

Composting in the Mid-Atlantic Region

September 2002

**Produced by MACREDO
(Mid-Atlantic Consortium of Recycling and
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Mid-Atlantic Consortium of Recycling and Economic Development Officials (MACREDO)

Mission Statement

The Mid-Atlantic Consortium of Recycling and Economic Development Officials (MACREDO) is an organization of recycling and economic development interests of the states of Delaware, Maryland, Pennsylvania, Virginia, West Virginia, and the District of Columbia. The organization's mission is to identify, promote, and implement projects and programs that enhance recycling and economic development opportunities on a regional basis.

Goals/Objectives

- 1) Stimulate demand for post-consumer materials.
- 2) Create an efficient regional recycling infrastructure.
- 3) Position post-consumer recyclables as viable feedstocks for manufactured products.
- 4) Institutionalize the practice of buying recycled-content products in the public and private sectors.
- 5) Identify and implement projects that financially sustain collection operations and maximize material diversion at the local level.
- 6) Stimulate economic growth and create jobs.

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**Prepared by
Maurice M. Sampson**

**for
MACREDO
1504 South Street
Philadelphia, PA 19146**

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INTRODUCTION

The purpose of this report is to present an overview of composting activities in the region, with emphasis on projects and initiatives that are being sponsored by state and local governments. MACREDO members are interested in this subject because governments composting efforts can result in:

- diversion of valuable organic matter from the waste stream for use in composting products;
- increase in recycling recovery rates;
- implementation of effective nutrient waste reduction strategies that emphasize the use of poultry manure in composting processes.

The report is organized into the following sections:

- Section One – *Composting Overview* provides background information and discusses composting as an effective waste management strategy. It also describes both trade organizations and federal government initiatives that support the emerging composting industry.
- Section Two – *Compost and Nutrient Management* discusses the threat to waterways from nutrient pollution, including animal manure runoff, and presents composting as one effective nutrient management planning strategy.
- Section Three – *Regional Perspective* provides a summary of the emerging composting industry success factors and barriers, a review of state program and policy initiatives, and recommendations to state governments in supporting the continued growth of composting activities in the region. In addition, the section presents an overview for each state that highlights government composting programs, nutrient management initiatives, and profiles of selected composting ventures and pilot projects.

Composting in the Mid-Atlantic Region is intended to give a snapshot of the spectrum of composting and related nutrient management activities in the region and to encourage support for the emerging composting industry.

SECTION ONE -- COMPOSTING OVERVIEW

Background

Composting is a biological process of recycling organic materials to support and sustain new plant growth. Composting is the transformation of organic material (animal manures, and plants and animals at the end of their life cycles) through decomposition involving invertebrates (insects and earthworms), and microorganisms (bacteria and fungi), into a stable, nutrient rich, soil-like material called compost.

Composting is an ancient practice, described in the writings of Marcus Cato, a farmer and scientist who lived in Rome two thousand years ago. Cato viewed compost as the fundamental soil enhancer, essential for maintaining fertile and productive agricultural land. He stated that all food and animal wastes should be composted before being added to the soil.

While the value of compost has been long been accepted by farmers, its application is more art than science and it is frequently misunderstood by the general public. Compost is neither a peat nor a mulch. It is a soil amendment that can be used in place of peat and mulch, with added benefits: slow release of nutrients, water retention, suppression of some plant diseases, and better protection of transplants and seedlings.

It is also important to clarify that compost is not a soil, a chemical fertilizer, or a manure. Soil consists of sand, silt, clay, and small amounts of organic material and is the material on the outer layer of the earth's surface. Chemical fertilizers have specific proportions of nitrogen, phosphorus, potassium, and other nutrients, but do not have any organic material. Manure is animal waste that is often combined with wood chips, straw or similar bedding or sludge, containing plant seeds and potential disease organisms. Mature compost is a complex organic material, containing slow releasing plant nutrients. While compost can be produced from manure and carbon bulking agents (leaves, wood chips, straw), it must be properly processed and fully stabilized to assure destruction of weed seeds and disease organisms.¹

Composting and Waste Management

Long accepted for its agricultural benefits, composting also has value as a waste management strategy. Yard and food wastes make up approximately 30 percent of the municipal solid waste in the United States. Composting of manure and sewerage sludge biologically binds nitrates and phosphorus, avoiding pollution of surface and ground waters. Free of heavy metals and herbicides, properly finished compost is a valued commodity.

The beneficial qualities of composting have captured increased interest among policy makers in the Mid-Atlantic as a means of managing waste and nutrients:

- Yard waste composting can provide a lower-cost alternative to landfilling and provides an alternative for those states that have banned leaves and yard waste from landfills. Comprising as much as a third of waste generation, composting contributes to achieving higher recycling rates. Composting is an alternative to burning which produces unhealthy particulate matter and toxic, carcinogenic hydrocarbons and carbon monoxide.
- Composting is also a viable nutrient management alternative for farmers. It is a process that stabilizes poultry, hog, and livestock manures for beneficial use.
- Biosolid composting is an alternative to ocean dumping and direct land application in managing sewerage sludge. Mature compost has been used to reclaim strip mines, golf courses, and, typically, other applications where food is not grown.

Composting regulations fall within the department of agriculture and the department of environmental protection in each state. The agricultural community is working to develop a product-oriented regulatory

¹ "Compost: What Is It and What's It To You," A.H. Christian and G.K. Evanylo, Extension Specialists, Virginia Cooperative Extension, Publication Number 452-231, Posted November 1997.

framework for compost, while environmental protection staff enforce regulations based on the composting process as a preferred waste management practice and are primarily concerned about the impact of facilities on health and the environment. Some in the emerging composting industry voice concerns about high permitting fees, bonding requirements, and other regulations they believe to be a hindrance to the development of composting businesses. An ongoing dialogue of industry representatives and government officials is needed to assure that regulations will protect public health and safety while supporting private sector development.

Contamination Issues

Heavy metals and herbicides are potential contaminants that can undermine the marketability of finished compost. Heavy metals have primarily been seen as an issue in the production of compost from biosolids. For this reason, the standard recommendation has been to limit the use of biosolid compost to non-food applications: golf courses, playgrounds, and mine reclamation. However, in the case of some of the biosolid operations surveyed for the report, heavy metal content has been monitored and found to be within regulatory limits. As a result, biosolid compost is not only widely sold by these operations, but they report demand in excess of production.

Herbicides present a more difficult issue. Although most herbicides break down rapidly after application, BioCycle magazine in its September 2000 issue reported compost contamination by two Dow Chemical products, Clopyralid and Picloram, each demonstrating a tendency to break down very slowly, particularly during the composting process. Referred to as a “persistent herbicide,” Clopyralid is extremely toxic to legume crops such as peas and beans, tomatoes, potatoes, and sunflowers at levels as low as ten parts per billion. Damaged plants have been found in local gardens and nurseries as well as in university test sites in Washington State, Los Angeles, New Zealand, and Pennsylvania. This issue presents a serious threat to compost operations. In 2000, the Spokane Regional Compost Facility was not able to market 25,000 cubic yards of material due to contamination by herbicides.

Clopyralid is sold under a variety of trade names including: Confront for use in turf; Curtail for use in cereal grains; Stinger for use in sugar beets, mint, and asparagus; Lontrel in Canada for use in strawberry, blueberry, and balsam fir Christmas trees. It is also marketed for home use and, in some instances finds its way to municipal and regional composting operations. The U.S. Composting Council, Washington State University, along with a growing number of facility managers, regulators, public agencies, researchers, and herbicide manufacturers are seeking solutions to the problem ranging from on-site treatment to regional product bans.

On March 1, 2002, the Washington State Department of Agriculture announced a ban on the use of Clopyralid for lawns and turf in an effort to prevent the contamination of compost materials. Golf courses are exempt from the regulation if they do not send any grass clippings or other vegetation to composting facilities servicing the public. The state imposed additional restrictions, effective June 28, 2002, limiting the purchase of Clopyralid for use on some agricultural crops to licensed pesticide applicators. California followed Washington’s example of protecting compost from contamination by passing legislation (Assembly Bill 2356) that limits the use of herbicides containing Clopyralid.

Trade and Professional Organizations

National, regional, and state organizations play a critical role in promoting regulations that support the emerging composting industry, in encouraging the production of quality materials, and in increasing product acceptance by consumers.

The US Composting Council (USCC) is a non-profit organization that describes itself as “the only national organics organization that is committed to the advancement of the composting industry.” The organization has a membership of about two hundred and is currently working to improve the profitability of its members and the overall health of the industry while increasing the profile of composting and fostering a positive business climate for businesses.

