

Rural, Small Town, and Tribal Compost Use and Applications Compendium



Stabilizing storm-damaged roadside banks with compost socks and blankets. (Jamaica, Vermont)

A resource to assist Rural, Small Town, and Tribal decision makers, materials management staff, nonprofit organizations, citizen activists, and others in implementing and expanding compost use and applications.

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Additional organics and food scrap management resources can be found by searching in NERC’s “[Resource](#)” directory. Available documents include:

- [Manure Management for Small and Hobby Farms](#)
- [Food Recovery Hierarchy Compendium](#)
- [Organics Management & Composting Guide](#)
- [Community Food Scrap Composting Training Presentation](#)
- [Compost Marketing Guide](#)
- [Model Compost Marketing Plan Template](#)
- [Reduce Wasted Food - Tip Sheet for Residents](#)
- [School Composting Options](#)

Cover photo credit: Composting Association of Vermont

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Introduction

This Compendium presents resources on general compost use and applications, compost use for erosion control, and compost use for low impact development and green infrastructure.

Many states are promoting the increased use of mulch and compost-based solutions for sustainable landscaping, for example, requirements in California’s [Model Water Efficient Landscape Ordinance](#). The use of compost and mulch for low impact development (LID) and stormwater management projects (e.g., bioretention soils) is also on the rise in urban, small, and rural communities. Landscape architects, developers, road construction crews, and others can cost-effectively and efficiently meet vegetation and erosion control specifications by using compost and other organic amendments. Similarly, the use of LID and green infrastructure techniques can serve to more cost effectively supplement stormwater management requirements.

Please note that many of the entities and websites referenced below have documents relating to all three of these compost use topics contained in this Compendium.

Readers are advised to remember that compost quality and the types of compost vary widely.

It is highly recommended that compost users practice due diligence in researching:

- *The type of compost recommended for specific applications.*
- *Consult suggested specifications for the applications intended in order assure that compost is an appropriate media for use in the project being developed.*
- *Know the qualities of the compost product being considered for use to ensure that the product is indeed appropriate for the intended use.*

General Compost Use and Applications

The use of compost improves soil structure, porosity, aggregation, moisture infiltration, permeability, holding capacity, cation exchange capacity, and helps to buffer soil pH. When added to soil it improves the organic matter content of soil and supplies or increases beneficial soil microbes. As a soil amendment, compost helps plants more efficiently use and retain nutrients, and supports more vigorous root growth. It can also play an essential role in carbon sequestration and greenhouse gas mitigation.



Photo Credit: NRCS Photo Gallery

- [Appropriate Technology Transfer for Rural Areas \(ATTRA\)](#) ATTRA is a program developed and managed by the [National Center for Appropriate Technology \(NCAT\)](#). It is largely funded through a cooperative agreement with the United States Department of Agriculture's Rural Business-Cooperative Service. ATTRA serves as a national sustainable farming information center that provides technical assistance to farmers, ranchers, Extension agents, market gardeners, agricultural researchers, and others involved in sustainable agriculture in the United States. The organization offers numerous resources and [publications](#) ranging organic production and livestock to business and marketing, and pest management.
- [US Composting Council \(USCC\)](#) is involved in research, public education, composting and compost standards, expansion of compost markets and the enlistment of public support to advance composting, [compost use](#), and increasing compost quality and standardization through [certification](#), and [Landscape Architecture Specs](#). USCC's [Backyard Composting and Vermicomposting Resources and Links](#) contains information for home and school composting and compost use, as well as instructional videos. It's [Composting Council Research and Education Foundation](#) supports scientific research, increasing awareness, and educating practitioners and the public to advance environmentally and economically sustainable organics recycling, including [International Compost Awareness Week](#).

