

Food Scraps Composting In The United States



Nora Goldstein, BioCycle

GA Environmental Protection Division Workshop

May 6, 2008









PRESENTATION ROADMAP

- **MSW Disposal Data — Organics-Rich**
- **COOL 2012 Campaign — Food Scraps & Methane Link**
- **The Environmental Benefit Factor**
- **Proven Collection and Technology/Processing Options**
- **Residential SSO vs. Residential Mixed Waste Composting**
- **Commercial SSO Composting — Lots of Tires To Kick**
- **Battling single bullet phenomenon**



- **Workshop and campaign launch in San Diego on April 13, 2008**
- **GrassRoots Recycling Network; BioCycle is media partner; Eco-Cycle, Boulder, Colorado**
- **Outreach and Education Campaign**
- **Compostable Organics Out of Landfill by 2012 — emphasize methane generation of organics when in landfill**
- **Using 20-year time frame, which makes methane 72 times more potent than CO₂ — versus 100 year time frame and 23 times more potent**
- **www.cool2012.org**



- **Turning A Climate Problem Into A Soil SOLUTION!!**
- **Put organics back in the soil via composting, energy recovery followed by composting, direct land application**
- **Easy To Be Cool By 2012:**
 - **Step One: Seize the paper**
 - **Step Two: Source separate into compostables, recyclables, and garbage**
 - **Step Three: Feed the soils (“Victory” Gardens)**
 - **Step Four: Stop creating methane now — keep organics out of the landfill**

Give us **5**
minutes.

We'll put your
compost site
on the map.

Join BioCycle's www.findacomposter.com.

Your searchable data base of
composting facilities in North America.

Get linked to organics generators
and compost buyers today.

findacomposter.com

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BPI Biodegradable
Products
Institute 
promoting biodegradable products throughout the world

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MSW Landscape: USEPA 2006 Facts and Figures

Figure 5. Total MSW Generation (by Material), 2006
251 Million Tons (Before Recycling)

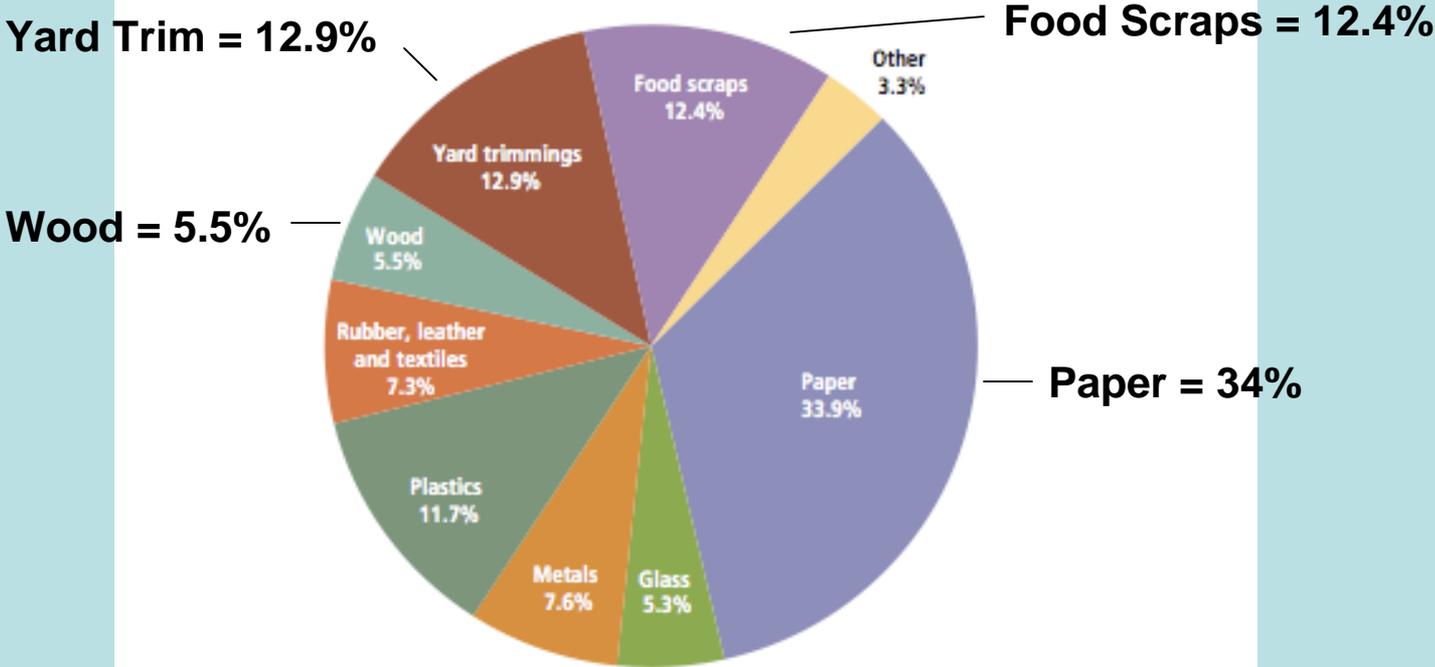
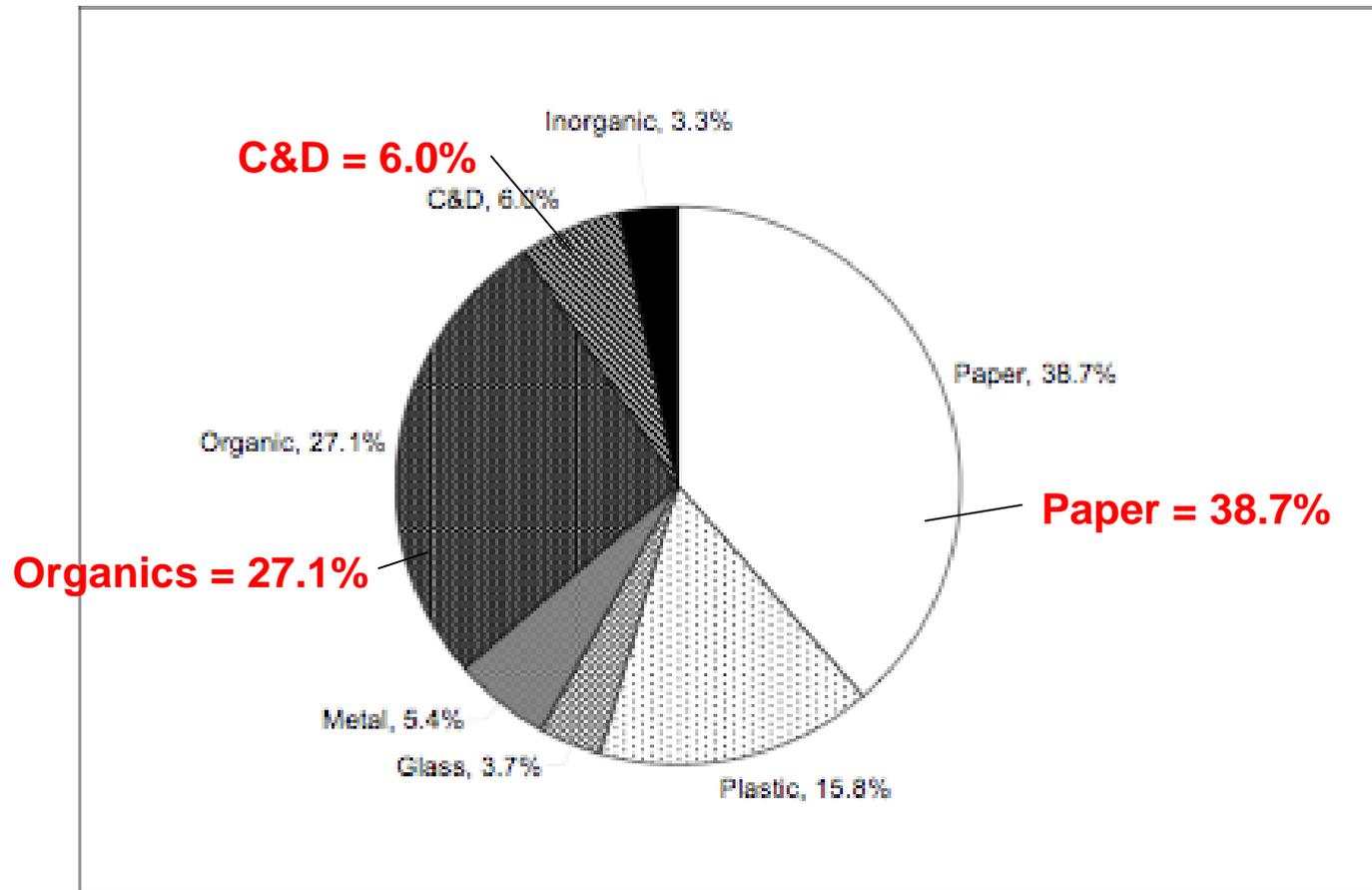
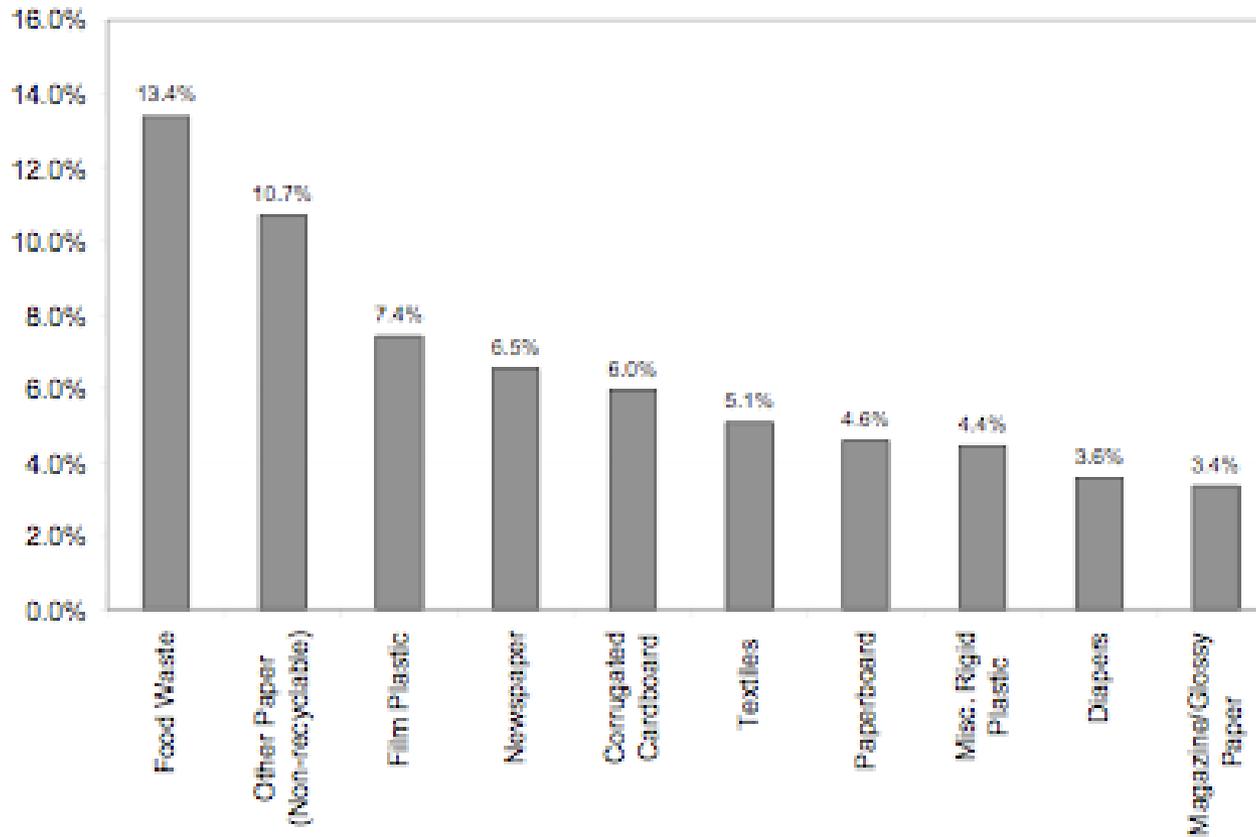


