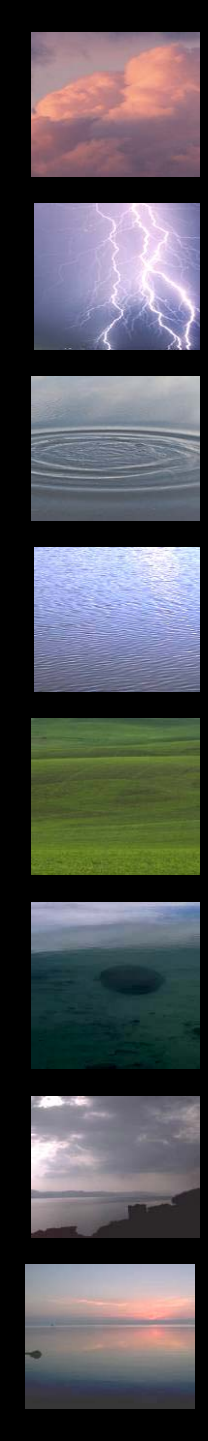
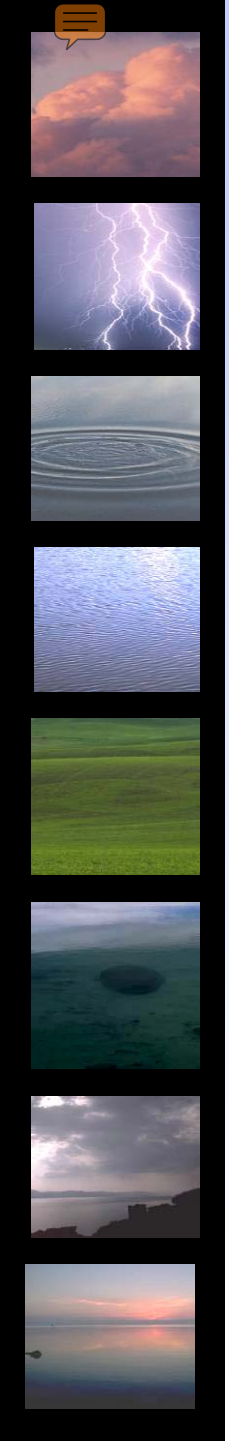


# Compost-Based Stormwater Best Management Practices

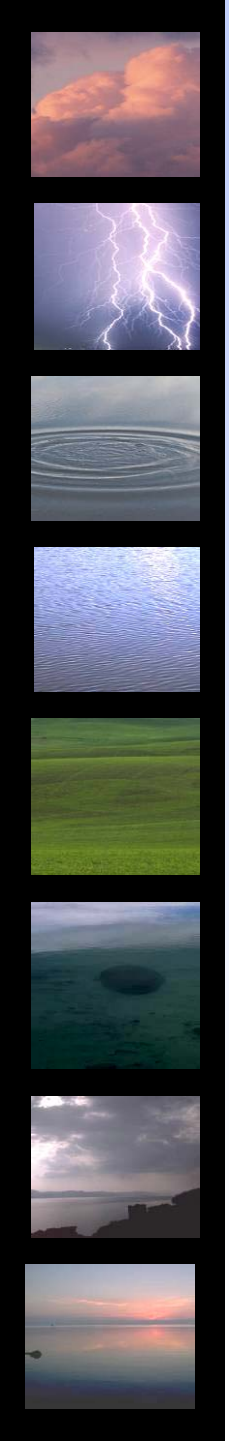
## Using Compost to Improve Stormwater Management and Erosion Control On Roadsides