- The United States Department of Agriculture (USDA) Natural Resources Conservation Services has numerous resources relating to [soil](#), including [HEALTHY SOILS ARE: full of life](#). The USDA National Agricultural Library has a [Natural Resource Management](#) database, which includes resources for [Soil Management](#) and [Compost and Composting](#).
- The Cooperative Research and Extension Services provide resources on a range of topics relating to soil improvement and conservation, including: [Landscape Conservation Initiatives](#); [Landscape planning](#), a natural resource problem solving and management process; Environmental Improvement Programs includes, [Agricultural Management Assistance](#), [Cooperative Conservation Partnership Initiative](#), and [Environmental Quality Incentives Program](#).
- The [eXtension Foundation](#) is a member-based nonprofit established by Extension Directors and Administrators nationwide. It is a part of the Cooperative Extension System. Its [online courses system](#) offers a range of learning opportunities that reflect the breadth of the Cooperative Extension System, including composting and Master Composter Courses. The Cooperative Extension System has many [online resources](#), including [The On-Farm Composting Handbook](#) and a recording of a 12-part webinar on composting and compost use.
- The [Cornell Waste Management Institute \(CWMI\)](#) is a program in the Soil and Crop Sciences Section, School of Integrative Plant Science in the College of Agriculture and Life Sciences at Cornell University. CWMI serves the public through research, outreach, training, and technical assistance, with a focus on organic residuals. It addresses a broad range of residuals including manure, yard and food wastes, and mortalities for an array of audiences including households, schools, farms, municipalities and private entities. CWMI's resources are extensive, including numerous resources under the category [Use and Quality of Compost](#).
- [Compost Production and Utilization: A Growers Guide](#) is published by the University of California Division of Agriculture and Natural Resources. It and other resources for gardeners, farmers, agricultural educators, and others are available through the [University of California Division of Agriculture and Natural Resources](#) online catalogue.
- [Using Composts to Improve Turf Performance](#) is a resource from PennState Extension that provides guidance for improving turf performance in marginal or poor soils with the use of compost as a soil amendment.

- The [Washington Organic Recycling Council \(WORC\)](#) has established the [Soils for Salmon](#) project, which provides best management practices to builders, developers, and landscapers, in the interest of “preserving site topsoil and vegetation where possible, reducing compaction, and amending disturbed soils with compost to restore healthy soil functions.” The Soils for Salmon website includes extensive information about building healthy soil, as well as a number of case studies and additional resources.
- The Institute for Local Self-Reliance has a [Composting for Community](#) web page that includes numerous resources for composting to reduce food waste and contribute to soil amendments, including [Building Healthy Soils with Compost to Protect Watersheds](#).
- The R. Alexander Associates, Inc. website contains numerous resources on compost use including: [Compost End Use](#) and [Compost Quality & Specifications](#).
- California’s [Climate Change Assessments](#) are being developed to present a scientific foundation for understanding climate-related vulnerability at the local scale and to inform resilience actions. A Report for California’s Fourth Climate Change Assessment, [Carbon Sequestration and Greenhouse Gas Mitigation Potential of Composting and Soil Amendments on California’s Rangelands](#), specifically addresses how rangeland management can contribute to climate change mitigation and how processing California’s organic waste-stream into compost reduces greenhouse gas emissions and contributes to carbon sequestration.
- The [Institute for Tribal Environmental Professionals](#) (ITEP) was developed to act as a catalyst among tribal governments, research and technical resources at Northern Arizona University (NAU), various federal, state and local governments, and the private sector, in support of environmental protection of Native American natural resources. ITEP’s [Waste & Response](#) Programs feature numerous resources and training opportunities, including the use of compost on Tribal lands.
- [Tribal Lands - Second State of the Carbon Cycle Report](#) address climate change mitigation for Tribal nations, including the use compost as soil amendment and the role of compost in carbon sequestration.
- The [Rodale Institute](#) conducts extensive research, farmer training, and consumer education on regenerative organic agriculture and soil health.
- The [AgResource Inc.](#) website contains numerous [resources](#) for compost use and applications, including [articles](#), a [Specifications Manual](#), and a [Top Dressing Guide](#).

- The [Ontario Ministry of Agriculture, Food and Rural Affairs](#) has a wealth of information on the role of organic matter and compost for soil health. The fact sheets include:
 - [AF151 - Soil Health in Ontario](#)
 - [AF153 - Adding Organic Amendments](#)
 - [AF155 - Buffer Strips](#)
 - [AF163 - Cropland Retirement](#)
 - [AF165 - Erosion Control Structures](#)
 - [AF167 - Field Windbreaks](#)
 - [AF169 - Inter-seeding Cover Crops](#)
 - [AF171 - Mulch Tillage](#)
 - [AF173 - No-Till for Soil Health](#)
 - [AF179 - Residue Management](#)
 - [AF181 - Rotation for Agronomic Crops](#)
 - [AF187 - Wind Strips](#)
 - [AF189 - Winter Cover Crops](#)
 - [AF191 - Soil Erosion by Water](#)

Erosion Control

Erosion is the wearing down or washing away of the soil and land surface by the action of water, wind or ice. Eroded debris (silt or sediment) may become a pollutant via stormwater runoff. Erosion occurs naturally but can be increased by human activities such as farming, development, road-building, and timber harvesting.