The Seal of Testing Assurance Program (STA) is an important USCC program that was initiated in 2000 to improve compost field results and to increase consumer confidence in purchasing compost products. Participating facilities pay a fee to the USCC, agree to have their products tested on a regular basis at an approved laboratory, and report the test results to the USCC and to others upon request. STA composters must also provide consumers with an ingredients list and guidance on proper usage. In return, the participating compost facilities may use the STA logo along with a written statement prepared by USCC. Currently there are more than fifty STA compost facilities throughout the country. The following are located in the Mid-Atlantic region:

- Maryland Environmental Service, Annapolis, Maryland
- US Filter, Baltimore, Maryland
- J.A. Rutter Company, Murrysville, Pennsylvania
- Laurel Valley Farms, Avondale, Pennsylvania
- Philadelphia Water Department, Philadelphia, Pennsylvania
- Huck's HenBlends, Lightfoot, Virginia
- Loudin Composting, Chantilly, Virginia
- SPSA, Chesapeake, Virginia

The USCC is working to convince landscapers and government agencies to cite the STA certification when specifying the use of compost materials.

The Mid-Atlantic Composting Association (MACA) is a regional organization that is seeking to achieve consistency of regulations throughout the Mid-Atlantic states. They are involved in educating regulators about the industry and in promoting best management practices as it applies to labeling and marketing compost. MACA is currently comprised of members from Delaware, Maryland, and Virginia; and they hope to expand their membership to Pennsylvania and West Virginia.

The *Virginia Composting Council* educates the general public and government about composting. One of the major barriers they are working to overcome is the lack of understanding of what composting is and the benefits it imparts. The Council meets twice a year independently and once a year in cooperation with MACA.

The *Pennsylvania Composting Association (PACA)* is a non-profit organization with the mission of facilitating the "responsible production and use of compost in Pennsylvania." PACA works in partnership with the US Composting Council and other state composting organizations.

Cooperative efforts among these organizations are critical in advancing the composting industry in the region.

Federal Government Initiative

The U.S. Environmental Protection Agency has developed Comprehensive Procurement Guidelines (CPG) that require procuring agencies to purchase a wide range of recycled-content products including compost materials made from yard trimmings, grass clippings, leaves, and/or food waste. Also, where appropriate, EPA recommends that agencies set up composting systems to convert their own organic waste into compost for their landscaping needs.

The CPG program was established through the Resource Conservation and Recovery Act (RCRA), Section 6002, and Executive Order 13101. The requirement applies to procuring agencies that purchase more than \$10,000 worth of a designated product in a given year. In addition to federal agencies, state and local governments and their contractors that use appropriated federal funds are expected to comply with the guidelines. Agencies may be exempt from the requirements due to excessive costs, insufficient competition, failure of a product to meet performance specifications, and/or unavailability of a product within a reasonable time frame.

SECTION TWO -- COMPOST AND NUTRIENT MANAGEMENT

Introduction

One of the most significant common issues currently driving both government initiatives and the interest in composting among Mid-Atlantic states is the introduction of excessive nutrients to ground and surface waters from chemical fertilization, animal manures, sewage treatment plants, and urbanization. Excessive nutrients present a serious threat to the ecological and economic viability of the all of the region's waters and Chesapeake Bay in particular. Decisive policy development promoting Nutrient Management Planning has been driven by concerns for human health, most recently the Pfiesteria outbreaks widely reported in Maryland, Virginia and South Carolina in 1996 and 1997. The widening drought of 2002 and the rapidly expanding poultry and swine industries will bring increasing attention to these issues. This paper would not be complete without providing the background to understand these issues.

The Role of Nutrients in the Environment

Nature moves basic elements through a series of chemical and biological states commonly referred to as cycles. Through these cycles, elements moves between a more disperse to more abundant states (usually chemical) where nature safely stores the bulk of the element. The nitrogen cycle, for instance stores the bulk as a gas in the atmosphere. Pollution occurs when, through human interference, material moves in an inappropriate amount or form disrupting the environmental balance.

Nitrogen and phosphorus move through the environment in such cycles and are essential to plant growth. Both of these elements are found in fertilizers and animal wastes. When applied to crop and pasturelands in amounts in excess of plant needs, these elements can adversely affect water quality. Phosphorus is quickly bound in the soil or taken up by plants. Because most of the phosphorus-- about 85%-- remains in the soil, runoff of eroding sediments and organic materials are a primary source of phosphorus in water.

Nitrogen from fertilizer and animal waste acts differently. Soluble in water, nitrogen becomes nitrate. Nitrate ions, not absorbed by plants or converted to gas, move through the soil, downward into the groundwater or laterally to contaminate surface waters.²

There are a number of sources of nutrients in the Mid-Atlantic region. The bulk of excessive nutrients are from agricultural practices: crop fertilization, livestock, and poultry manure. Urban and suburban areas also contribute to the problem through urban storm water run off, wastewater treatment facilities, and use of phosphate detergents.

Nutrient Management Planning

Nutrient management planning is a series of best management practices aimed at reducing nutrient pollution by balancing nutrient inputs with crop nutrient requirements. Nutrient management planning is

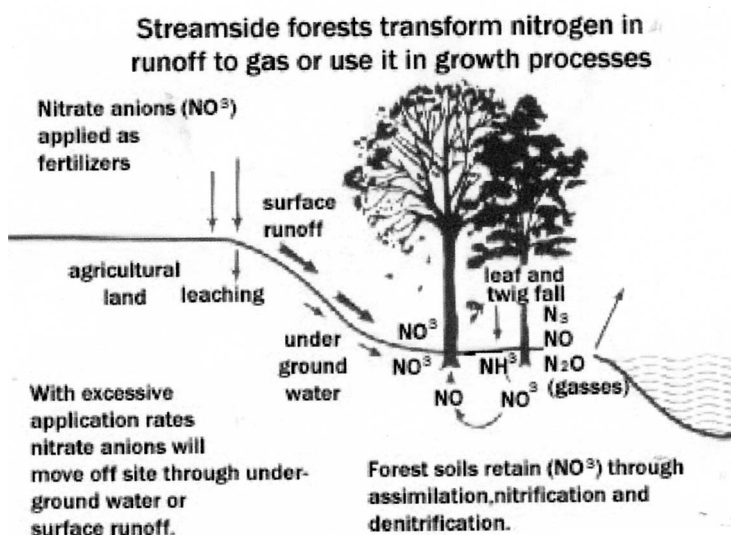


Chart provided courtesy of the Maryland Department of Natural Resources.

² Website, Maryland Department of Natural Resources Forest Service, posted July 18, 2002: <http://www.dnr.state.md.us/forests/publications/biocycles.html>

considered one of the most cost-effective means of controlling excessive nutrient applications including livestock manures and poultry litter.

To date, most of the attention on nutrient management strategies in this region has been concerned with poultry litter. There are four basic approaches to handling this material:

- Land application of stabilized poultry litter,
- Redistribution of poultry litter from areas of excess to areas where it can be beneficially used,
- Composting as a means of biologically binding and stabilizing nutrients, and
- Alternative programs including pelletizing for use as land application in other areas and gasification.³

These strategies were identified in response to the detrimental impacts of excessive nutrients on the Chesapeake Bay.

The Chesapeake Bay

Concerns for the declining water quality in the Chesapeake Bay and its tributaries led to a six-year study by the US Environmental Protection Agency (EPA) beginning in 1976. The study documented declining water quality with reduced numbers and diversity of fish, shellfish, and aquatic vegetation. The main cause of these changes was identified as eutrophication⁴ and turbidity caused by soil sediments and increases in plant nutrients. Reducing nutrients entering the Bay can reverse this situation, and water quality models simulating ecosystem processes were used to establish nutrient reduction goals of 40 percent. Based on the study, the Chesapeake Bay Agreement was signed in 1987 by the states of Maryland, Virginia, Pennsylvania, as well as the District of Columbia, EPA, and the Chesapeake Bay Commission.

The Chesapeake Bay Agreement was a major impetus in the development of nutrient management planning. Originally promoted as a voluntary practice among farmers, well-publicized outbreaks of the algae bloom *Pfiesteria* between 1988 and 1997 and uncertainty about its impact on human health have resulted in mandatory nutrient management planning in Delaware, Maryland, and, to a limited extent in Pennsylvania.

Pfiesteria

Pfiesteria piscicida, is a single-celled organism, referred to as a dinoflagellate⁵. It occurs naturally in the brackish mud and sediments of rivers, bays and estuaries. *Pfiesteria* is a marine organism, commonly found as dormant, harmless, microscopic cysts. In the presence of nutrients, however, the microbe can change to twenty-four distinct forms, including a ferocious two-tailed killer, much like a tiny stinging sea nettle, with a very powerful toxin.