Chris Newman
US EPA Region 5
Chicago, IL



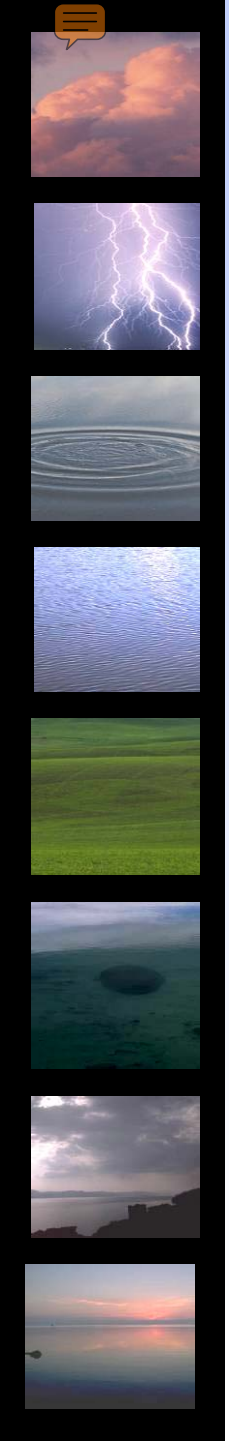
# Compost-Based BMPs

- **Compost-based stormwater best management practices (BMPs) control both stormwater quantity and quality**
- **They meld two important EPA initiatives**
  - Resource Conservation Challenge (RCC)
  - National Pollutant Discharge Elimination System (NPDES)
- **EPA developed fact sheets for three compost-based BMPs—compost blankets, compost filter berms, and compost filter socks**
  - See EPA Stormwater Phase II (NPDES) Menu of BMPs



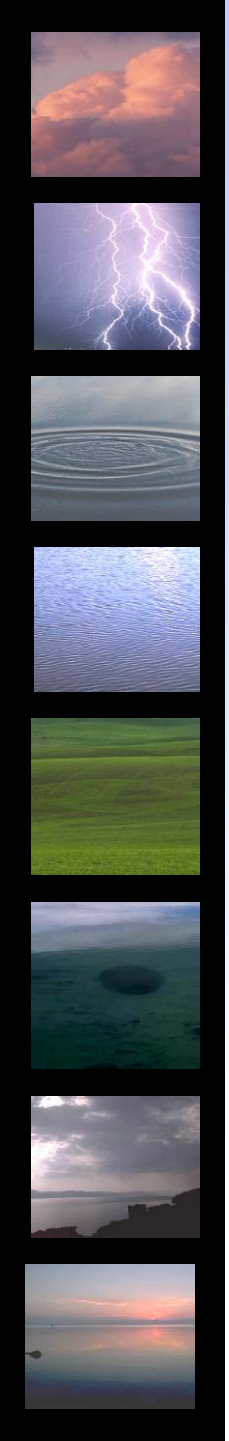
# Resource Conservation Challenge

- **Focus of the RCC is to increase waste recycling and reuse in the U.S.**
  - One focus of the RCC is to increase recycling of municipal solid waste (MSW)
    - Goal: Increase recycling of MSW to 35 percent by 2008
    - Goal: Increase recycling of MSW to 40 percent by 2011
- **Organic materials (green yard waste and food waste) are a focus area to increase recycling of MSW**
  - Increasing high-value markets for compost is one way to support increased recycling of organic waste



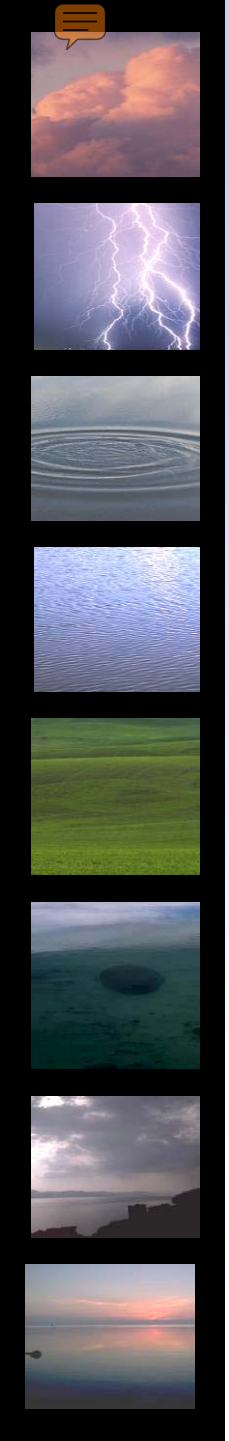
# National Pollutant Discharge Elimination System

- **NPDES regulates the quantity and quality of stormwater discharges to waters of the U.S.**
  - Control of stormwater quality is a particular concern at construction sites
    - Large disturbed areas may contribute sediment and other pollutants to stormwater
  - Municipal separate storm sewer systems (MS4s) and construction site operators must control stormwater quantity and quality from construction and post-construction activities