Compost controls erosion by helping to increase water infiltration into the soil surface, reducing runoff and soil particle transport in runoff, adding soil nutrients to build plant growth and soil cover, increasing water holding capacity of soil which serves to reduce runoff, and helping to reduce soil compaction by increasing soil structure.

Erosion control techniques for which compost is suitable include berms, buffers, filter strips, hydroseeding, compost blankets, and mulching.



Photo Credit: Connecticut Department of Energy and Environmental Protection (DEEP)

- In 2006 - 2007, Hennepin County, Minnesota managed a [pilot project](#) to measure the effectiveness of compost in preventing erosion on roadway slopes. The benefits of the project included reduced stormwater runoff and increased demand for a recycled product (compost).
- The Connecticut Departments of Environmental Protection and Transportation collaborated on a [two-year research project](#) which demonstrated that compost was effective in controlling soil erosion, growing turf, and amending soil used in planting trees and shrubs. The research and results are posted on the project website.
- Texas Department of Transportation has a long history of using compost for erosion control and soil amendment, see its [Compost & Mulch](#) webpage for resources, including: [Use of Compost and Shredded Brush on Rights-of-Way for Erosion Control: Final Report](#); [Water Quality Characteristics and Performance of Compost Filter Berms](#); and [Special Specification 1122 Temporary Erosion, Sedimentation and Environmental Control](#)
- The University of Georgia Extension has an excellent overview of [Compost Utilization for Erosion Control](#).
- The website of the [Composting Association of Vermont](#) contains an extensive list of resources highlighting “the use of compost products for stormwater management, erosion control, pollutant filters and reducing site discharge”. These include:

- [Building Soil: Guidelines and Resources For Implementing Soil Quality and Depth BMP T5.13](#) (Washington DOE Stormwater Management Manual)
- [Achieving the Post-construction Soil Standard”](#) (King County, Washington)
- [Building the Soil for Cleaner Water, Healthier Streams, Successful Landscapes, and Healthy Communities – Best Practices, Case Studies, Other Resources](#) (Soils for Salmon, Washington Organic Recycling Council)
- [Technical Information on Compost BMP’s and Erosion Control Products \(Filtrexx Sustainable Technologies\)](#)
- [Compost Based Stormwater Best Management Practices](#) (U.S. EPA Webinars)
- [“Using Compost for Erosion Control & Stormwater Management Solving Problems on Tough Sites”](#) (U.S. EPA Region 5, Dwayne Stenlund, Minnesota DOT)
- [“Soil Strategies for Stormwater Management, Erosion Control, and Landscape Success”](#) (Soils for Salmon Project, Washington Organic Recycling Council)
- [“The Soil and Water Quality Link – Using Composted Products for Effective Stormwater Management”](#) (Rodney W. Tyler, Filtrexx International)
- [“Composting and Stormwater Management – Tapping the Potential”](#) (BioCycle, August 2002)
- [“LID, GSI and the Shifting Stormwater Paradigm”](#) (presented by Stone Environmental)

Low Impact Development & Green Infrastructure

Stormwater runoff is an increasing source of water pollution. When precipitation falls onto rooftops, parking lots and roads it collects oils, chemicals, excess nutrients, sediments, and other potentially detrimental materials as it flows into storm drains connected to our waterways. Natural environments, such as wetlands tend to hold excess water in place, filtering out pollutants and sediment before they reach waterways.

Low impact development (LID) and green infrastructure focus on practical ways to adapt human-constructed landscapes to better manage stormwater, enhance overall environmental quality and provide utility services. LID and green infrastructure practices use natural systems or engineered systems that mimic natural processes to absorb excess water and reduce the amount of pollution entering our waterways.

LID and green infrastructure projects are designed complement, and sometimes replace, traditional stormwater management systems. LID, green infrastructure, and erosion control techniques frequently include compost, compost amended soils, or mulch to protect vegetation and underlying media and to enhance certain characteristics, such as water retention qualities.

