growing option for Virginia's tree farmers

In Virginia, approximately 50 percent of the biosolids produced by wastewater treatment plants are recycled and used as soil amendments on farms. A small portion of that amount is used on Virginia's forests, an application method that is growing steadily.

In 2001 just over 600 acres of forests in Virginia received biosolids. In 2005 this increased to more than 3,000 acres, out of approximately 50,000 total acres that were land applied that year.

Biosolids are a good source of forest nutrients, since they act as a slow release fertilizer that supplies most of the essential elements needed to increase tree growth, including nitrogen and phosphorus.

According to Dr. Thomas R. Fox, associate professor of forestry at Virginia Tech, biosolids applications to forestland, which are provided at no cost to the



A spreader applies biosolids in a pine forest in eastern Virginia.

landowner, are an attractive alternative to the high cost of commercial fertilizers. The proximity of many forests in the Piedmont and Coastal Plain of Virginia to metropolitan areas that produce biosolids also reduce transportation costs for the land applicators.

"The growth of most pine stands in Virginia is limited to some extent by the availability of nitrogen and phosphorus," said Dr. Fox. "Large loblolly pine forests in the Piedmont and Upper Coastal Plain are well suited to the land application of biosolids since most of these forests grow on nutrient deficient soils and will grow better if fertilized. Nutrient uptake by tree roots in the soil is rapid, which decreases the potential for runoff."

Virginia Tech and the Virginia Department of Forestry are conducting ongoing research to evaluate the agricultural and environmental impacts of biosolids on forest ecosystems.

Forestland owners can get more information by sending an e-mail to: info@virginiabiosolids.com



This Douglas-fir tree was cut when it was about 30 years old. When it was 20 years old, the tree was fertilized with biosolids, resulting in the wider growth rings. Source: King County, Washington

Washington state forestry research

Research on the benefits of biosolids in forestry has been conducted in Washington state for more than 20 years in King County, which has the largest forestry biosolids program in the country. About 30,000 tons of biosolids are forest applied annually.

Studies demonstrate that application of biosolids to forestland is one of the most cost-effective and environmentally sound ways to recycle.

Since 1986, forest streams in the application sites have been sampled and analyzed four times a year for ammonia nitrogen, nitrate-nitrogen, fecal coliform and enterococcus. Wherever possible, water upstream of the units is collected for comparison. Storm events are also sampled to verify that the site has adequate buffers.

The monitoring has shown no changes to surface water quality from biosolids.

More information on the King County program is at: <http://dnr.metrokc.gov/wtd/biosolids/Forest.htm>



The Virginia Biosolids Council supports the land application of biosolids in Virginia through information and education on the beneficial use and safety of biosolids. The Council is supported by municipal wastewater treatment plants, land application companies and biosolids users, and is available as a resource to those who need information about the recycling of biosolids.

Expert Panel looks at health and environment

In 2007 the Virginia General Assembly passed House Joint Resolution 694 requesting that the Secretary of Natural Resources and the Secretary of Health and Human Resources convene a panel of experts to study the impact of land application of biosolids on human health and the environment. This panel convened in 2007 and will submit its findings and recommendations prior to the start of the 2009 Session.

The Panel will meet several times during 2008 to address the questions contained in the Resolution concerning human health and the environment.

It will conduct the bulk of its work in two subcommittees, human health and the environment.

The Panel was asked to (i) perform a detailed analysis of the chemical and biological composition of biosolids; (ii) evaluate the toxic potential of biosolids constituents derived from land application to humans, agricultural products, soil organisms, and wildlife; (iii) evaluate alternative technologies for the beneficial use of biosolids and their disposal; (iv) determine the



The full Expert Panel met at the Virginia Capitol on November 16.

availability, costs, and feasibility of technological alternatives to Class B land application; (v) investigate the availability, capital and operations costs, feasibility, environmental and human health impact, and public acceptance of alternative technologies; and (vi) identify and recommend institutional and financial mechanisms for assisting localities in implementing alternative technologies at the state, local, and regional levels.

You can follow the Panel's activities on the web at: <http://www.deq.virginia.gov/info/biosolidspanel.html>

Agricultural value of biosolids is significant

Farmers use biosolids to supply most or all of the nutrients needed by the crop during the growing season following the application. When substituted for commercial fertilizer, the savings can be significant.

Biosolids contain the primary macronutrients nitrogen, phosphorus, and, to a lesser extent, potassium; as well as the secondary macronutrients magnesium, calcium and sulfur; and such micronutrients as copper, zinc, iron, manganese, molybdenum and boron.

Biosolids can save farmers as much as \$180 an acre and more.

In addition, biosolids, like manures, provide considerable amounts of organic matter to the soils on which they are applied. The organic matter improves soil structure and water-holding capacity, a particular benefit during years when crops are stressed by drought.

The economic value of biosolids to the farmer depends on a number of factors, including the rate at which they are applied, the residual fertility in the field at the time and, of course, the price of the commercial fertilizer the farmer might otherwise use.

Each application is unique and each farmer has to determine the value based on these individual

characteristics, which in the case of fertilizer prices can fluctuate greatly over time.

In general terms, however, a typical biosolids application containing 4 percent total nitrogen would be worth about \$5.20 a wet ton just for the plant-available nitrogen it contains – based on nitrogen prices of 65 cents/pound.

If the biosolids were lime-stabilized, their lime content might provide another \$1.50 - \$2 value for each wet ton. Biosolids also contain considerable phosphorus, which may or may not be needed based on residual fertility levels.

Farmers applying biosolids for maintenance fertilizer needs on grass fields (60 pounds N/acre) could realize \$40 - \$100 an acre in fertilizer savings. Farmers applying biosolids to meet the nitrogen needs of a high-yielding corn crop (160 pounds N/acre) could realize \$100 - \$180 an acre in savings. These numbers do not include the benefits of the organic matter or micronutrients that biosolids supply.



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