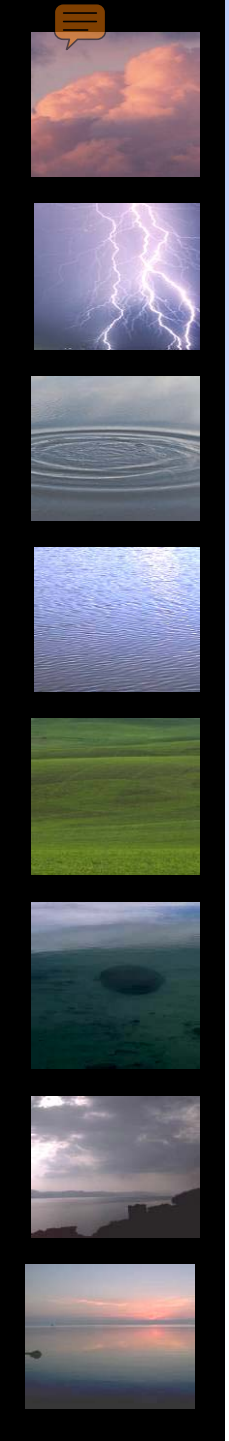
# RCC and NPDES Working Together

- **Compost-based BMPs bring these two programs together**
- **Benefits to NPDES program**
  - Compost BMPs help control sheet-flow runoff
  - Compost provides effective stormwater treatment
- **Benefits to RCC program**
  - High-value markets can drive demand for more compost
  - Increased recycling of organic waste will help increase the national MSW recycling rate



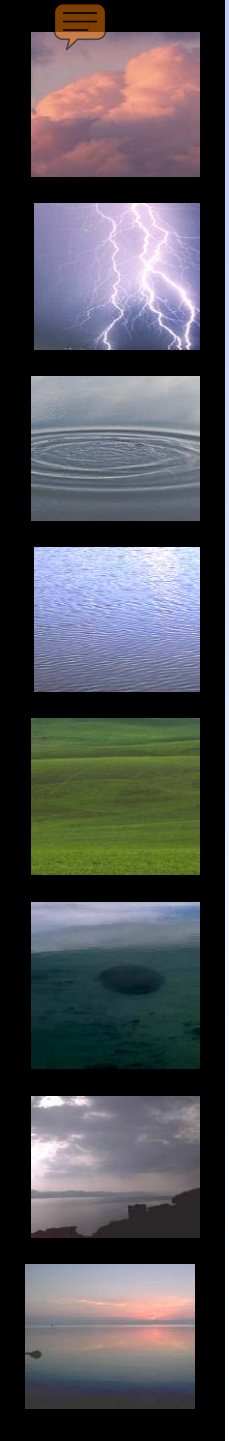
# Benefits of Compost in Stormwater BMPs

- **Compost retains a large volume of water**
  - Prevents or reduces rill erosion
  - Reduces runoff volume
  - Promotes establishment of vegetation
- **Compost improves downstream water quality by retaining/adsorbing pollutants**
  - Heavy metals, nitrogen, phosphorus, oil and grease, fuels, herbicides, and pesticides
  - Nutrients and pollutants are decomposed by naturally occurring microorganisms



# Benefits of Compost in Stormwater BMPs, cont.

- **Compost improves soil structure and nutrient content**
  - Reduces need for chemical fertilizers, pesticides, and herbicides
- **Compost-based BMPs remove as much or more sediment and pollutants from stormwater as traditional perimeter controls, such as silt fence**
  - Allow a larger volume of clear water to pass through

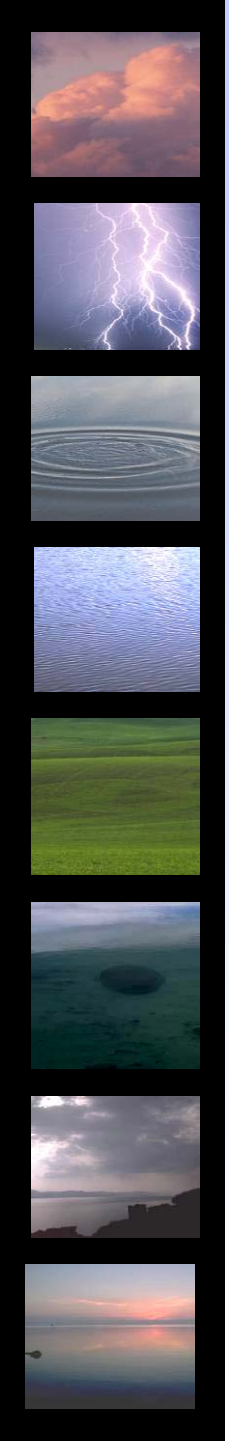


# Compost Quality

- **Use sanitized, mature compost with no identifiable feedstock constituents or odors**
- **Must meet all local, state, and federal quality requirements**
- **U.S. Composting Council certifies compost products**
  - Seal of Testing Assurance program
  - Products certified under program have a standard product label for comparison of products
- **Some composts contain metals and/or nutrient concentrations that are higher than topsoil; these do not result in higher stormwater concentrations**