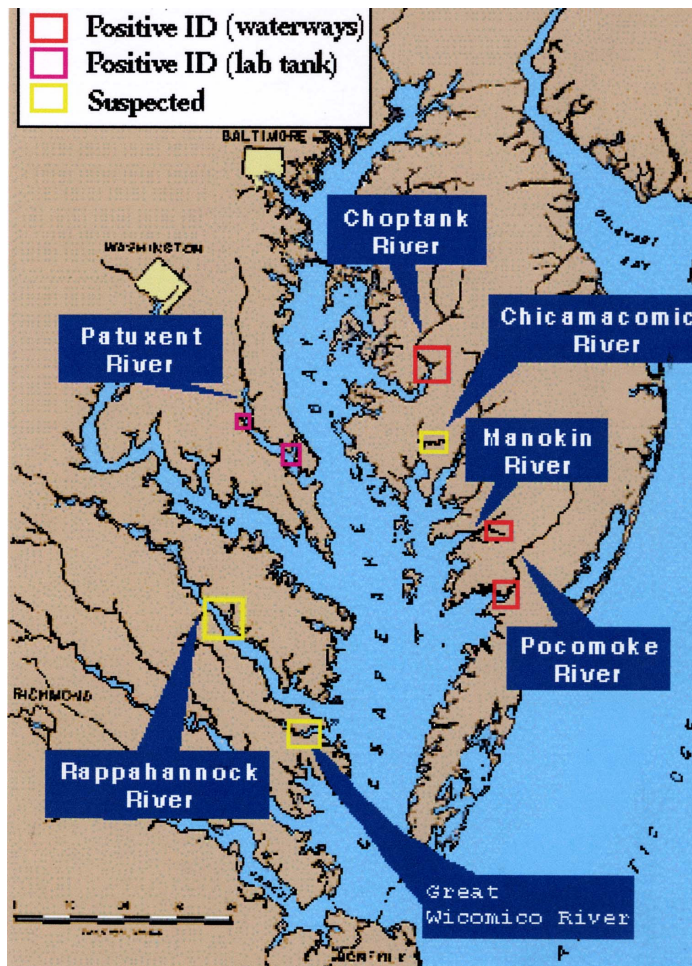
Scientists believe that *Pfiesteria* has been present along the Atlantic coast of the US for thousands of years. Most of that time it persists as a nontoxic predator, feeding on bacteria, algae, and small fish. The presence of increased levels of nutrients, however, transforms dormant to active cells, filling the water in huge numbers. A paralyzing toxin is released, paralyzing the fish's nervous system, causing it to gasp for breath at the surface. Eventually, the fish suffocates, and the *Pfiesteria* begin consuming the flesh, leaving lesions that look like open sores on the dead fish.

³ Bud Malone,

⁴ According to the Merriam-Webster's Collegiate® Dictionary Eutrophication is the process by which a body of water becomes enriched in dissolved nutrients (as phosphates) that stimulate the growth of aquatic plant life usually resulting in the depletion of dissolved oxygen

⁵ any of an order (Dinoflagellata) of chiefly marine planktonic usually solitary unicellular phytoflagellates that include luminescent forms, forms important in marine food chains, and forms causing red tide

Outbreaks of Pfiesteria 1992 to 1997



- 1992 - Choptank River, MD
Jenkins Creek
- 1994 - Patuxent River, MD
Marine laboratory, Benedict
- 1996 - Patuxent River, MD
Marine laboratory, St. Leonard
- 1996 - Manokin River, MD
Aquaculture ponds
- 1997 - Pocomoke River, MD
Shelltown to Pocomoke Sound
- 1997 - Patuxent River, MD
Marine laboratory, St. Leonard
- 1997 - Manokin River, MD
Kings Creek – Suspected
- 1997 - Rappahannock River, VA
Suspected
- 1997 - Chicamaomic River, MD
Suspected
- 1997 - Great Wicomico River, VA
Suspected

SOURCE: Island Press, Eco Compass Features, Sept. 22, 1997, modified from USGS.

Pfiesteria and Human Health

Pfiesteria has consequences for human health. Although it is not a virus or a bacterium, and is not contagious or infectious to be "caught" like a cold, it is dangerous. Well-documented human health effects have occurred in laboratory conditions, where researchers were working with the organism in close proximity and in high concentrations. Others, including fishermen, a water-skier, and those monitoring fish kills, have complained of skin lesions and other health effects, such as headaches, light-headedness and temporary memory loss.

Health Issues From Excessive Nutrients and Improper Manure Management

Currently, scientists have found Pfiesteria to be a phenomenon unique to estuaries and the brackish portions of rivers. These conditions are not found in West Virginia and rarely exist in Pennsylvania. Excessive nutrients that are not absorbed in vegetation or contained by the soil are extremely soluble in water and can move easily into drinking water supplies. Once in ground water, the contamination can move great distances from the source. EPA has established a drinking water standard for public water systems of 10 mg/L (10ppm) of nitrogen-nitrate or less, and no more than 45mg/L (45ppm). The greatest danger of excessive nitrates is methemoglobinemia or blue baby syndrome. This condition occurs when

the oxygen carrying hemoglobin is converted by nitrate to methemoglobin, robbing vital organs of the oxygen they need to function. This can cause severe brain damage, even death and is particularly dangerous to children under six. Ingestion of water with high levels of nitrate (greater than 1,000ppm) can cause acute nitrate poisoning, while continued ingestion of lower levels may contribute to development of some forms of cancer, and reproductive disorders⁶.

Improper management of manures from poultry and livestock operations can lead to contamination of wells and run-off to streams, rivers, reservoirs and other sources for drinking water. Bacteria and parasites can lead a number of illnesses as noted in the chart below.

Microorganisms or Parasites	Potential Health Effects from Ingestion of Water
Cryptosporidium	Gastrointestinal illness (e.g., diarrhea, vomiting, cramps, fever).
<i>Giardia lamblia</i>	Diarrhea, bloating, nausea, abdominal cramps, fatigue and weight loss. Vomiting, chills, headache and fever may also occur.
Campylobacter	Diarrhea (frequently with blood in the feces), abdominal pain, fever, headache, nausea and/or vomiting. Complications from infection include: bacteremia, hepatitis, pancreatitis, and abortion. Post-infection complications include: reactive arthritis and neurological disorders such as Guillain-Barre syndrome. Fatalities are rare, but when they occur it is usually in infants and children, elderly, or those suffering from another serious disease such as AIDS.
<i>Escherichia coli</i> (<i>E. coli</i>)	Gastrointestinal illness sometimes followed by hemolytic uremic syndrome, with potential for lowered blood cell counts, low platelet counts, and kidney damage.
<i>Hepatitis E</i> (<i>HEV</i>)	Fatigue, anorexia, abdominal pain, joint pain and fever. Pregnant women seem to be most at risk, suffering a fatality rate near 20%.
Leptospirosis	Abrupt onset of fever, rigors, muscle pain and headaches Symptoms may also include dry cough, nausea, vomiting and diarrhea, joint aches, bone pain, sore throat and abdominal pain. Complications may include kidney damage, meningitis, liver failure, and respiratory distress. May result in abortions in pregnant women and, in rare cases, death.
Listeria	Fever, muscle aches, nausea, and diarrhea. If infection has spread to the nervous system, symptoms include: headache, stiff neck, loss of balance, confusion and convulsions In pregnant women, Listeria most often infects the fetus, leading to spontaneous abortion, stillbirths, or sepsis in infancy.
Yersinia	Common symptoms in children include: fever, abdominal pain and diarrhea, which is often bloody. In older children and adults symptoms include: right-sided abdominal pain and fever, which may be confused with appendicitis.
<i>Viruses (enteric)</i>	Gastrointestinal illness (e.g., diarrhea, vomiting, cramps).

Source: Environmental Protection Agency, Citizens for Pennsylvania's Future

⁶ *Drinking Water: Nitrate and Methemoglobinemia ("Blue Baby" Syndrome)* S. Skipton, D. Hay, Cooperative Extension, Institute of Agriculture and Natural Resources, University of Nebraska-Lincoln, July 1995.

SECTION THREE -- REGIONAL PERSPECTIVE

This section provides an overview for each state that highlights government composting programs, nutrient management initiatives, and profiles of selected composting ventures and pilot projects. It is intended to give a snapshot of the spectrum of composting and related nutrient management activities in the region.

Emerging Compost Industry

The research shows that there are some established composting ventures in the emerging composting industry in the region. Common factors in their success are:

- providing a consistently, high quality product to their customers;
- doing ongoing education and promotion about composting product attributes;
- setting fair market prices and charging both tipping fees and compost product fees to support their ventures;
- creating brand name loyalty - working to both attract new customers and retain existing ones;
- securing supply from the local area to avoid excessive transportation costs.

