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From Waste to Wood

Using millions of tons of agricultural manure and municipal biosolids in ways that will take advantage of the nutrients in the wastes and protect the quality of water resources presents significant challenges in Maryland. Presently much of this material is applied to agricultural crop fields. However, nutrient management requirements and a shrinking amount of agricultural land require that new and innovative methods be pursued. The application of manure and biosolids to forests and tree plantations is a natural recycling system that uses available nutrients, produces forest products, and enhances other forest benefits.

The environmental benefits of forests to protect water quality are significant. Trees absorb excess nutrients from many sources and break down harmful chemicals, providing a natural cleaning process and protecting soil and water resources. This natural recycling system can reduce the reliance on more expensive treatment methods, such as incineration, landfilling, and new treatment plants. At the same time, trees provide visual and sound buffers, reduce atmospheric carbon dioxide, use waste nutrients to produce forest products, and improve wildlife habitat.

Trees Use Nutrients

Trees need large amounts of nitrogen and lesser amounts of phosphorus to grow. These are the same nutrients that pose the greatest threat to water quality through runoff and leaching. Potassium, magnesium, calcium, and sulfur also are needed by trees but in smaller amounts.

Hybrid poplar trees experience increased growth with deep-row application of biosolids.

Trees and other plants usually respond to increases in nitrogen by increasing their rate of growth, the same way garden vegetables and flowers do. The application of manures and biosolids to existing forests or forest plantations requires developing a nitrogen budget, and in some cases a phosphorus budget. A nitrogen budget is based on the nitrogen needs of trees and the nitrogen content of the materials applied. It verifies that the trees can use the nitrogen that is applied, also ensuring protection of the environment.

Some trees are capable of using large amounts of nutrients due to characteristics such as genetic makeup

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and root systems. Trees well-suited for using treated wastes include hybrid poplar, hybrid willow, sweetgum, sycamore, yellow poplar, and loblolly pine. Hybrid poplar and hybrid willow especially are attractive in forest plantations because of their high nutrient needs and ease of regeneration. In addition to the growth rate and nutrient needs of a species, one needs to consider the market for the wood products of that species.

Deep-row Application of Biosolids

Traditionally, many of the biosolids (solid material resulting from the wastewater treatment process) produced in our metropolitan areas have been surface-applied on agricultural and marginal lands, which can result in problems such as run off and odors. A newer method used with tree plantings, called **deep-row application**, solves many of the problems associated with surface application and converts infertile gravel spoil to a productive environment.

Biosolids are placed in trenches 40 inches wide, 30 inches deep, and 8 feet apart. The trenches are partially filled at prescribed rates with biosolids obtained from municipal waste treatment facilities. They are immediately covered with soil which eliminates odors and minimizes the production of nitrogen compounds that would leach through the soil. The trenches then are planted with a nitrogen-demanding tree that utilizes the underground nutrients over a planned rotation without further application of biosolids or other fertilizer.

An example of deep-row application of biosolids in forest plantations is in Prince George=s County at ERCO, Inc., a private firm that pioneered the technique in the early 1980's. ERCO plants hybrid poplar trees in six year rotations on a 90-acre abandoned gravel spoil. The gravel spoil at ERCO previously could not support any significant vegetation or wildlife habitat and was subject to massive erosion. As a result of growing hybrid poplar, the site has been reclaimed and transformed into a forested habitat with an abundance of deer, beaver, quail, doves, and other wildlife. In 17 years of operation and intensive water quality monitoring, there have been no negative impacts on water quality.

Deep-row application provides a natural recycling system that utilizes nutrients on-site, reduces erosion, produces forest products, and provides wildlife habitat while reclaiming abandoned, biologically dead soils. This technique is being researched further, exploring application to other types of sites. For more information, contact Jonathan Kays, regional extension specialist-natural resources, Western Maryland Research and Education Center, 301-432-2767, jk87@umail.umd.edu.

Poultry Manure as Forest Fertilizer

More than 700,000 tons of poultry manure are produced annually on the Delmarva Peninsula. Using poultry manure on agricultural land is a serious problem due to the high phosphorus concentration of the manure that reduces the application rates. At the same time, because of land development, there are declining amounts of agricultural and forestland on which manure can be applied. For the forestry industry to be sustainable in the long term, more wood fiber will have to come from the existing forestland base.