Figure 4-1 Georgia Statewide Aggregate Disposed MSW Composition



2005 State of Georgia Data

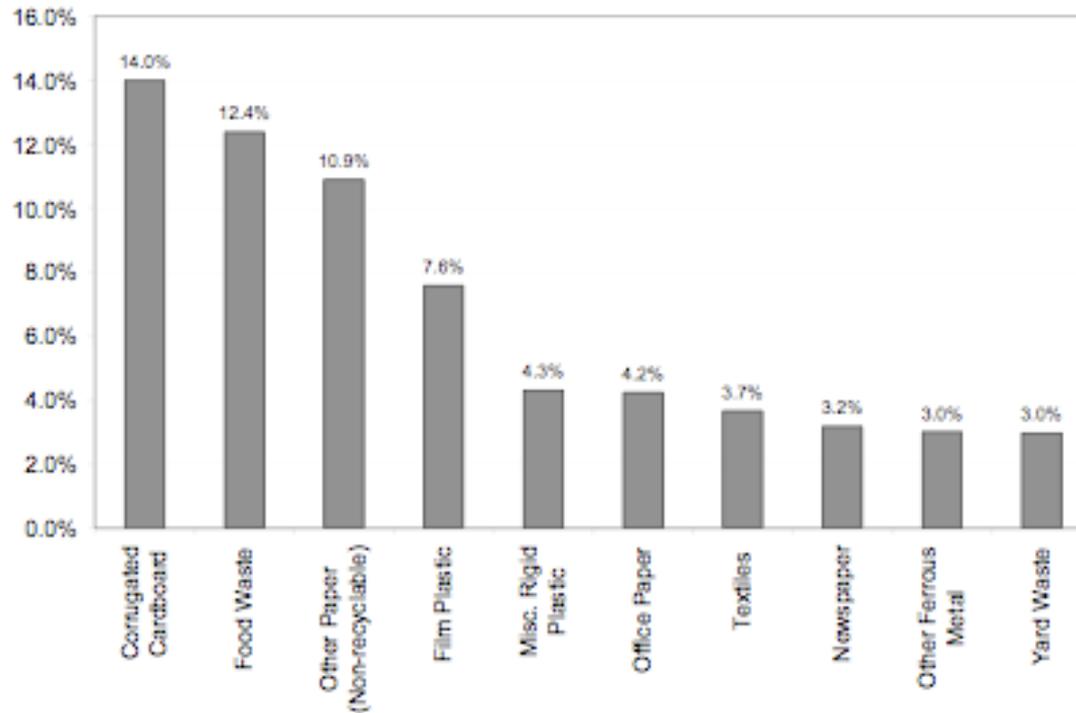
Figure 4-6 Top 10 Most Prevalent Materials in Georgia Residential Waste