# Compost Quality, cont.

- **American Association of State Highway Transportation Officers (AASHTO) standards**
  - Quality and particle size specifications for compost to be used in compost blankets, compost filter berms, and vegetated compost filter socks
- **Quality and particle size specifications for unvegetated compost filter socks provided in EPA fact sheet**
- **Many State Departments of Transportation (DOT) also have specifications for compost quality and particle size used in BMPs**

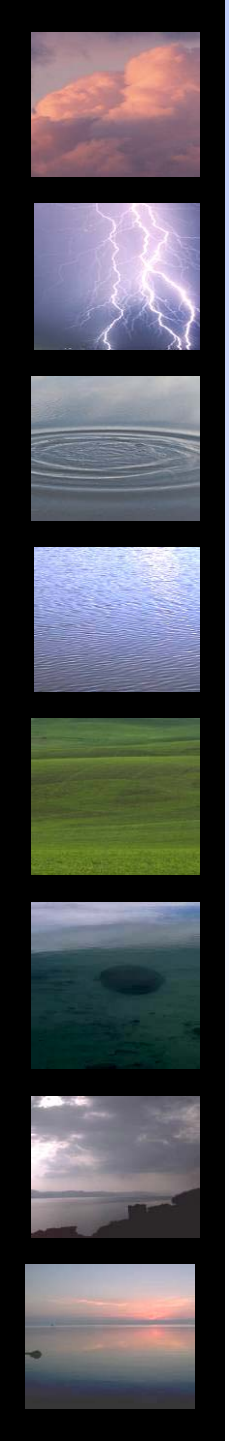


# Compost BMP Fact Sheets

- **Fact sheets provide the following information about the compost BMPs:**
  - Description of how the BMP is used
  - Applicability of the BMP (e.g., sheet flow only or some more concentrated flow)
  - Siting and design
  - Installation, limitations, and maintenance
  - Effectiveness
  - Costs
  - References for further information

# Compost Blankets

- **What is a compost blanket?**
  - Loosely applied compost placed on soil in disturbed areas
- **Controls erosion and retains runoff resulting from sheet flow**
- **Typically used in place of hydromulch, geotextiles, or drill-seeding with straw matting**

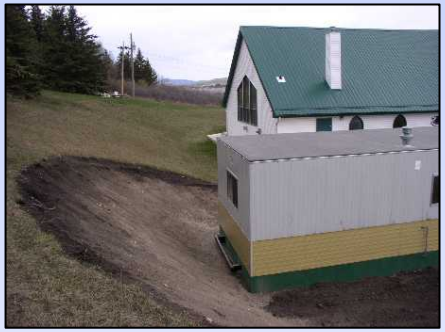


# Benefits of Compost Blankets

- **Can be used on any soil surface**
  - Rocky or frozen ground
  - Steep slopes (1:1)
- **Seed mixed into compost before it is placed allows even seed distribution**
- **Compost retains water, which helps seed germination**
- **Compost provides soil nutrients and aids in plant growth**
- **Blanket can be blown onto surface, so equipment and workers do not need to access slope**

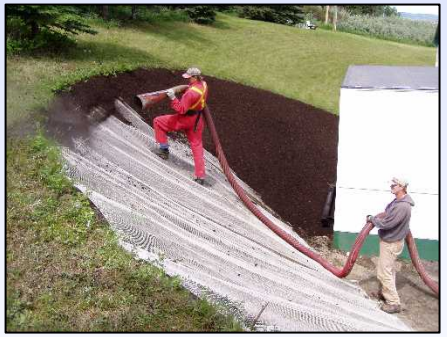
# Example—Installation on a Steep Slope

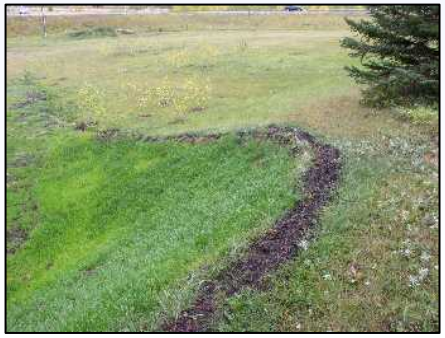
- **Construction of an addition disturbed a slope adjacent to a church**
- **A compost blanket was installed to stabilize and revegetate the slope**
- **Netting provided additional slope stabilization before the seeded compost blanket was installed**
- **Filtrexx products installed:**
  - Lockdown netting
  - EcoBlanket