Fertilization can stimulate forest growth and decrease the time between timber crops. The Maryland Cooperative Extension has initiated a research and demonstration project on the Eastern Shore to evaluate the use of poultry manure to fertilize native pine forests. The project brings together the two largest industries on the Delmarva Peninsula—forestry and agriculture—to address an environmental and economic problem.

Approximately 12,000 forested acres are thinned or planted annually on the Delmarva Peninsula. These acres potentially are available to fertilize. If poultry manure were applied at a rate of 1-3 tons per acre, an estimated 23,000 tons of manure would be used. This would take the strain off other agriculture land to absorb the manure. It also would benefit the forest landowner through increased tree growth and financial returns because of a shorter crop rotation.

This presents a unique opportunity for forestland owners. For over 20 years, forestland has been fertilized in the southern United States, with an estimated 1.3 million acres of pine forests fertilized annually. Commercial fertilizer recommendations for pines and application rates have been established, meeting the nutritional needs of the trees and stimulating growth by 20-25 percent. Poultry manure meets these application rates and can be applied in an environmentally safe manner.

For more information on on applying poultry manure to forestland, contact Bob Tjaden, regional extension specialist-natural resources, Wye Research & Education Center, 410-827-8056, rt20@umail.umd.edu.

Branching Out
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Two Groups Agree

Two of the largest forest management standards and certification programs in the United States have formally recognized each other's standards for sustainable forest management. The Tree Farm System and the Sustainable Forestry Initiative (SFI)SM program signed a Mutual Recognition Agreement that acknowledges that the intent, outcome, and process of the two programs are substantively equivalent and that the credibility and reputation of each will be maintained by the programs' respective systems already in place. Tree Farm and SFI will collaborate to increase sustainable forestry on private lands and educate non-managing landowners about the benefits and support for practicing sound forestry.

The agreement recognizes that both programs are committed to sustainable forest management: Tree Farm is a credible standard for sustainable forestry on smaller forests and SFI is an independent standard for the forest products industry, larger forests, and licensees. The programs will remain independent of each other and continue to use their own methods to measure and assure performance standards.

The American Tree Farm System, with 25 million acres and 66,000 non-industrial private forest landowers, is the oldest certifier of sustainable forests in the United States. It is a program of the American Forest Foundation, a non-profit organization that develops, funds, and administers programs that encourage long-term stewardship of natural resources. The Sustainable Forestry Initiative, with 60 million acres and 250 member companies and associations, is administered by the American Forest & Paper Association, the forest and paper industry's national trade association. All members of AF&PA must comply with SFI.

1,500 Tree Farms in Maryland

More than 66,000 nonindustrial private forest landowners are members of the American Tree Farm System. In Maryland there are 1500 certified Tree Farms involving 275,000 acres. Under the program, members manage their property according to a plan and maintain their certification every five years by meeting standards for sustainable forestry, taking into consideration wood and fiber production, wildlife habitat, water quality, recreation, and the environment. For information on the Tree Farm System, contact your local DNR forester, listed in the blue pages of the telephone book and at http://www.dnr.state.md.us, or the Tree Farm System at http://www.treefarmsystem.org.

In Maryland, 85 percent of forestland is privately owned. Average private ownership is 23 acres but 60 percent of private forestland is less than 10 acres.

Management Plan a Must

A management plan is a must for your forest land. It helps you articulate the objectives for your property and is the blueprint for meeting those objectives. Management plans can be developed by a professional forester, e.g., state, private, or industrial. Your time with the forester is best used when you already have an idea of your objectives. Two resources that can help are

- *Forest Stewardship Planning Guide*, USDA NED software downloaded from http://www.fs.fed.us/ne/burlington, and
- *Tree Farm Management Plan Guide*, from the American Forest Foundation, 202-463-2700, or http://www.treefarmsystem.org.

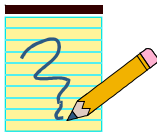
Forestry Groups Convene

A first for Maryland forestry groups occurs January 30. These groups are hosting a legislative reception and dinner program in Annapolis, featuring Dr. Patrick Moore of the Forest Alliance of British Columbia. Dr. Moore, a founder of Greenpeace, told attendees at the Maryland Forests Association annual meeting in October of his evolving education in forestry issues, his realization of the environmental importance of sustainable forestry, and his subsequent departure from Greenpeace. In November, the Maryland Forest Conservancy District Boards convened representatives of the numerous forestry groups in Maryland. As a result, the January event was planned to help legislators better understand forestry issues. For information, contact Bill Miles, 410-414-2525 or billmiles@chesapeake.net.