Food Waste = 13.4%

Other Paper = 10.7%

Figure 4-7 Top 10 Most Prevalent Materials in Georgia Commercial Waste



Corrugated = 14%

Food waste = 12.4%

Yard waste = 3.0%

Preliminary BioCycle/EEC 2008 State of Garbage In America Data

- Georgia landfilled 12.5 million tons in 2006
- 56 MSW landfills in state
- 3.4 million tons of organics being landfilled (27% in MSW stream)
- 429,202,431 cubic yards of remaining landfill capacity (12 years, and adding capacity)
- State does not report recycling and composting data

**WHAT WILL DRIVE FOOD SCRAPS
COMPOSTING???**

True Costs Associated with Managing Organic Waste in Region of Niagara, Ontario, Canada (Cdn\$\$/metric ton)

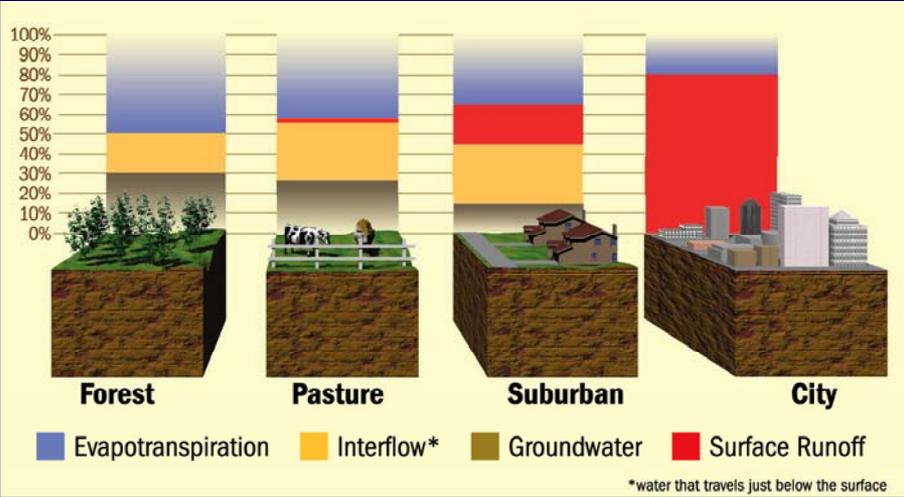
	Compost Green Waste only	Compost Food Waste	Landfill Gas Recovery Flare	LGR Elec.	EFW Low	EFW High	EFW Best case
Operations Cost/ton	33.83	81.77	82.93	69.00	102.00	168.00	88.00
Environ. Benefit/Ton	49.59	49.59	7.79	19.63	25.28	25.28	25.28
True Cost/ton	(15.76)	32.18	75.14	49.37	76.72	142.72	62.72

<http://www.regional.niagara.on.ca/news/2008/pdf/jan21Study.pdf>

Niagara Study Assumptions

- Emissions include particulates, toxics, carcinogens, eutrophication, acidification and ecosystems toxicity
- Net decrease of CO₂/annum is almost equivalent for composting and landfilling with flaring, and about 3,000 tons higher with LFG recovery
- Used 50% of monetized value of avoided pollutants as a result of finished compost replacing pesticides and synthetic fertilizer
- At **25%** monetized value, compost benefit is \$22.67, about \$3/ton less than EFW scenarios
- Cost is \$59.10/ton for composting food waste, vs. \$49.37 with landfill gas recovery
- Substitute of “waste-generated” electricity for natural gas

Where Does the Rain Go?