Prepared slope

Installation of compost blanket over lockdown netting





Revegetated slope

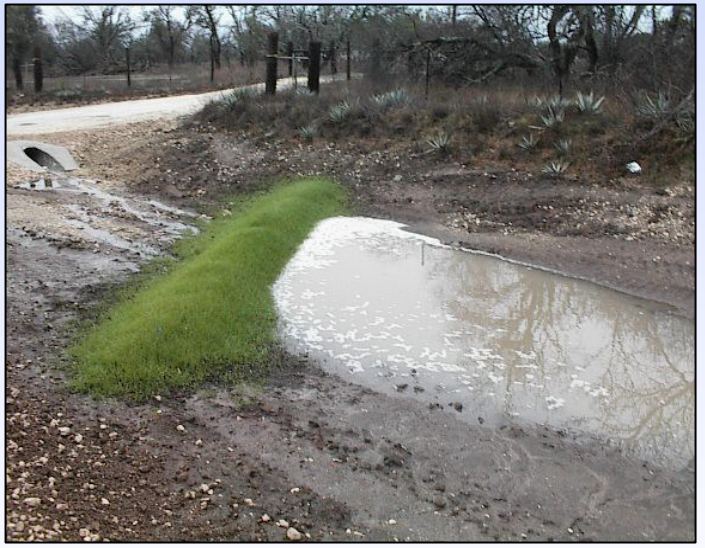
# Effectiveness of Compost Blankets

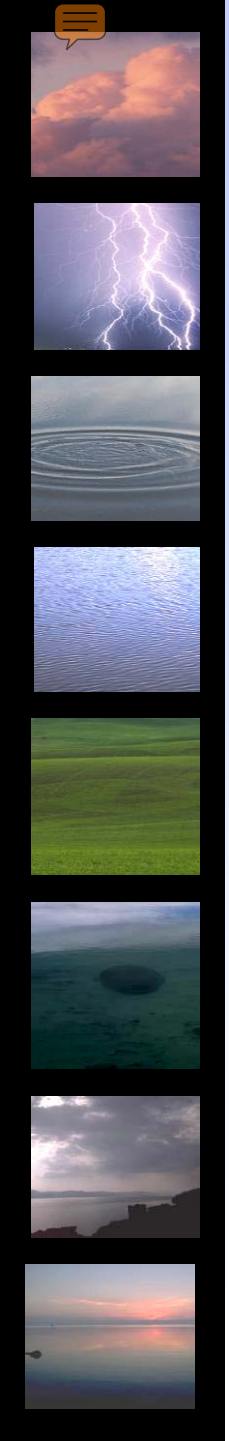
- **Study conducted by Iowa State University for Iowa DOT**
- **Study compared:**
  - Direct seeding into embankment topsoil
  - Imported topsoil/seeding of embankment
  - Seeded compost blanket
- **Erosion rate from blanket area was 0.02 percent that of the topsoil areas**

Compost blankets also suppressed weed growth

# Compost Filter Berms

- **What is a compost filter berm?**
  - A dike of compost placed perpendicular to sheet flow runoff in a disturbed area
- **Controls erosion, retains sediment, and adsorbs pollutants**
  - Use in concentrated flow conditions if drainage area is small
- **Replaces traditional BMPs such as straw waddles and silt fence**





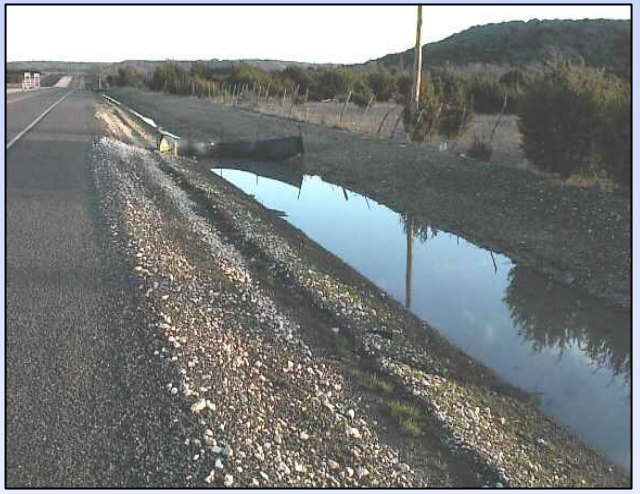
# Benefits of Compost Filter Berms

- Can be used on rocky or frozen ground
- Does not require trenching for installation
- Low profile is not blown down by high winds
- Seed mixed into compost before placement allows even seed distribution
- Compost retains water, which helps seeds germinate and anchor berm to soil surface
- Berm has higher permeability than silt fence, allowing more clean water to pass through