Although there is a need to increase markets for composting products in many parts of the region, it is interesting to note that most of the profiled businesses stated that there was greater demand for their products than what they could supply. Targeted markets for these businesses include landscapers, garden centers, and homeowners.

The following are barriers that were identified as needing attention in further developing markets for compost products:

- Consumers' negative experiences with poor or inconsistent quality compost or "compost-like" materials undermine the industry's efforts to increase product acceptance.
- Many consumers do not understand the value of compost – they do not know what it is, how it is best used, and do not know how to distinguish between real compost and alternative products of lesser value.
- In not understanding the value of compost material, many individual and institutional consumers will use a free "compost-like" material rather than spend money on an established compost product.
- Supply dislocations are a problem in some areas. Transportation costs may be prohibitive when transporting feedstock or finished product a great distance.
- Several businesses throughout the region expressed concern that government-subsidized compost facilities have an unfair advantage in securing supply and in distributing their products for no or low cost.
- There were concerns expressed by the private sector that some government regulations and permitting requirements need to be reevaluated and revised so they do not hinder the development of the industry.

Government Initiatives

A wide range of policies and programs are in place throughout the region to support the composting of sewerage sludge, to include composting as one of many nutrient management strategies, and to divert yard waste from the waste stream.

Biosolid compost products have been successfully produced and marketed at government-subsidized facilities throughout the region. While some facilities have closed after an extended period of operation, many are doing well and have established brand loyalty to their products. Examples of this are Earthmate compost product made by the Biosolids Recycling Center in Philadelphia, Pennsylvania, and Nutri-Green Compost® from the Hampton Road Sanitation District in Virginia.

Nutrient management planning varies from state to state. Efforts to support the composting of poultry manure include demonstration projects by the Delaware Department of Transportation and the U.S. Department of Agriculture Resources Conservation Service (NRCS). In addition, the non-profit Warrington Foundation is working to advance the use of poultry manure compost through research, education, and pilot projects.

All of the states, through their solid waste management and recycling planning, have encouraged the development of yard waste drop-off and curbside collection programs. Most states track the amount of yard waste composting; however, the data collection systems are different and do not provide an overall perspective on the amount of composting in the region. Government policies and programs have taken a variety of forms.

- *Landfill Bans* - Three states -- Maryland, Pennsylvania, and West Virginia -- have banned yard debris from disposal at landfills; and the Delaware Recycling Public Advisory Council is recommending passage of a yard trimmings landfill ban.
- *Department of Transportation Procurement* – The DOTs in each state have experimented with the use of compost materials, although none of them are using these materials yet in large scale applications.
- *Education and Outreach* – All of the states promote backyard composting through workshops, distribution of literature, and web site information. Most states distribute compost bins to homeowners as part of their backyard composting outreach programs. Pennsylvania and West Virginia have sponsored composting conferences for professional audiences.
- *Grant Programs* - Pennsylvania, West Virginia, and, mostly recently, Delaware, have established recycling grant programs that include composting as an eligible activity. In addition, in 2002 Pennsylvania DEP announced a \$150,000 grant program for composting businesses.
- *Professional Certification* - West Virginia has provided funding for a “Compost Certification Course” for facility operators and *Handbook for Commercial and Municipal Composting in West Virginia*. Pennsylvania is funding the development of an Education/Certification Program for Professional Composters. Maryland requires operators of composting facilities that sell to the public to be certified by the Maryland Department of Agriculture. Wastewater treatment plant operators are exempted, but are regulated by the Maryland Department of the Environment.
- *Organics Recycling Task Force* - A task force with public and private sector representation met throughout 2002 and prepared a white paper report for the Pennsylvania DEP Secretary outlining the barriers to further development of organics recycling and recommendations for addressing these challenges.

Recommendations

Building on the success of the existing government initiatives, the following are recommendations to support the continued growth of the composting industry in the region:

- *Education, Outreach, and Marketing Promotion* – inform consumers about the value of compost products in meeting their needs. Information should include both guidelines for selecting quality compost materials appropriate to their application and directions for their proper use. Outreach is best tailored to user audiences and promoted to target markets for residential and large-scale applications. Compost marketing would benefit from the development of a unifying message that provides resonance to all composting efforts throughout the region. The dairy industry’s “Got Milk” campaign and the “Pork – The Other White Meat” themes can be used as models for the composting message.
- *Training and Certification* – provide training and certification programs for facility managers to support professional standards for composting operations.
- *Demonstration Projects* – support the use of pilot projects to identify and document viable options in the use of compost products and to explore compost operational methods currently limited by regulations.
- *Government Procurement* – review and adopt certification standards to be used in state and local government procurement of composting products. Governments can significantly increase demand by using composting materials for highway landscaping, mine reclamation, brownfields restoration, and other large-scale applications. The federal Comprehensive Procurement Guidelines may serve as a model for establishing and implementing government purchasing policies.
- *Public/Private Sector Dialogue* – convene members of the composting industry and regulatory officials in a process of systematically addressing composting barriers and issues.
- *Regional Cooperation* – facilitate regional forums with the existing composting organizations to explore issues of common concern and to advance the industry throughout the Mid-Atlantic states.

DELAWARE

Background

The Delaware Solid Waste Authority has been responsible for much of the composting in Delaware for almost twenty years. From 1984 to 1993 the Delaware Solid Waste Authority (DSWA) processed 330,000 tons of sewage sludge at its Delaware Reclamation Plant, located just north of New Castle. The Delaware Reclamation Plant was designed to produce electricity from the incineration of refuse derived fuel and to produce a soil amendment product through the composting of sludge and the organic portion of municipal solid waste. The Center experienced problems with improper burning in the incinerator, a high nickel content in the sludge, and odors from the digesters. In 1993, DNREC ordered the shutdown of the Sewage Sludge Processing Module.

Since 1990 DSWA has been operating the state's Recycle Delaware drop-off program. There are currently 145 centers throughout the state that accept traditional materials including beverage containers, paper, and glass and metal food containers. In addition, DSWA accepts yard waste at its three landfills. In fiscal year 2001, DSWA collected 6,981 tons of yard waste and shredded the materials for homeowners as well as for use as ground cover, wet weather pad construction, and the making of topsoil.

Other government composting efforts include:

- Newark, Dover, New Castle and Rehoboth Beach collect leaves for mulching or composting. In addition, the City of Wilmington, on request, picks up leaves at the curb and processes them into a mixture of biosolids and fly ash that are used as landfill cover. Limited data are available on these programs.
- The Delaware Department of Natural Resources (DNREC) sold more than 700 compost bins to homeowners in 1997-98 in an effort to encourage backyard composting. EPA funding allowed DNREC to sell the bins at discounted prices. The level of homeowner composting in the state has not been measured.

The Delaware Recycling Public Advisory Council (RPAC) recognizes the key role that composting can play in helping the state meet its residential solid waste diversion rate goal of 30 percent and, in its *First Annual Report*, in January 2002 recommended:

- Procurement of compost material for landscaping by the State Parks and Recreation, Administrative Services, and Delaware Department of Transportation (DelDOT);
- Implementation of a rebate program for the purchase of mulching mowers;
- Banning of yard waste from landfill disposal.

RPAC estimates that current composting efforts are only contributing 2 to 4 percent to the state's 14 percent recycling rate and believes that the implementation of the above recommendations will divert much greater amount of yard waste from the waste stream, as is the case in many other states.

Nutrient Management

In recent years there have been major developments regarding environmentally-sound methods of addressing poultry litter issues. Sussex County is reported to be the "birthplace of the modern broiler industry," and the most concentrated poultry region in the world, producing about 250 million broilers/roasters every year. Annually, the poultry industry in the larger Delmarva Peninsula produces 700 million broiler chickens and 800,000 wet tons of poultry litter, a mixture of poultry manure and wood chips or shavings.

The environmentally-appropriate disposition of this intense concentration of poultry litter is the issue. The volume is often in excess of nearby demand for land application. Transportation to other sites is an option, but often expensive. In addition, established practices of land application and chemical fertilization have resulted in excessive application of nutrients that contribute to the aforementioned water quality issues in local ground waters, tributaries, and the Chesapeake Bay.

Delaware was the first of the Chesapeake Watershed states to sign the Chesapeake Bay Agreement and Governor Thomas R. Carper formed the Governors Agricultural Industry Advisory Committee on Nutrient Management. The committee developed the groundwork for legislation that became Title Three of the Delaware Code, Chapter 22, and Delaware's Nutrient Management Program. The law, adopted in 1999, established a certification and nutrient planning program with the intent to "both maintain agricultural profitability and improve water quality in Delaware."