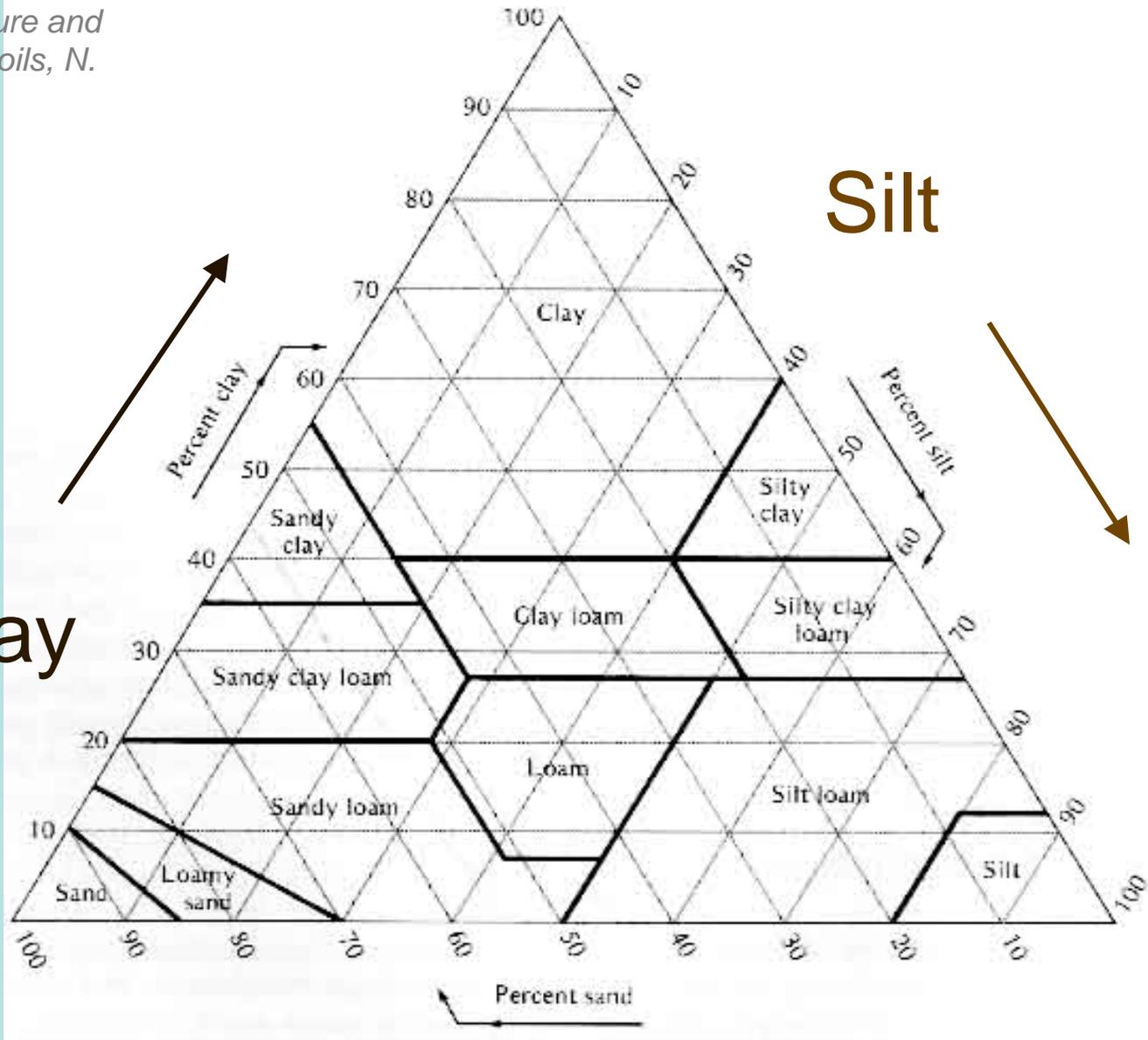


Source: Sego Jackson, 2001

From: *The Nature and Properties of Soils*, N. Brady

Clay

Silt



Sand

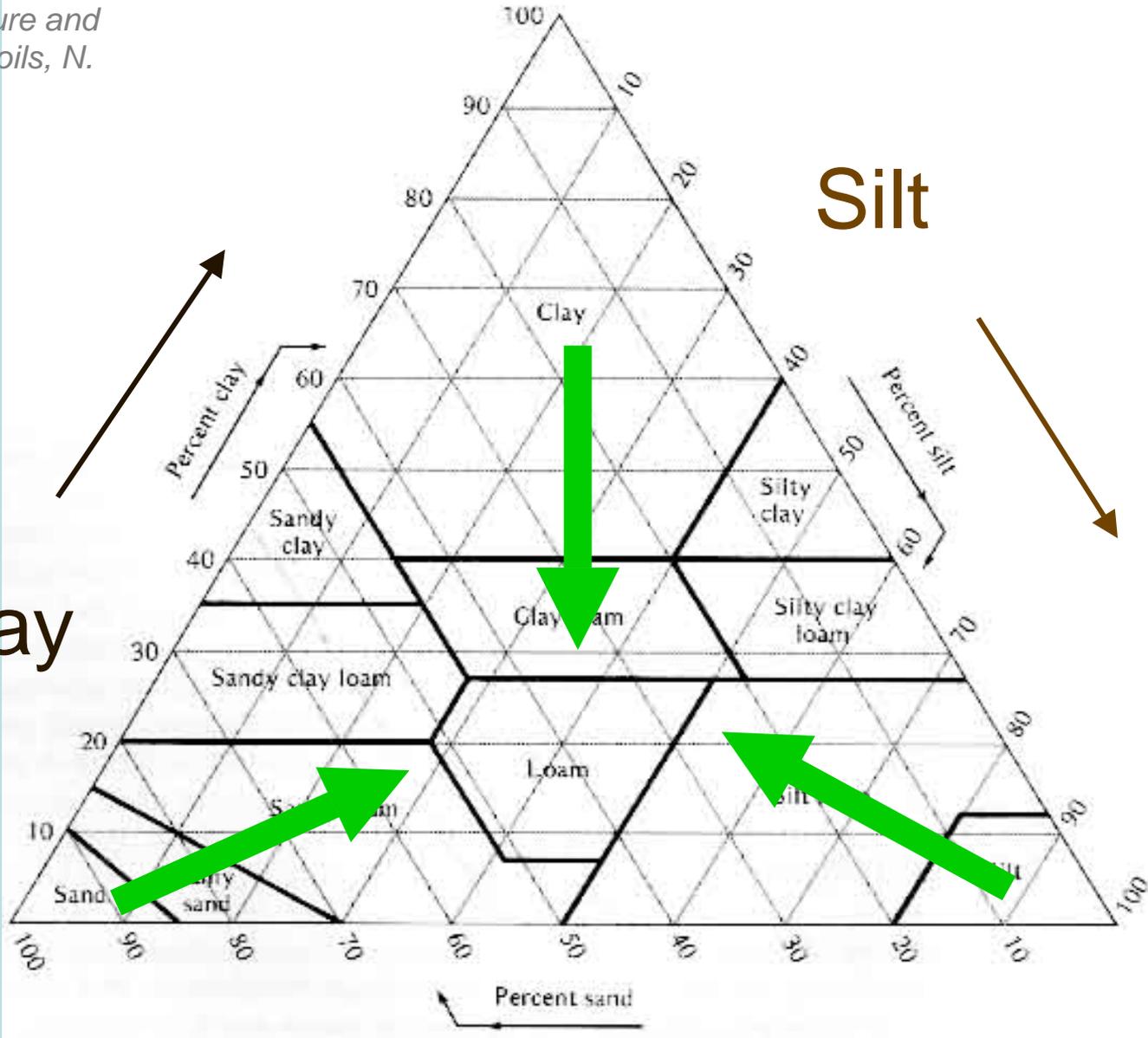
What Does Compost Do?