# Example—Sediment Control in Road Ditch

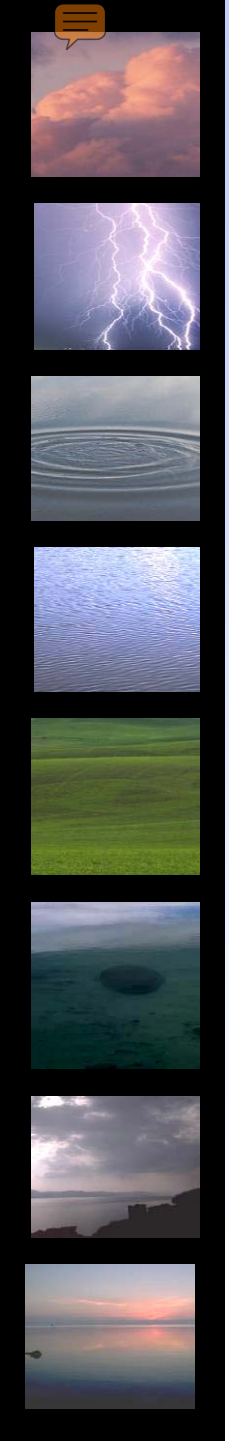
- **Texas DOT installed a compost filter berm and a silt fence to compare their effectiveness in removing sediment**

Compost filter berm, US HWY 281 (Texas) on 1/30/2001



Silt fence, US HWY 281 (Texas) on 1/30/2001

- **Stormwater is backed up behind silt fence**
- **Clean stormwater passed through filter berm; sediment retained on upstream side**

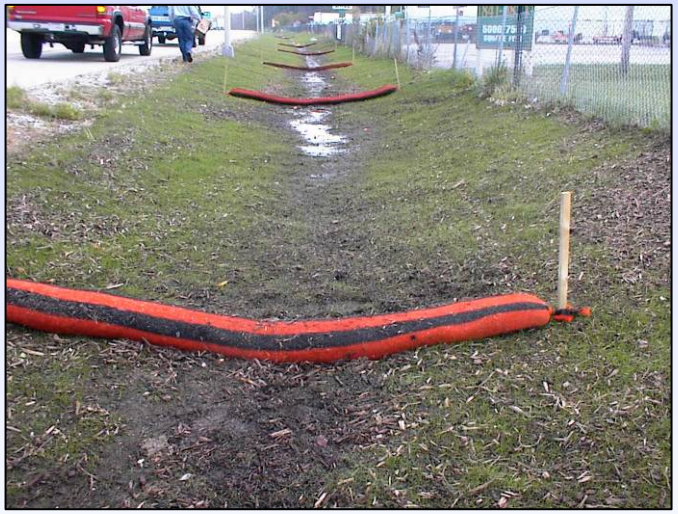


# Effectiveness of Compost Filter Berms

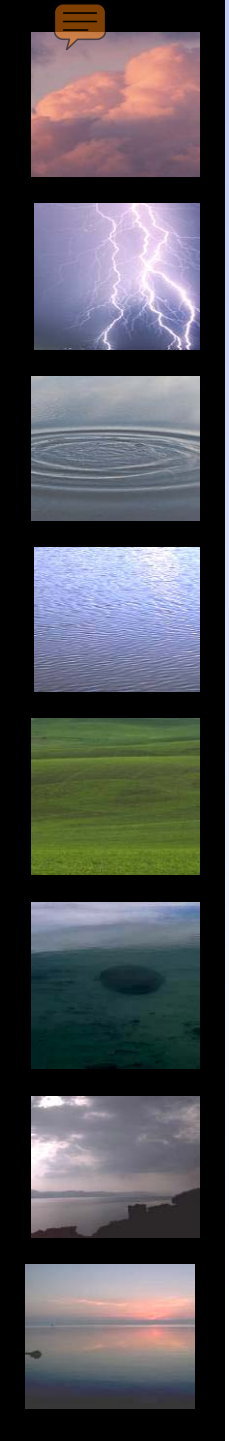
- **Study conducted for Metropolitan Service District (Portland, Oregon)**
- **Tested yard debris compost for erosion control**
- **Compared silt fence and filter berms made of yard-debris compost**
- **Study results showed filter berm was:**
  - 90 percent effective in removing suspended and settable solids, when compared to control plot
  - 66 percent more effective than silt fence in removing suspended and settable solids