The Delaware Nutrient Management Program, based in the Delaware Department of Agriculture, has been successful in:

- approving the relocation of more than 14,000 tons of poultry manure; more than half of the material is produced in the critical areas defined by the Delaware Nutrient Management Commission.
- providing cost-sharing support of five dollars per acre for nutrient management planning for more than 88,000 acres of land.
- offering classes to more than 1,100 people who are seeking nutrient management certification.
- establishing an agreement with poultry companies and DNREC to work together in supporting nutrient management practices in the state. The poultry industry signers were: Perdue Farms, Inc.; Allen Family Foods, Inc.; Mountaire Farms of Delmarva, Inc.; Tyson Foods, Inc., and its subsidiaries.

Profiles

Perdue AgriRecycle and the DelDOT demonstration trials are highlighted here because they represent environmentally-appropriate solutions for managing poultry litter.

Perdue AgriRecycle

In July 2000, Perdue Farms, Inc., in Salisbury, Maryland, and AgriRecycle, Springfield, Missouri, formed Perdue AgriRecycle as a joint venture company to help poultry producers comply with nutrient management goals outlined by DNREC and the Delaware Department of Agriculture. Perdue AgriRecycle produces MicroStart60™, a pelletized fertilizer product made from pasteurized poultry litter. The product is certified as an organic fertilizer, approved by the Organic Materials Review Institute for organic crop production.

The raw material comes from poultry farms and is transported to the processing facility in Seaford, Delaware, in specially-designed sealed trucks. The production process at the 68,000 square foot facility includes drying, screening, grinding, and pelletizing.

According to a Perdue AgriRecycle spokesperson, "Our innovative process is the only alternative to ground application that recycles both the valuable nutrients and organic material without creating any waste byproducts." The facility uses air scrubbers and an air-filtration system to avoid any dust or odors from escaping into the environment. In addition, there is no wastewater discharge because the moisture from the drying process is recovered and used during the pelletizing process.

The markets for MicroStart60™ are regions in the Midwest, Southeast, and internationally that are nutrient deficient. The plant's annual capacity is 80,000 tons of fertilizer pellets.

Web site: www.perdueagrirecycle.com

DelDOT Demonstration Trials

The Delaware Department of Transportation (DelDOT) signed a Memorandum of Understanding to support the use of poultry compost in the state by conducting demonstration trials and using the results to develop general use specifications for landscaping applications.

DelDOT used New Earth Services' "Chesapeake Green" in its demonstration trials and learned that poultry litter compost can be effectively applied on Delaware roadsides. Their results show that the work can be performed by contractors using mechanical equipment available to them. The best method is use of a 4:1 ratio of soil mixed with compost because it produces a material that can be handled in a similar manner as topsoil. The compost mixture can be used on level and sloping ground on roadside shoulders. Poultry litter compost can also be directly applied and then incorporated into the soil. More testing is needed to determine the feasibility of blowing compost on slopes using a Finn blower.

DelDOT has been effective in using poultry litter compost in improving the organic matter content of the sandy soils used for road shoulder reconstruction in Sussex County in addition to improving compacted soils in medians and adjacent roadsides without vegetation. Lower Kent County roadsides are also being considered for poultry litter compost use.

DelDOT has preliminary cost information and intends to do additional cost-analysis. The Department plans to evaluate the vegetative growth in the 2001 trial plots and will do additional testing before developing specifications.

Contact: Eugene R. Rosan, Jr., Roadside Environmental Supervisor, DelDOT Field Services (Phone: 302-760-2185; email: erosan@mail.dot.state.de.us)

MARYLAND

Background

The state of Maryland has established an effective yard waste collection system through its counties. The state banned disposal of separately collected yard waste at solid waste facilities while encouraging counties to consider the composting of solid wastes as part of their solid waste management plans. As a result, all counties collect yard trimmings and all counties except Caroline County collect Christmas trees. Dorchester County also has crab chum composting. In calendar year 2001, 617,390 tons of material were collected for composting, this represents 26.5 percent of the total amount by weight of Maryland Recycling Act materials recycled in the state.

Maryland regulates composting for yard waste under provisions of its Natural Wood Waste Facility Permit. Applicants are required to submit an application, document other permitting requirements, and cover costs for public notices and a public meeting. These facilities can produce compost, mulch, and a variety of products that may be sold to consumers.

The Maryland Environmental Service (MES), a state agency and a not-for-profit corporation, has played a critical role in developing consumer acceptance of quality compost materials. MES operates and manages public and private wastewater treatment plants in Maryland. From 1980-1999, MES sold more than 700,000 cubic yards and 725,000 bags of ComPRO®, a biosolids compost. Montgomery County closed its ComPRO® facility in 1999 because it determined that it was more cost-effective land applying the biosolids than composting them. Since 1984, MES has also been successfully marketing Leafgro®, a soil amendment made from composting leaves and grass clippings (see Profile below).

Other important initiatives include:

- The counties handle home composting programs at the local level.
- The Maryland State Highway Administration uses compost each year to improve topsoil in landscaping, turf, and wildflower establishment. The Administration has numerous suppliers who have been approved by the Maryland Department of Agriculture.

Nutrient Management

The regulatory origin for nutrient management planning in Maryland is referred to as the “Tributary Strategies,” comprehensive plans developed in 1993-94 to reduce nutrient pollution entering the Chesapeake Bay from Maryland’s watersheds. The Strategies were developed as a collaboration of state agencies, local governments, and citizens in their respective waters. Maryland was divided into ten major tributary watersheds, each with a specific nutrient reduction goal and strategy for achieving the goal.

Governor Parris N. Glendening appointed the Citizens’ Pfiesteria Action Commission to study and make recommendations regarding the Pfiesteria outbreaks on the Lower Eastern Shore. In its November 1997 report, the Commission stated a probable link between Pfiesteria populations and nutrient over enrichment. At the same time, a group of agricultural scientists concluded that dissolved phosphorus in runoff can be high on soils with excessive soil test phosphorus levels. This finding caused the Commission to place a higher emphasis on phosphorus (found in poultry litter) in nutrient management planning.

The Water Quality Improvement Act of 1998 was introduced by Governor Glendening and passed by both legislative houses. The Act shifted agricultural nutrient pollution control programs from being voluntary to being regulated by the Maryland Department of Agriculture.

The Water Quality Improvement Act requires that most farms, those with annual incomes greater than \$2,500 or with more than eight animal units, develop nutrient management plans based on nitrogen and phosphorus. The state requires that the plans be prepared by certified and licensed nutrient management consultants. The deadlines are:

- December 31, 2002 for commercial fertilizer plan implementation,
- December 31, 2002 for nitrogen-based implementation plans for animal manure, biosolids, and other organic nutrients,
- July 1, 2005 for phosphorus-based implementation plans.

The later date for organic waste reflects concerns over the time needed to refine and implement these solutions. Because of the ability to blend balanced commercial fertilizers, time was not considered to be as much of an issue for commercial fertilizer users.

The University of Maryland's College of Agriculture and Natural Resources (AGNR) conducts nutrient management research and provides educational programs in both rural and urban areas. AGNR and the Maryland Department of Agriculture work together in training the certified nutrient management consultants for developing nutrient management plans. Among its accomplishments in 2001, nutrient management advisors prepared plans for about 300,000 acres of Maryland farmland.

The Warrington Foundation, a Maryland-based non-profit corporation, supports research and education in agricultural waste management and is working to advance the use of compost made from poultry manure. With U.S. Environmental Protection Agency funds, the Warrington Foundation supported the development of a facility available to any Delmarva compost producer for bagging poultry-litter based compost. The plant is located at the New Earth Services compost facility in Dorchester County, Maryland. In addition, the Warrington Foundation is funding the Maryland Cooperative Extension at the Central Maryland Research and Education Center to conduct two demonstration projects for using compost in urban settings.

Profiles

The Maryland Environmental Service and New Earth Services have been leaders in the production and marketing of compost in Maryland.

Maryland Environmental Service

MES provides assistance to local governments and the private sector in the areas of solid waste management as well as water and wastewater treatment. As mentioned above, MES successfully marketed a biosolids compost product called ComPRO® from 1983-99.

MES's Leafgro, a soil amendment made from composting leaves and grass clippings, is rated as a "general use" compost by the Maryland Department of Agriculture. MES manages two facilities, one in Montgomery County and the other in Prince Georges County. The two facilities receive annually approximately 140,000 tons of yard waste from the Montgomery, Prince Georges, Anne Arundel, Baltimore, and Howard County collection programs.