From: *The Nature and Properties of Soils*, N. Brady

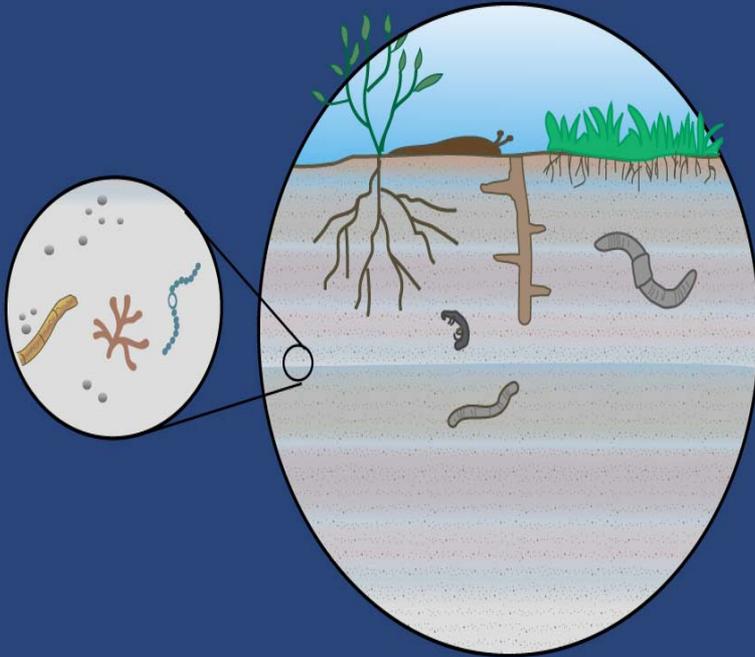
Clay

Silt



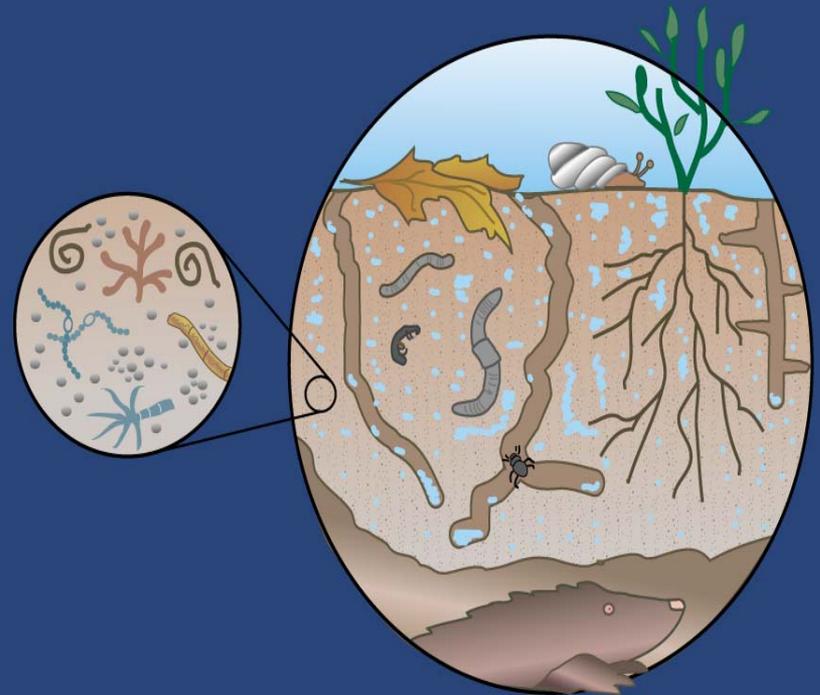
Sand

Magnified view of disturbed soil



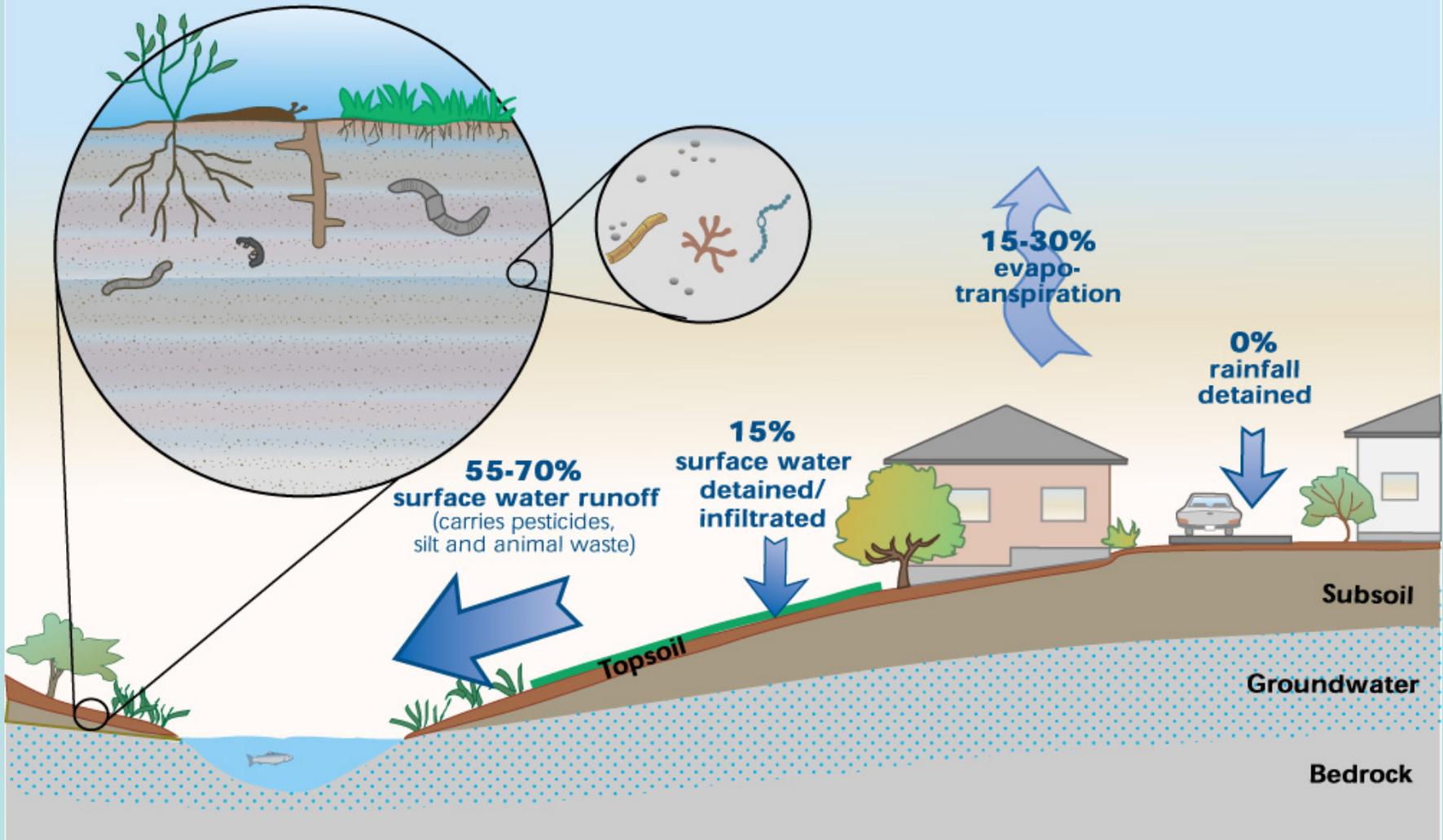
Compost-amended soils mimic undisturbed native soils

Magnified view of native soil



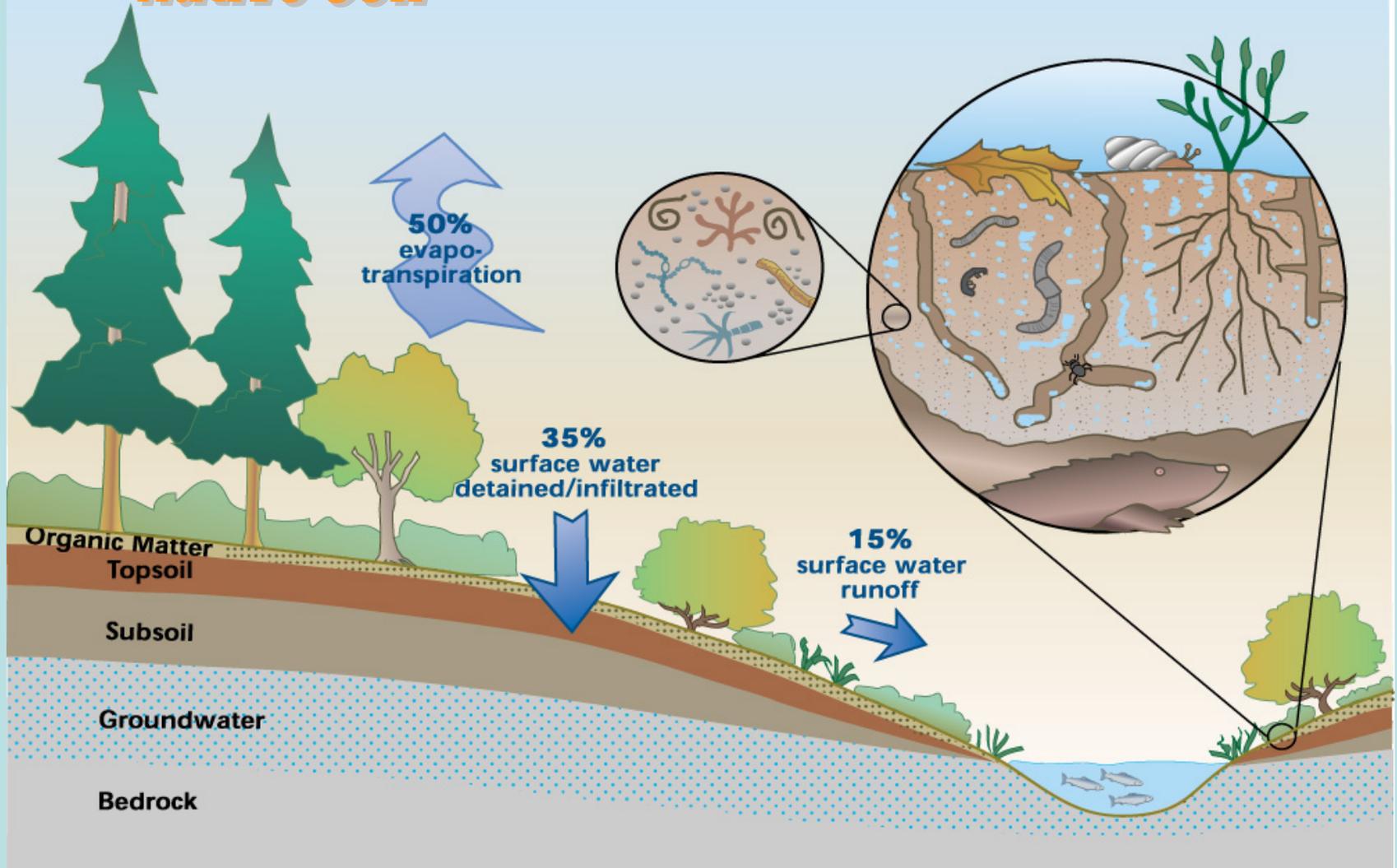
From: Soils for Salmon, City of Seattle/King County, WA

Disturbed Soils- Urbanization



From: Soils for Salmon, City of Seattle/King County, WA

Native Soil



From: *Soils for Salmon*, City of Seattle/King County, WA



On many sites (here in a Snohomish home remodel) it is more cost effective to till compost into the existing soil. Tilling 2-3 inches of compost into any soil – sand, clay or till – makes planting easier and grows a healthier landscape.