Now is the time to . . .

. . . order trees from the state nursery. See "Take Note" on page 4 for catalog information.

. . . check your forestland roads and trails to see how they perform under winter rains and snows. How is the drainage? Does water soak in or drain off? Are there wet pockets? Is the road/trail surface stable? If not, you might consider planting this year a ground cover that also would benefit wildlife, such as lespedeza or a pasture mix other than Kentucky 31.



Take Note

- ***Working Trees for Treating Waste***, USDA National Agroforestry Center, East Campus-UNL, Lincoln NE 68583-0822; phone: 402-437-5178, fax: 402-437-5712, nhammond@fs.fed.us.
- ***Wastewater Management Using Hybrid Poplar***, Agroforestry Note 17, April 2000, USDA National Agroforestry Center, East Campus-UNL, Lincoln NE 68583-0822; 402-437-5178, www.unl.edu/nac.
- ***State forest tree nursery*** catalog with seedlings available for 2001 planting. Includes hardwoods, conifers, and bundles for wetland, wildlife, stream, and upland. Minimum number required. Call 800-873-3763, your local DNR forester, or www.dnr.state.md.us/forests/nursery.
- New! ***Developing a Custom Portable Sawmill Enterprise***, MFS-1. 24 page Maryland Cooperative Extension fact sheet with background, analysis, enterprise budget, resources, and guidelines. From your county Cooperative Extension office.
- New! ***Holiday Greenery,*** SPF-1. 14 page Maryland Cooperative Extension fact sheet with background, analysis, resources, enterprise budget, and guidelines on developing a decorative forest products enterprise. From your county Cooperative Extension office.
- ***Introduction to Forest Ecology and Silviculture,*** 2nd edition. Useful to forest landowners, loggers, foresters, forest managers, advisors, consultants, and policymakers. Order from NRAES, 607-255-7654, or nraes@cornell.edu.
- ***Landowner Assistance Programs***, FS-640, USDA Forest Service. Briefly describes federal technical and incentive support, including these programs: Forest Stewardship, Forest Legacy, Forest Resource Management, Forestry Incentives, Conservation Reserve, Environmental Quality Incentives, Wetlands Reserve, and Wildlife Habitat Incentive. For a pamphlet, contact your local Conservation District, USDA Service Center, or www.nrcs.usda.gov or www.fsa.usda.gov/dafp/cepd/crpinfo.htm.
- ***Guide for Funding & Assistance, Landowner Stewardship Referral Service.*** Published by the Maryland Department of Natural Resources for private landowners and resource professionals. Includes land with forests, streams and floodplains, agriculture, and non-forested land plus suburban and urban. Available from local DNR offices.

Websites:

- *Forest Landowner's Guide to Internet Resources*. Listings and links to publications, brochures, fact sheets, resources by state, and government agencies, newsletters, and organizations: http://www.na.fs.fed.us/pubs/misc/ir/index.htm.
- National Audubon Society photographic field guides. Customized for flora and fauna in your area: www.enature.com.
- Forestry and wildlife topics. Produced by Mississippi Cooperative Extension, but much information applicable to mid-Atlantic region: http://www.ext.msstate.edu/anr/wildfish/wildresources/index.html.
- American Forests periodic forestry notes. To receive, send an e-mail to forestbytes-subscribe@americanforests.org.

Upcoming Stewardship Events

- **Feb. 24: Delmarva Forest Stewardship Seminar "Opportunities in a Changing Environment."** For landowners and others. Webster's 801 Conference Center, Salisbury, 8:30 a.m. - 3:30 p.m.. Register with Bob Tjaden, 410-827-8056, or rt20@umail.umd.edu.
- **Apr. 7: Southern Maryland Forestry Seminar.** For landowners and others. Doncaster Demonstration Forest, Charles County. Register with Dave Gailey, 301-934-2543.
- **Apr. 21: "Deer in Rural Woodlands" videoconference.** Downlinked at Western Maryland Research & Education Center, Keedysville, 9 a.m. - 12 noon. For landowners, educators, foresters, managers, and others. Register with Jonathan Kays, 301-432-2767, or jk87@umail.umd.edu.