# Compost Filter Socks

- **What is a compost filter sock?**
  - A mesh tube filled with compost placed perpendicular to runoff
- **Controls erosion, retains sediment, and adsorbs pollutants**
  - Use to treat sheet flow runoff or concentrated runoff from small drainages



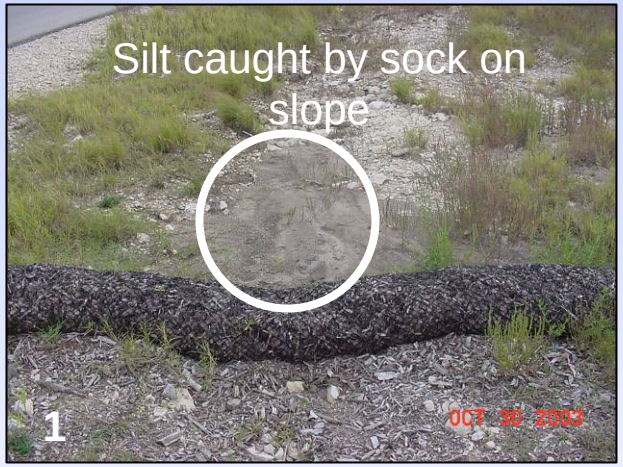
- **Replaces traditional BMPs such as silt fence, rock berms, and straw waddles**