Once foundations are in and houses are framed and sided, 14 inches of compost-amended reused soil is placed (to allow for settling to 12-inch finish grade). The compost blend prevents erosion, so work can proceed year-round.

www.buildingsoil.org



Port Blakely also uses compost-amended soils in park and home landscapes, for a high-end, quality product that sells, and attracts future customers too!







AUG 19 2004



Pythium root rot on creeping bentgrass



No compost



With 20% compost

THE SUSTAINABLE SITES INITIATIVE™



www.sustainablesites.org



LINKING LANDSCAPES TO SUSTAINABILITY...

30% to 65% of water used daily by a family of four is for landscape irrigation.

U.S. Environmental Protection Agency, "Outdoor Water Use in the United States", 2007

Combine sewer overflows result in sewage and large volumes of storm water containing pathogens, solids, debris and toxic pollutants being discharged into surface water.

U.S. Environmental Protection Agency, "Report to Congress on Impacts and Control of Combined Sewer Overflows and Sanitary Sewer Overflows", 2004





ECOSYSTEM SERVICES

- ❑ Air
- ❑ Water
- ❑ Habitat
- ❑ Food
- ❑ Medicine
- ❑ Materials



Food Scraps: What Are We Dealing With?

- **By weight, one of biggest categories in waste composition studies**
- **Is highly putrescible, i.e., it DOES NOT degrade gracefully**
- **Food scraps in landfill are greenhouse gas contributor**
- **Separation, materials handling, collection methods are key to successful diversion**
- **These feedstocks have high energy value**
- **Compost has high soil & water value**
- **Need to design for diversion**

2007 BioCycle MSW Composting Data: Source Separated MSW

- **Source separated organics that include household organics beyond yard trimmings**
- **42 municipalities with SSO programs**
 - 17 in California
 - 17 in King County, including Seattle
 - 7 in Minnesota
 - 1 in Michigan
- **10 composting facilities servicing these programs**
 - 4 municipally owned
 - 6 privately owned (yard trimmings primary feedstock)

City and County of San Francisco, California

Three-Stream Source Separation

- Residential, commercial and institutional organics diversion
- 150,000 households
- 300-plus tons/day of source separated organics



Norcal Waste Systems' Jepsen Prairie Organics Composting Facility

Composting System

- Pre-grinding
- Initial composting in Ag-Bag pods
- Windrows





King County, Washington



**Cedar Grove Composting
Seattle, WA region
Gore Cover systems
Aerated static piles**



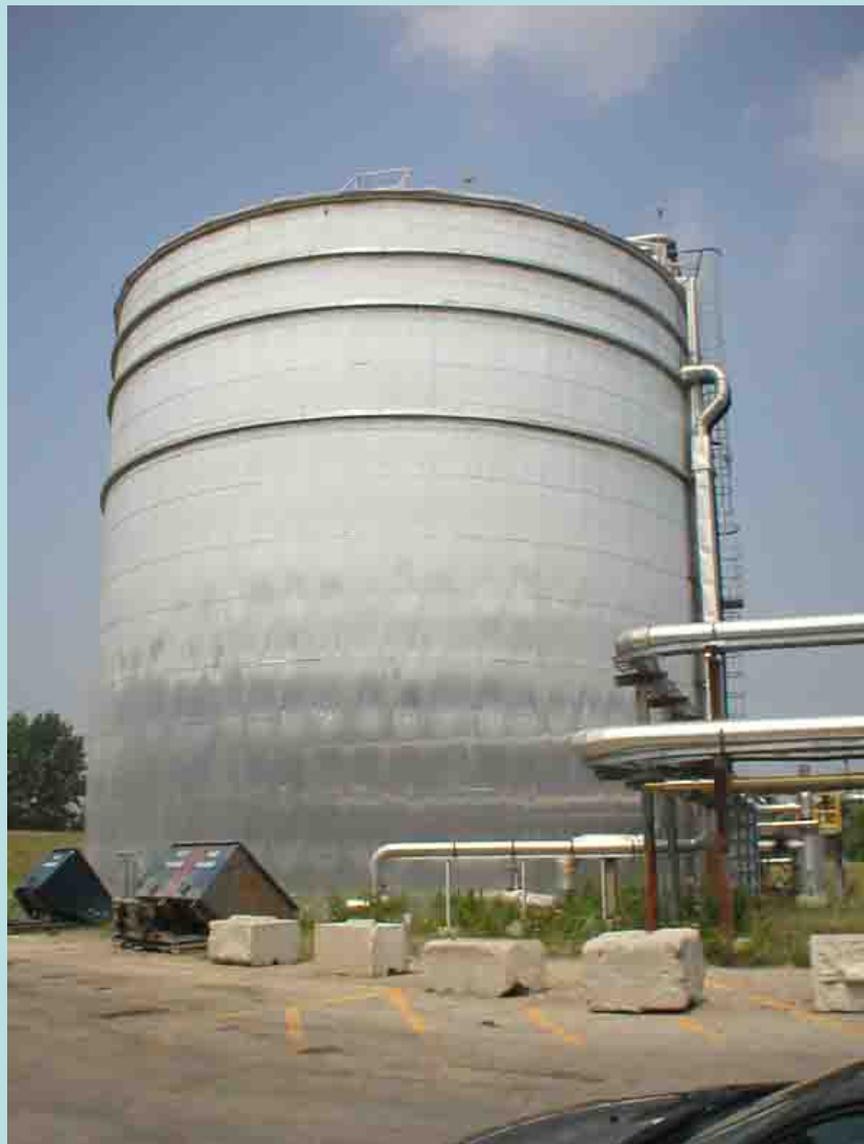
Western Lakes Superior Sanitary District, Minnesota



One Million-Plus Households Serviced



**Dufferin Transfer Station
Toronto, Ontario**



Source Separated Composting — Derbyshire, UK





30,000 MT/year; \$6.2 million



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Why Residential SSO On West Coast, In Canada?