Both composting facilities were originally developed and financed as biosolid composting facilities. MES attributes some of Leafgro's success to composting on a paved site that produces a purer compost product. Yard waste composting is very equipment intensive requiring multiple front-end loaders, windrow turners, debuggers, and screeners for large operations. In addition, a bagging line is required for those who wish to package the compost.

Avoided disposal costs and Maryland's forty percent waste reduction mandate are incentives that support composting. For example, the twenty-five dollar per ton tipping fee at the Prince Georges County Facility is significantly lower than the \$45 to \$65 waste collection/disposal costs.

The Leafgro® sales and marketing mission is to "sell all available Leafgro® in a timely manner to assure ample pad space for incoming materials while maximizing revenues." The marketing program has focused on quality, consistency, and education.

In 2001, MES sold 119,000 cubic yards of Leafgro®. They sell mostly to traditional markets, including landscapers and garden centers. About 85 percent of Leafgro® is sold in bulk form while the other fifteen percent is bagged and sold through a distributor network.

MES sells all the compost that it produces. Tait Saderholm, Marketing Specialist, believes that the market is much larger than the volume that they are currently producing. Transportation costs do limit their market area to within a 70-mile radius of the composting facilities. Occasionally, MES sets up marketing arrangements with other producers when it is not able to meet market demand with bulk Leafgro®. MES carefully tests the materials from the other producers to ensure they are meeting specifications.

Leafgro® has received customer acceptance and is considered a quality compost product as is demonstrated by its success in the market place. Leafgro® can be purchased in approximately 150 different locations. MES participates in the U.S Composting Council's Seal of Testing Assurance Program and supports the compost industry by being a member of this organization and the Mid-Atlantic Composting Association.

Web site: www.menv.com

New Earth Services

New Earth Services, the only commercial composter on the Delmarva Peninsula, operates a 30-acre, windrow-compost facility for processing crab, clam shuckings, vegetable and animal residues. The company receives all of its materials from industrial food processing facilities. Prior to New Earth Services start-up about ten years ago, the materials it now processes were either directly land applied or land filled. In the case of the clamming industry, the disposal problem was threatening the industry.

Companies now pay New Earth Services a tipping fee to accept their materials and consider this arrangement a lower cost alternative to a waste disposal service and the regulated need to divert nitrogen-rich materials from direct land application. Most of New Earth Services' revenues are generated from its tipping fee and product sales, with an occasional grant.

New Earth Services receives about 20,000 tons of material annually and produces 10 to 15,000 tons per year of finished product in the forms of Organic Chesapeake Green Lawn Enhancer and Organic Chesapeake Blue, a soil enhancer for vegetable gardens and flower beds. Primary markets have been landscapers, golf courses, wildflower plantings for state highways, and independent lawn and garden retail stores.

New Earth Services was in place as the nutrient management issue from poultry waste became prominent in the late 1990s. New Earth Services has not and does not see regulations as a barrier; the absence of extensive regulations and the helpfulness of the University of Maryland were the reasons they chose to set up business in the state.

Web site: www.newearthservices.com

PENNSYLVANIA

Background

Act 101 of 1988, the “Municipal Waste Planning, Recycling and Waste Reduction Act” requires mandated municipalities to separate leaf waste from other residential waste and encourages the establishment of leaf composting programs by providing recycling grants to cover some costs. Pennsylvania now has more than eighty municipal leaf composting facilities. If they are less than five acres in size, they may operate under permit-by-rule.

Since 1994, the Cumberland County Solid Waste Authority has taken an innovative, cooperative program approach by providing yard waste composting processing equipment to municipalities on a scheduled basis. The participating municipalities pay a user’s fee, provide their own fuel, and clean the equipment after use. Some municipalities use the processed materials on City grounds and some distribute it to their residents.

The Pennsylvania Department of the Environment (DEP) in 1999 made yard waste composting a higher priority when it hired its first Composting Coordinator to oversee the statewide composting program and to encourage commercial and municipal compost activities as a valuable means of recycling.

In fiscal year 1999-2000, the counties reported that a total of 351,339.78 tons of leaf and yard waste were recycled. In the same time period, DEP distributed 121 Recycling Program Grants totaling \$7,224,348 for municipal leaf and yard waste programs.

DEP is committed to strengthening composting programs in the state. First quarter results from the current DEP-funded waste composition study indicate that organic materials comprise 28-36 percent of the total waste stream. The following are recent DEP initiatives to support composting:

- From 2000 through spring 2002, DEP, in cooperation with the Penn State Extension offices, distributed 40,000 backyard composting bins to residents in 63 of 67 counties for their participation in an hour-long composting educational session.
- Beginning in June 2001, DEP has sponsored annual Compost Marketing Conferences for businesses, consultants, government employees, and other interested individuals.
- DEP is funding the Pennsylvania Composting Association (PACA) and the Professional Recyclers of Pennsylvania (PROP) in the developing of an Education/Certification Program for Professional Composters. The first course was held in June 2002. A certificate will be issued to people who attend a series of classes including introduction to composting, advanced composting, home composting, collection of organics, and uses of compost.
- Through its competitive Compost Infrastructure Development Grant, DEP will provide a total of \$150,000 of funding for businesses to purchase machinery or equipment that will improve their composting activities.
- The Organics Recycling Task Force produced a white paper report in August 2002 for the DEP Secretary presenting recommendations for overcoming barriers to the composting industry. Task Force recommendations fall in the categories of economics and marketing; education, training, and technology; legislation and regulations; and coordination and strategy.

There are several operating biosolids composting programs in Pennsylvania including:

- The Biosolids Recycling Center (BRC), a division of the Philadelphia Water Department, is one of the largest, centralized biosolids processing facilities in the country. BRC has produced 2,640,000 tons of biosolids products, including 278,000 tons of screened compost, during its ten years of operation. BRC markets its EarthMate compost product through garden centers and soil dealers in southeastern Pennsylvania.
- The University Area Joint Authority (UAJA) runs the Spring Creek Composting Facility in Center County as part of its innovative municipal and waste water collection and treatment facility. The finished product, UAJA Compost, is sold to wastewater customers, local residents, and commercial clients.
- Two smaller biosolid composting projects are operated in conjunction with municipal treatment plants in Mansfield and Athens-Sayre. Both report an inability to keep up with demand for finished product.

The Pennsylvania Department of Transportation has had specifications for composted biosolids since the 1980s. In 1996, the specifications were amended to include paper mill sludge compost and compost from agricultural, food and organic yard wastes for use as soil amendment in backfill mixes for planting and transplanting. In 2001, DOT used leaf compost in reconstructed wetlands projects along the Interstate 78 corridor in Lehigh and Northampton Counties.

Nutrient Management

Pennsylvania's nutrient management policies have been developed as a result of the state's commitment to the Chesapeake Bay Agreements.

Pennsylvania's Nutrient Management Act was passed in 1993 and took effect on October 1, 1997. The law requires the preparation and implementation of nutrient management plans by all farms classified as concentrated animal operations (CAO), those with two or more animal equivalents per acre on an annual basis. CAOs represent only 5 to 10 percent of the farms in the states. The other farms are encouraged to do nutrient management planning on a voluntary basis.

The Act requires the existing CAOs to have their plans developed by October 1, 1998 and to have their plans implemented within three years of approval, with an extension of two years under certain circumstances.

The State Conservation Commission is responsible for preparing the nutrient management plan regulations and for providing financial assistance, as available, for implementation of the plans. Enforcement authority may be delegated to the local conservation districts. The state now requires nutrient management plans for nitrogen and is researching the best approaches for addressing concerns about phosphorus.

The nutrient management plans must be developed by a Certified Nutrient Management Specialist and approved by a Nutrient Managed Specialist from the conservation district or the State Conservation Commission Staff.

Profiles

J.A. Rutter Company, AgRecycle, Inc., and Nutra Soils, Inc. are important examples of businesses that are producing and marketing composting products.

J.A. Rutter Company

J.A. Rutter Company is a private owned and managed composting facility that operates on 10 acres of a 42-acre site located between a high-end residential neighborhood and industrial facilities. The company has owned the land for 30 years and has operated the compost facility for the last ten. J.A. Rutter handles its materials carefully to avoid odors and has never had a complaint from its nearby neighbors.

J.A. Rutter produces two products at its operation. It grinds seasoned wood pallets and colors them for sale and it also produces mature compost from yard waste including grass, brush, leaves, logs, and stumps. The yard waste is placed into windrows and is then turned and monitored until it becomes mature compost. Most of the company's materials come from landscapers and land clearing contractors. Its tipping fees are lower than the \$58 per ton fee that the nearby landfill put in place last year. Ninety-five percent of J.A. Rutter's finished compost is sold in bulk quantities.