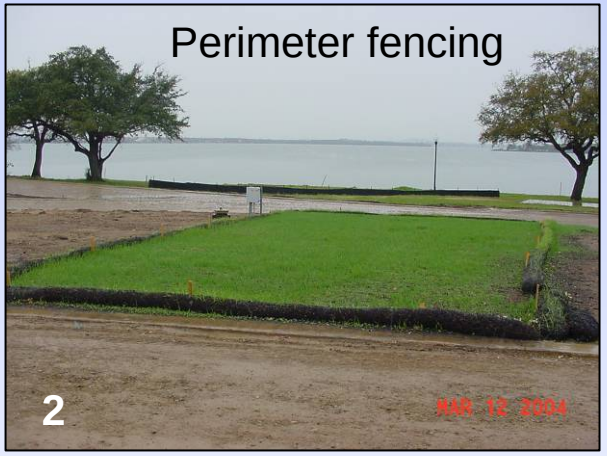


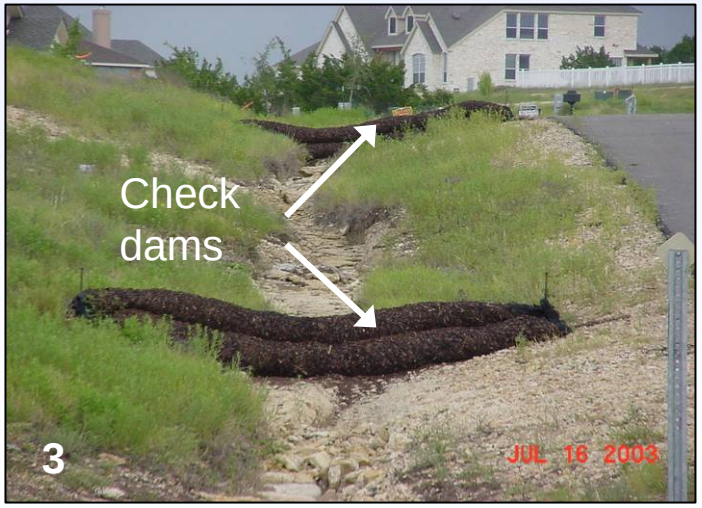
# Benefits of Compost Filter Socks

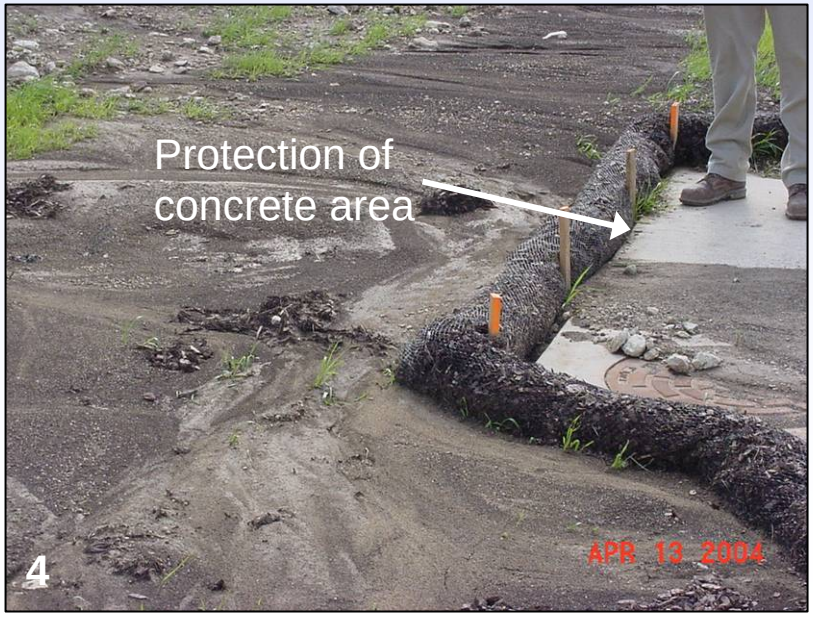
- **Can be used on rocky or frozen ground or on paved areas; does not require trenching for installation**
- **Shorter socks can be removed and reused**
- **Low profile is not blown down by high winds**
- **Can be placed in many environments:**
  - Steep slopes
  - Small drainageways
  - Storm drain inlet protection on pavement
  - Stacked to provide slope stability
- **Higher permeability than silt fence, allowing more clean water to pass through**

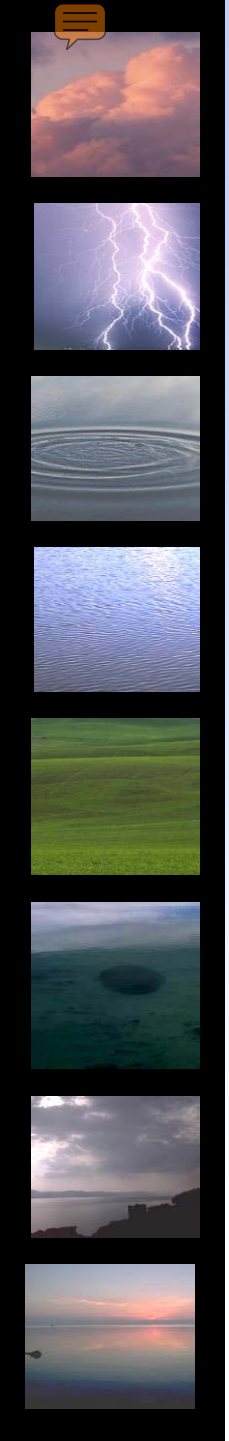
# Examples—Texas DOT



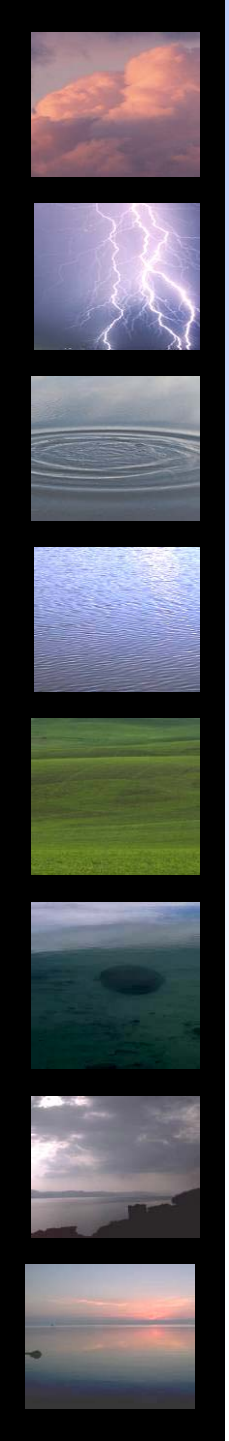





# Effectiveness of Compost Filter Socks

- **Qualitative studies: filter socks are effective in removing settleable and total suspended solids**
  - At least as effective as traditional BMPs, such as silt fence
- **Quantitative study performed by Filtrexx International:**
  - Laboratory test of filter socks with 13 types of compost
  - All filter socks removed over 50 percent of motor oil in simulated stormwater (1,000 to 10,000 mg/L)
  - Seven removed over 95 percent of motor oil



# Need More Information?

- **Full-length fact sheets for each BMP are available on EPA's National Menu of Stormwater BMPs**
  - http://cfpub.epa.gov/npdes/stormwater/menuofbmps/con_site.cfm
  - At menu, type in name of BMP (compost blanket, compost filter berm, compost filter sock)
- **Fact sheets provide many references and links to other sites with information about compost BMPs**
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  - 312-353-8402