Techniques use soils and vegetation to infiltrate, evapotranspire, and/or recycle stormwater runoff, through practices that include: bioretention systems (or bioswales), constructed wetlands, green roofs, green streets and tree plantings, infiltration trenches, permeable

pavements, planter boxes, rain gardens, native planting, and vegetative swales. As noted above, many of the applications are also used for erosion control measures.

Small and rural communities often have limited funding and staffing due to smaller tax base support. Nonetheless, these communities must adhere to federal and state requirements for wastewater treatment and managing stormwater run-off. LID and green infrastructure practices, including constructed wetlands, can be effectively applied to supplement and even replace aging wastewater treatment and stormwater management infrastructure in small, rural, and Tribal communities.



Photo Credit: Federation of New York Solid Waste Associations & Charles Duprey, Naturcycle

- Administered by [Green Business Certification \(GBCI\)](#), the [Sustainable SITES Initiative](#) certifies sustainable landscape design projects. The Initiative's certification process requires extensive knowledge of water conservation and soil management and restoration techniques, including the uses of compost.
- Funded by the [Water Quality Protection Charge \(WQPC\)](#) of Montgomery County, Maryland, the [RainScapes Rewards Rebate Program](#) offers rebates to Montgomery County property owners who install techniques such as rain gardens, rain barrels, conservation landscaping (including composting) and other approved projects that help control stormwater. The [design criteria](#) for eligibility includes amending soil with compost.

- The [Washington State Department of Ecology](#) updated its stormwater management manual to require the use of compost and/or other organic materials in the low impact development (LID) of all areas “subject to clearing and grading”. In addition to its stormwater manuals, the Agency’s website also has manuals for management and design, including LID technical guidance, and rain garden design.
- Kitsap County’s (Washington) [Low Impact Development \(LID\) Guidance Manual](#) offers practical guidance for LID Implementation, including site assessment and planning, design standards and guidance.
- The [American Society of Landscape Architects](#) offers an extensive library of resources, including [sustainable landscape case studies](#) and [sustainable landscape resources](#), including [*BANKING ON GREEN: A Look at How Green Infrastructure Can Save Municipalities Money and Provide Economic Benefits Community-wide.*](#)
- The Vermont Agency of Natural Resources, Department of Environmental Conservation has published the [Vermont Stormwater Treatment Manual](#) and other materials. The [2017 Vermont Stormwater Management Manual Rule and Design Guidance](#) includes recommendations for the use of compost in stormwater management projects. The state’s [Green Infrastructure Collaborative](#) is a partnership between the Lake Champlain Sea Grant Program at the University of Vermont and the Vermont Department of Environmental Conservation. The Collaborative promotes Low Impact Development and Green Stormwater Infrastructure (GSI) practices in Vermont watersheds to manage stormwater runoff from developed lands.
- Minnesota Pollution Control Agency has developed a comprehensive [Stormwater Best Management Practices Manual](#).
- In the District of Columbia, the [RiverSmart Homes](#) program offers incentives to homeowners who reduce stormwater pollution via “bayscaping” and other practices. The District’s recommended [maintenance schedule](#) includes twice-yearly applications of compost.
- EPA’s archives includes a document entitled [Green Infrastructure: How to Institutionalize Organics Diversion through local/state & government/business collaboration](#), and a webpage entitled [Green Infrastructure Design and Implementation](#) provides links to a number of relevant studies.

- The EPA also has a [Green Infrastructure Modeling Toolkit](#) comprised of innovative models, tools, and technologies for communities to manage water runoff, including the use and application of compost in green infrastructure projects. The [Green Infrastructure Research at EPA Brochure](#) provides an overview of green infrastructure tools. EPA's [Stormwater Management and Green Infrastructure Research](#) webpage provides links to Research and Technical Assistance Information, Basics, Planning, and Partnerships, and Sustainable Communities, including:
 - [Green Infrastructure Research at EPA Brochure](#)
 - [Urban soils, ecosystem services, and the application of green infrastructure practices](#)
 - [Assessments of green infrastructure impacts on watersheds](#)
 - [Best practices for design, operation and maintenance of green infrastructure](#)
 - [Decision support guidance for sustainable communities](#)
 - [Promoting sustainability through Net Zero strategies](#)
 - [Technical assistance with green infrastructure](#)
 - [EPA's Green Infrastructure Information](#)
 - [More on Green Infrastructure: Soak Up the Rain](#)
 - [Healthy Benefits of Green Infrastructure in Communities Fact Sheet](#)
 - [Using Economic Incentives to Manage Stormwater Runoff in the Shepherd Creek Watershed, Part I](#)
 - [Urban Street Trees and Green Infrastructure](#)
 - [Community Solutions for Voluntary Long-Term Stormwater Planning](#)