- **West Coast: Year-round green waste generation**
- **Use of 64- or 90-gallon organics carts**
- **Commingled (single stream) recyclables**
- **Can enable automated and co-collection**
- **Canada: 13-gallon carts**
- **Reduce frequency of trash collection — weekly organics, biweekly trash**

2007 BioCycle MSW Composting Data: Mixed MSW

- **Mixed waste composting: 13 plants operating**
 - 12 municipally owned, 3 privately operated
 - 1 privately owned
- **Tons/day processed:**
 - 3 under 50 tpd
 - 5 between 50-100 tpd
 - 3 between 100-200 tpd
 - 2 > 200 tons/day



West Yellowstone, MT
-2,000 cubic yards/year
-50 tpd design



Engineered Compost Systems in-vessel technology



Delaware County, NY
-120 tons/day (35,000 tpy)
-6,700 tons/year of biosolids
-Conporec/S&W Services





IPS/Siemens composting bays

**WeCare Environmental
Marlborough, MA**

**Two Bedminster rotary digesters
Aerated Windrows
100 tpd MSW; 5 biosolids**



Mechanical-Biological Treatment — Athens, Greece



300,000 tons/year; \$87.7 million

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Commercial, Institutional Organics

Separation, Collection And Composting Options

Food Waste Generators (by percent, after recycling)

- **Full Service Restaurants**
 - 66% are food scraps
 - 5% “compostable paper”
- **Fast Food**
 - 52% food scraps
 - 12% “compostable paper”
- **Grocery Stores**
 - 65% food scraps
 - 6% “compostable paper”
- **Large Hotels**
 - 44% food scraps
 - 7% “compostable paper”









Grocery Store Installation – Direct To Compactors



Capturing Food Residuals At Portland (OR)
Airport Coffee Shop



Designing For Diversion



Compostable Products





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McEnroe Farms Millerton, NY



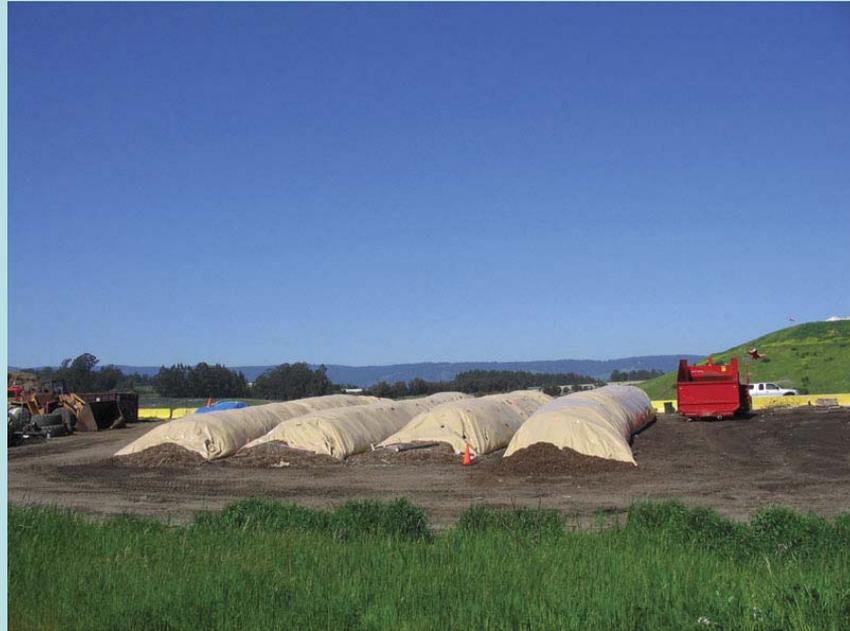
Ag Choice, Andover, NJ



Rocky Hill Farms Saugus, MA



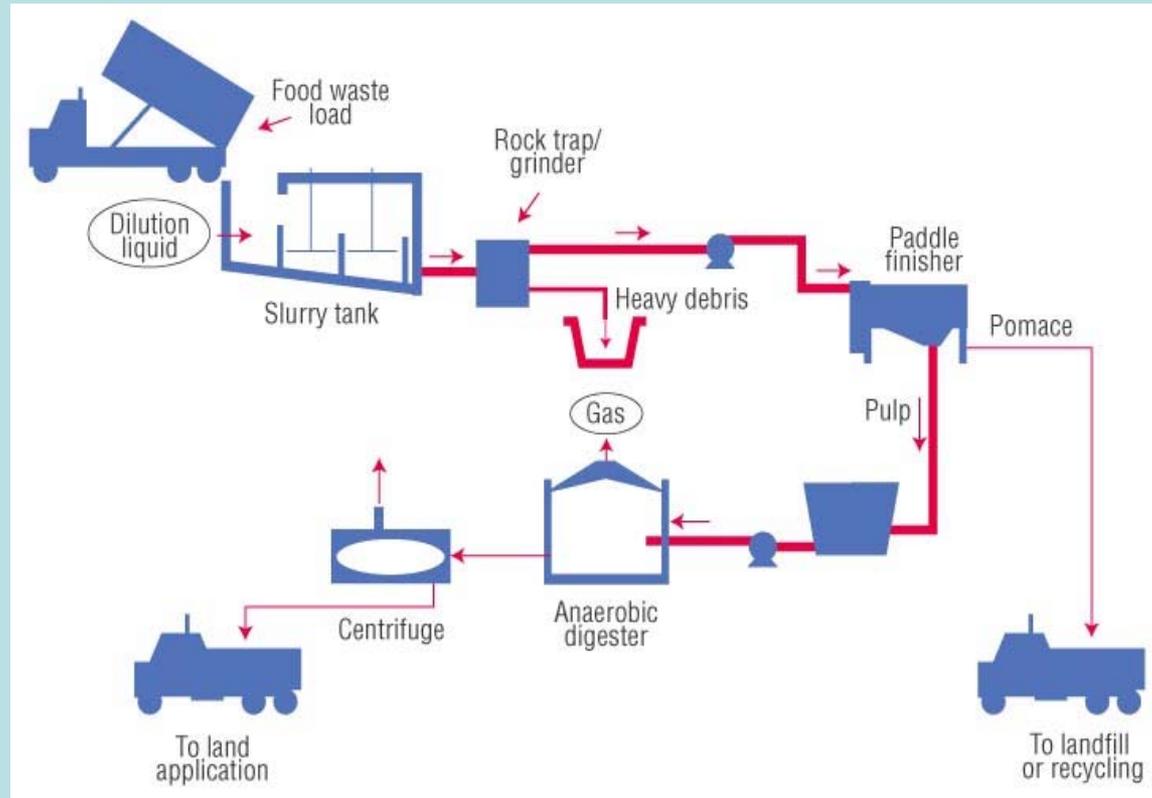
Santa Cruz County, CA



Olympia, WA



Schematic of EBMUD Food Waste Recycling Process



Patent Pending



Pulp extruded from slurry





**Fepro Farms
Cobden, Ontario**



Toyota Motor Manufacturing Kentucky, Inc.