The company is successful in selling the full volume of product that it makes and could sell more if it were produced. Its product is not the least expensive among many options, but it is considered a valued material by its users. J.A. Rutter credits its marketing efforts as the primary reason for its success. The company is certified through the U.S. Composting Council's Seal of Testing Assurance program.

Web site: www.ruttersop.com/about.htm

AgRecycle, Inc.

AgRecycle, Inc. is a private, stockholder-held corporation, founded in the early 1990s. The company produces a quality compost product that is marketed as an organically derived soil amendment for agricultural and horticultural applications including landscaping, organic farming, and soil remediation.

AgRecycle is the state's largest, private compost operation. Eighty percent of its business is represented in three sites about sixty miles apart in Beaver and Washington Counties and the border of Butler and Allegheny Counties. The other twenty percent of the business is a combination of other activities, including compost related services and the marketing and sale of tire derived turf topdressing and arena footings. The company activities are strictly market driven; revenues are derived from tipping fees and product sales.

AgRecycle has a "general composting permit" from DEP, allowing it to receive any form of pre-consumer material, including food waste, manures, papers, and residual wood waste. Post consumer liquid wastes and prepared food waste (e.g., restaurant waste) are prohibited.

Fifteen to twenty percent of the material AgRecycle receives is municipally generated material and the balance is from commercial sources. The company could handle more food waste if it received more municipally generated materials. However, it can not compete with municipal operations that are grant subsidized by the state. Municipal leaf fall is an important component in the composting process; its availability dictates the level of food waste that can be composted because of the mixing recipe requirements of composting these materials.

AgRecycle's composting process is performed in large open windrows on an improved surface, a requirement of its permit and a necessary condition for year-round quality production.

Phone: 412-767-7645

Nutra Soils, Inc.

Nutra Soils, Inc. is a soil processing company located in West Grove, Pennsylvania offering retail soil products including topsoil, potting soil, compost, mulch, and humus. Bagged sales are handled through distributors to chain stores and bulks sales to local garden centers.

Nutra Soil is owned by a consortium of mushroom growers in the region. The company's primary feedstock comes from mushroom farms after mushrooms are harvested. "Spent" mushroom soil is still very valuable for gardeners and farmers and provides a nutrient rich growing environment. Nutra Soil incorporates a unique on-site drying process to help regulate moisture content of compost and soil products. In addition to its use of mushroom soil, the company incorporates yard waste, food processing residuals, and other organic waste in its process.

Nutra Soil processes 80,000 to 100,000 tons per year of material input to produce 80,000 – 100,000 tons of finished product.

Web site: www.nutrasoils.com

VIRGINIA

Background

There are fourteen permitted composting facilities in the Commonwealth and most of them are yard-waste processing operations. Some localities have initiated composting programs, mostly in conjunction with their landfill operations and waste diversion programs. Biosolid compost is being produced by the Rivanna Sewer and Water Authority in Charlottesville, Harrisonburg-Rockingham Regional Sewer Authority in Mount Crawford, the Town of Abington, and the Town of Spotsylvania. In addition, the Hampton Road Sanitation District delivers biosolids to a local paper mill where it is combined with processed paper waste and wood chips, placed in windrows, cured, and marketed as Nutri-Green Compost®. The product is recommended for use on lawns, flower beds, vegetable gardens, and in bedding plants.

The Virginia Department of Environmental Quality (DEQ) is responsible for permitting composting facilities and has three categories of composting requirements: full composting permit, permit-by rule, and exempt composting activities. Applicants for a full composting permit must comply with bonding requirements, submit extensive facility information, and pay an application fee of \$9,700. Permit-by-rule requires facility bonding, but is a much less rigorous process and applies to both yard waste and solid waste facilities (producing less than 700 tons per quarter). Small quantity exemptions specifically target on-site composting by farmers, households, educational facilities, and in-vessel systems. The exemptions were also written to encourage farmers to work with urban areas, receiving leaves as well as materials from local grocers and food processors.

DEQ also tracks annual composting data and reported that 164,348.91 tons of material were composted in the state during the calendar year 2000. This includes 158,813.15 tons of vegetative/yard waste, 5,000.96 tons of C&D debris, and 534.80 tons of other waste.

Other government initiatives include:

- In 2000, the Virginia Department of Transportation (DOT) conducted a project using compost as a means of adding organic matter to eight locations in southeastern Virginia. These sites, varying in size from 0.46 acres to 2 acres, had been compacted after removing topsoil in preparation for construction projects. Grass seed was planted on one site and wildflowers on the other seven. DOT staff report costs at \$.18 per square foot, comparing an increase of grass coverage of 30% to 40% over areas not using compost.
- Information about the proper use of compost is provided through the Virginia Cooperative Extension network.

Nutrient Management

Nutrient management in the state is practiced through Virginia's Tributary Strategy Program, a multi-agency effort "to restore water quality and living resources in Chesapeake Bay tributaries." The program is responsible for development and implementation of nutrient reduction strategies as part of the state's commitment to the Chesapeake Bay Agreement. Virginia's 1996 Tributary Strategy Law, the 1997 Water Quality Improvement Act, and the Tributary Strategy Law 1999 amendment provide the statutory guidance for the program.

Virginia's tributary strategy program is voluntary and encourages the involvement of farmers, local officials, businesses, and citizen groups. Nutrient management strategies are developed based on scientific information, stakeholder experiences, and local circumstances. Each tributary strategy plan addresses the unique water quality concerns of the tributary basin.

DCR provides farmers with technical assistance in developing nutrient management plans as well testing nutrient levels in manure and cropland. As of August 2001, DCR trained and certified two-hundred and forty-six Nutrient Management Planners.

To date, composting has not played a significant role in the nutrient management planning process.

Profiles

Panorama PayDirt and Green Hill Farm are two excellent examples of farms that are successfully producing and selling compost made from poultry manure. Virginia's Southeastern Public Service Authority is effectively marketing Nature's Blend compost and mulch products.

Panorama PayDirt

The Murray Family founded Panorama PayDirt in 1997 as a business venture that is consistent with their agrarian culture, preserves the integrity of the open space, and does not require additional infrastructure. The Murray Family practiced conventional agriculture on their 800-acre farm from 1953 until the mid-1990s when the economic viability of their efforts were becoming more difficult.

Panorama PayDirt responded to a request for proposals (RFP) in 1996 issued by the City of Charlottesville seeking local farmers to provide a site and service to compost the City's collected leaves. During the discussion phase of the RFP, Panorama PayDirt hosted a pilot that both limited the City's liability and provided PayDirt the opportunity to gain hands-on experience in learning composting and determining its economic viability. After months of trial and error, PayDirt produced a course-screened material by the early spring of 1997. They took samples of the finished product to local landscapers who quickly consumed all the materials produced at \$15 cubic yard.

Based on this experience, the City issued a more comprehensive RFP in the late spring of 1997 and Panorama PayDirt was successful in winning a five-year, renewable contract. Panorama PayDirt purchased a compost turner and subsequently sold the entire finished product by late September 1998. The company uses poultry litter as an inexpensive source of nitrogen, which is supplied from agricultural areas with significant nutrient problems.

Currently demand is greater than the supply, with the main markets being landscape contractors, businesses, and a growing homeowner population that understands the benefits of using compost. Panorama PayDirt views composting as a genuine business opportunity that also has the potential to solve problems posed by the disposal of yard waste and animal manures.

Contact: Steve Murray (Phone: 434-978-4566; email: Panoramapd@aol.com)

Green Hill Farm

Since 1996, Dennis Stoneberger has been operating a small composting and bagging operation at Green Hill Farm where he manages six poultry houses that produce 1 million broilers and 1300 tons of poultry litter each year. He used a skid loader to turn his windrows until he replaced it with a windrow turner in spring 2000. His operation is small enough that it is exempt from state permitting regulations.

Mr. Stoneberger sold his first load of finished compost to a landscaper. Harrisonburg is mostly a rural area, and most neighboring farmers can secure fertilizer from their own properties. The markets for composting materials appear to be with landscapers and a growing home owner population. High technology industry is moving into the area and housing subdivisions are being built.

The Cooperative Extension Service has provided Mr. Stoneberger with all the information that he needs for his composting activities. Green Home Farm hosted a composting school on November 26, 2001.

Contact: Dennis Stoneberger, 8223 Simmers Valley Road, Harrisonburg, Virginia 22802

Virginia's Southeastern Public Service Authority - Composting & Mulching Facilities

Virginia's Southeastern Public Service Authority (SPSA) Yard Waste Recycling Department operates a composting facility in Suffolk and a yard waste mulching facility in Virginia Beach. These facilities combine to produce high-quality compost and mulch branded as *Nature's Blend* products. *Nature's Blend* is a 100 percent recycled product composed of local yard waste. Products are sold in bulk and in 40-pound bags.