- [Filtrexx Sustainable Technologies](#) manufactures products from locally recycled organic materials inside of photodegradable or biodegradable mesh which are used widely in the erosion control and stormwater management industries. The products are applicable for sediment and erosion control, stabilization, pollutant removal, living walls, agriculture, and gardening applications. It's website contains numerous resources including a [Design Manual](#) with multiple uses for compost in landscape architecture and land planning, as well as a [Research Library](#) containing research on the performance of compost filter socks for sediment and erosion control. The site also includes a 2013 study entitled [Performance of Compost Filtration Practice for Green Infrastructure Stormwater Applications](#).

- Included among the US Composting Council's resources are several documents on using compost in green infrastructure and stormwater management, including [Working with Nature: Compost BMP Performance & Design in Green Infrastructure Applications](#) and [Using Compost in Stormwater Management](#).

- The website of the Federation of New York Solid Waste Associations includes a document entitled [Municipal Compost Use in Green Infrastructure](#), authored by Charles Duprey of Naturcycle. The Naturcycle [website](#) contains a listing of project examples using compost for green roofs and other green infrastructure projects, as well as soil improvement projects in rural and urban areas.
- Rutgers University's New Jersey Agricultural Experiment Station provides information on green infrastructure via [An Introduction to Green Infrastructure Practices](#).
- The [Rhode Island Green Infrastructure Coalition's](#) 37 members advocate, construct, and support infiltrating and naturally treating storm water. Its website contains project descriptions, ordinances and regulations, and other resources.
- Northeast Ohio Regional Sewer District has an extensive [Community Stormwater Resources](#) listings.
- The National Oceanic and Atmospheric Administration [Green Infrastructure Effectiveness Database](#) is a compilation of literature resources documenting the effectiveness of using green infrastructure to reduce impacts from coastal hazards.
- American Rivers' [Urban Farms: A Green Infrastructure Tool](#), while focusing on urban areas, does cite examples of the benefits of community farms in smaller cities. Urban or community farms can serve to help mitigate stormwater runoff, along with numerous other benefits of providing healthy food for communities, improving local economies, and bringing greenspace to neighborhoods.
- The [12,000 Rain Garden campaign](#) is a cooperative effort with local partners lead by Stewardship Partners and Washington State University Extension. Their website contains numerous resources for designing and constructing rain gardens.
- Forester University offers live and on-demand webinar trainings in stormwater management, erosion control, water efficiency, and other topics applicable for rural, small, and Tribal communities, including [Compost on Sustainable Sites: Managing Stormwater, Drought, and Erosion](#) and [Truly Sustainable Management Practices: Building Ecosystem Services with Compost](#) offered in conjunction with the US Composting Council's eLearning center, and [Constructed Wetlands for Wastewater Treatment in Rural Communities](#).

Organizations and Other Resources

Biosolids Associations

- [Mid-Atlantic's Biosolids Association](#)
- [National Biosolids Partnership](#)
- [North East Biosolids and Residuals Association](#)

Environmental Protection Associations

- [Association of Massachusetts Wetland Scientists](#)
- [Connecticut Association of Conservation and Inland Wetland Commissions](#)
- [Massachusetts Association of Conservation Commissions](#)
- [US Environmental Protection Agency: Composting](#)

Erosion Control

- [The International Erosion Control Association \(IECA\)](#)

Nursery and Landscape Associations

- [Connecticut Grounds Keepers Association](#)
- [GreenScapes Alliance](#)
- [Greenscapes – Massachusetts](#)
- [Maryland Nursery and Landscape Association](#)
- [Massachusetts Nursery and Landscape Association](#)
- [New York State Nursery and Landscape Association, Inc.](#)
- [Pennsylvania Landscape and Nursery Association](#)
- [Pennsylvania Turfgrass Association](#)

Turfgrass & Golf Associations

- [Golf Course Superintendents Association of New England](#)
- [Rhode Island Golf Course Superintendents Association](#)
- [New Hampshire Golf Course Superintendents Association](#)
- [Maine Golf Course Superintendents Association](#)
- [New England Sports Turf Managers Association](#)

Other Resources

- [BioCycle magazine](#)
- [Storm Water Solutions](#)