SPSA accepts 50,000 – 55,000 tons per year of leaves, grass clippings, tree trimmings, and clean wood waste to produce 30,000 tons of compost and 10,000 tons of mulch each year.

SPSA markets its products to local landscapers, garden centers, and home owners. Markets barriers have been overcome by producing consistent, quality product; providing delivery services for orders of more than 15-cubic yards ; and doing outreach and door-to-door sales.

Nature's Blend compost is the number one selling compost in Hampton Roads.

Web site: www.spsa.com

WEST VIRGINIA

Background

West Virginia has been actively promoting composting through a number of policies and programs. The State Legislature banned yard waste, including leaves and grass clippings, from disposal in landfills and other solid waste facilities not designed for composting. The law took effect on January 1, 1997. (WV Code 20-11-8 was amended on March 11, 1995 by Senate Bill 349 that extended the deadline from January 1, 1996 to January 1, 1997). John Caffrey, Director of the West Virginia Department of Environmental Protection, later issued a Policy Statement that “domestic” yard waste may be disposed at landfills, although he still encouraged the use of composting facilities for processing residential yard waste.

The Department of Environmental Protection is responsible for overseeing the permitting of commercial yard waste composting facilities. Landscape operators, nurseries, and greenhouses that compost materials into soil amendment and soil conditioner products are categorized as “non-residential” composting activities and do not require permits. There are currently twenty-three permitted composting facilities in the state in addition to several test sites. Each of the state’s seven watersheds has at least one composting facility.

The West Virginia Division of Natural Resources (DNR) reported that 681 tons of residential yard waste were composted in 2000. The data collection project based its information on major end users to avoid double counting. No data were collected on commercial operations. DNR’s Environmental Resources Section promotes composting through distribution of educational materials that emphasize household composting. In addition, DNR provided funding for:

- “Yard Waste Composting Certification Course,” sponsored by the Association of West Virginia Solid Waste Authorities on May 31-June 5, 1998. The purpose of the course was to train compost facility operators in proper composting procedures. Attendees received a notebook of materials on a wide range of topics including permitting, siting facilities, economics, marketing, and health and safety requirements. The event was organized in cooperation with DNR, West Virginia University, West Virginia, the West Virginia Public Service Commission, and the West Virginia Solid Waste Management Board.
- *Handbook for Commercial and Municipal Composting in West Virginia*, produced by the Wilmlink Associates in 2001. The two-hundred plus page handbook explains procedures for efficiently producing quality compost while minimizing odors and other problematic issues.
- “Composting Symposium,” sponsored by the Association of West Virginia Solid Waste Authorities on June 11-12, 2002 in Parkersburg, West Virginia.

The West Virginia Department of Transportation (DOT) uses some compost along highways to enhance wildflower plots. The material is generated from the DOT and from the Potomac Valley Conservation District Litter Composting Demonstration in Moorefield, West Virginia (described below).

Poultry Litter Management

Poultry litter is an excellent soil amendment and can be valuable in a variety of farm soil fertility programs. It is of special value in phosphorus deficient upland soils of central West Virginia when land applied at agronomic rates to improve the productivity of grassland soils. Most broiler and turkey production is located within the five-county Potomac Valley Conservation District which is about 100 miles to the east of West Virginia’s central grassland farms.

The Potomac Valley District currently has about 350 individual poultry operations operating an estimated 900 houses. Approximately 160,000 tons of litter are produced annually from broiler, turkey, and breeder-layer operations in the Upper Potomac watershed. Since 1995, poultry production within the watershed has doubled and there are significant concerns related to groundwater and surface water contamination from land application and storage practices. It is estimated that approximately 25 to 50 percent of litter produced within the Upper Potomac will need to be exported out of the watershed to avoid water quality concerns, particularly related to nitrogen and phosphorus losses from farm fields with excessive soil test levels. Transportation costs and mountainous terrain are currently the largest barriers to the economic movement of litter out of this region.

Typically, most litter is removed from the poultry houses and is stored in roofed litter sheds where it is kept dry and protected from precipitation. It is recommended that poultry litter be allowed to undergo a minimum three-week passive composting phase while in storage to allow thermophilic destruction of pathogens. The litter is then land applied, usually in the fall or spring, at agronomic rates based upon the operations nutrient management plan.

Litter composting can increase the farm value of raw, unprocessed litter from an average \$6 per ton upwards to \$60 - \$80 per ton for a high quality composted product. As such, composting provides a commercial driven option that is among a host of nutrient management practices that the USDA Natural Resources Conservation Service (NRCS) is promoting. However, large commercial operations have not yet been willing to commit the financial resources to initiate litter composting because of an unsubstantiated supply of poultry litter and uncertainty about its value in returning investment costs.

While there is no current regulatory agency overseeing management of animal wastes and their utilization, NRCS works on a voluntary basis with farmers on issues of nutrient management, waste utilization, and composting. NRCS provides technical and financial assistance to establish demonstration projects. The following are projects that NRCS has supported in partnership with the WV Conservation Agency, local Conservation Districts (CD), and participants:

- Potomac Valley CD Litter Composting Demonstration, Moorefield, WV – Demonstrating the production of high quality compost from poultry and forestry residues.
- Taylor County Workshop Composting Demonstration, Grafton, WV – Demonstrating small-scale, commercial production of compost from exported Potomac Valley litter with sawdust residue from pallet manufacturing at this sheltered workshop site.
- Poultry Litter Utilization Project, Fellowsville, WV – A two-year demonstration, in cooperation with the West Virginia Division of Environmental Protection and the West Virginia Development Office, to highlight beneficial environmental and economic use of poultry litter as a soil amendment on reclaimed mine land.
- Greenbrier Valley CD Litter Composting and Utilization Project, Lewisburg, WV – An extensive project to initiate on-farm composting of poultry and livestock wastes, improve waste utilization and marketing opportunities, and increase technical and educational support to farmers.

Profiles

The Charleston Composting Facility is the only permitted composting operation in West Virginia that processes both biosolids and yard waste. The Poultry Litter Utilization Project is a very innovative effort that is experimenting with the use of poultry litter for mine reclamation.

Charleston Compost Facility

The Charleston Sanitary Board began composting yard waste and biosolids at the Charleston Composting Facility in October 1998 using an in vessel process sold by US Filter.

The facility is designed to handle 55 tons per day of combined biosolids and yard waste. The biosolids are exclusively provided by the Charleston Sanitary Board and 35 percent of the yard waste comes from the City of Charleston and 65 percent from private haulers. All waste haulers, including the city, deliver their yard waste directly to the compost facility where it is weighed and information about the tonnage and hauler is recorded in a log. Currently, there are no tipping fees.

A consultant identified the first markets for the product among local landscaping companies. The Sanitary Board relies on these markets as well as the City Public Grounds Department for its product that is distributed in bulk. During peak seasonal use, the compost is sold for prices ranging from \$5 to \$7 per yard.

The Charleston Sanitary Board initially enrolled its product in the U.S. Composting Council's Seal of Testing Assurance program which likely contributed to the success in securing the first markets.

Phone: 304-348-0796

Poultry Litter Utilization Project

This is a two year project demonstrating the benefits of poultry litter as an alternative fertilizer on abandoned mine land sites. It is a joint effort of the West Virginia Development Office's Energy Efficiency Program (EEP), the West Virginia Division of Environmental Protection, and the U.S. Department of Agriculture/Natural Resource Conservation Service (NRCS). In April 2000, approximately 185 tons of litter were applied to approximately 46 acres at a rate of three tons per acre on a 100-acre mine reclamation site in Preston County. The amount represented the application rate of commercial fertilizer usage used at the site.

Bobby Lewis, Director, Community Development Division of the West Virginia Development Office, explained the importance of the project at the "Field Day Showcasing Poultry Litter Use on Coal Mines" in Morgantown, West Virginia on June 22, 2001:

"We look for partnerships to make new opportunities for businesses and the citizens of West Virginia. What we are seeing here today is certainly a unique partnership. The poultry industry and the surface mine industry have problems that could benefit the other. The mining industry needs to revegetate quickly to reduce acid mine drainage. The poultry industry needs new markets for poultry litter."

At the end of the first growing season, NRCS estimated that the growth rate of grasses on the demonstration site was 200 percent above the site control areas. Preliminary results also showed that wildlife habitat and soil quality were improved and the poultry litter may reduce acid on the former mining site. At the same time, the issue of transportation costs needs to be addressed in considering the cost-effectiveness of widescale application of poultry litter on mine reclamation sites throughout the state.

Contact: Ken Haid, US Department of Agriculture Natural Resource Conservation Service, (Phone: 304-538-7583).

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