Capital Cost: \$90,000

Avoided Tip Fees at Incinerator = \$250,000



Special Event Diversion





Odor Fundamentals

- **Be prepared: If it can stink, it will stink**
- **Take action: If it does stink, it can be fixed (9 times out of 10)**
- **Work together: Fix the problem with the public**
- **Set realistic expectations: Don't make promises that can't be kept**

Making Projects Happen — Social Aspects

- **Comfort zone on the technical and science side**
- **Social factors often overlooked and misunderstood, e.g. public “relations,” “acceptance”**
- **Social factors, such as public outrage, can interfere with program management**
- **Requires investment**

Positive Public Acceptance

- **Well-run operations following Best Management Practices**
- **Viewed as beneficial to community and environment**
- **Communicated well with — and often involved — stakeholders**
- **Introduced through communication process**
- **Strong organizational commitment**

Negative Public Acceptance

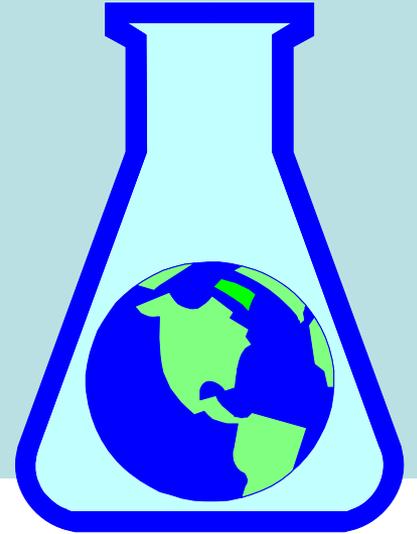
- **Minimal or no communication with public potentially impacting**
- **First encounter with project is negative one, e.g., odor, truck traffic**
- **Nuisance issues leading to antagonistic public meetings, inadequate communication**
- **Little or no local knowledge or oversight**
- **No apparent benefits to anyone but farmer**

Key Social Science Factors To Building Public Relationships

- **Risk Perceptions**
- **Outrage Factors**
- **Risk Communications and Public Participation**
- **Earning Trust**

Risk Perception

The risk assessment equation



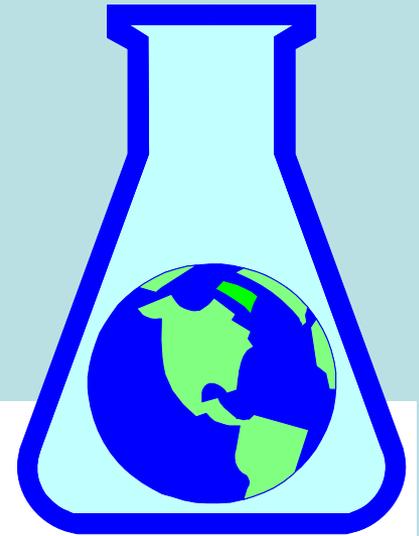
HAZARD (something dangerous)

+ EXPOSURE (there has to be exposure or dose)

= RISK

Risk Perception

The risk perception equation



HAZARD (something dangerous)
+ EXPOSURE (there has to be exposure or dose)
+ PERCEPTION (outrage factors)

= RISK (PERCEIVED RISK)

after Sandman, Powell, & Ropeik

Outrage Factors*



HIGH OUTRAGE

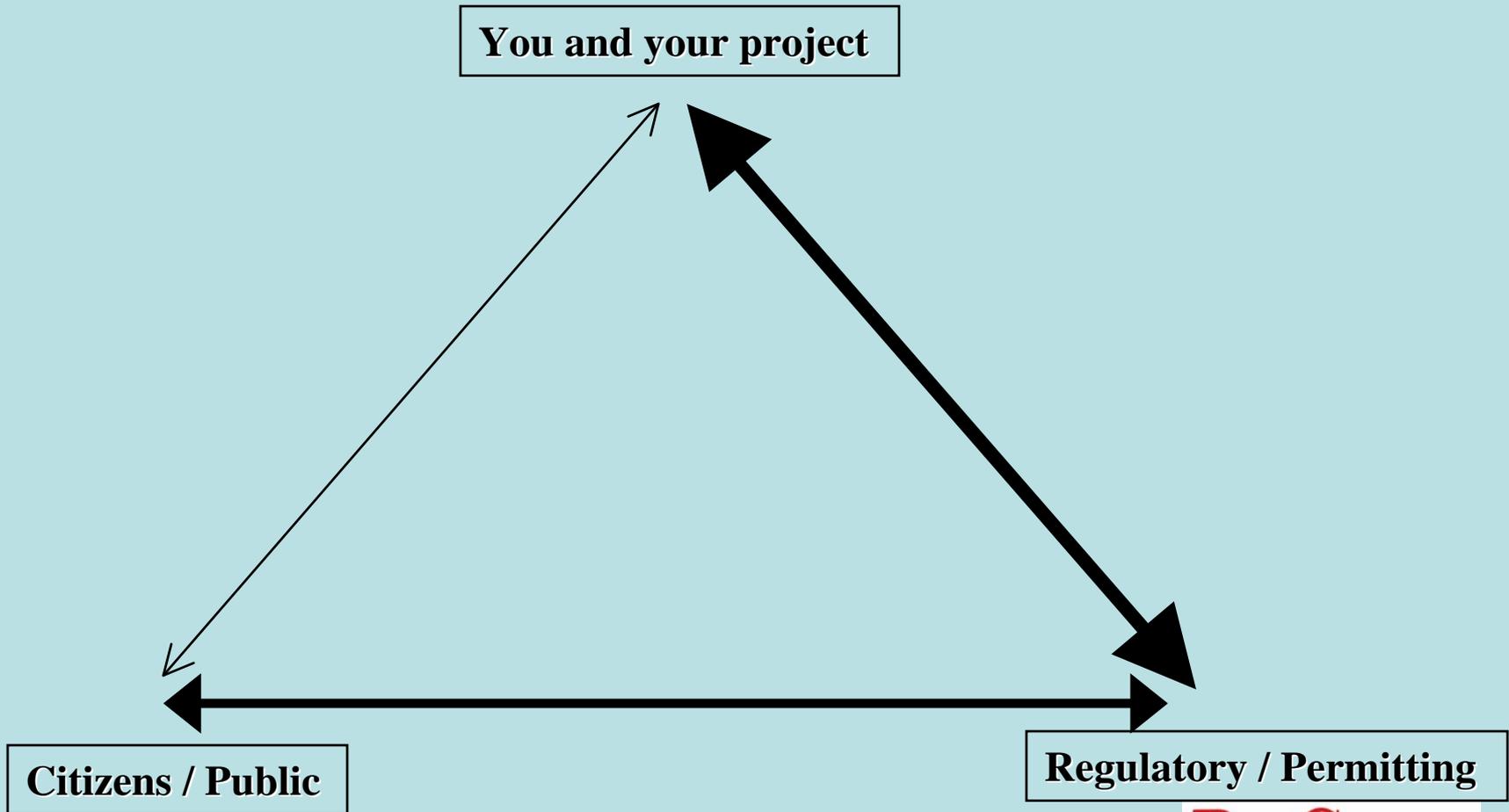
Involuntary
Artificial/Industrial
Exotic
Hard to understand
Memorable
Dreaded
Not reversible
Unknowable / Uncertainty
Closed process
Unfair

LOW OUTRAGE

Voluntary
Natural
Familiar
Well understood
Not memorable
Not dreaded
Reversible
Knowable / Well-known
Open process
Fair

* Courtesy of Peter Sandman and Vincent Covello, with interpretation by Mary McDaniel, and Barry Connell.

Traditional Stakeholder Interactions



Positive Public Policies

Food Scrap Management

http://www.epa.state.oh.us/ocapp/food_scrap/index.html

Ohio EPA Office of Compliance Assistance & Pollution Prevention
50 West Town Street, Suite 700 Columbus, OH 43215 (614) 644-3469

Chris Korleski, Director

Air Land Water Pollution Prevention Public Information

Food Scrap Management

Did you know that each American throws away an average of 1.3 pounds of food scraps every day? Each year, residents in Ohio generate enough food scraps to pile on a football field over a half mile high! Food scrap waste generated by all households in the United States could be piled on a football field more than 15 miles high.

The top two portions of the U.S. waste stream (paper and yard waste) have been successfully diverted from landfills through recycling and composting efforts, with recovery rates of 50 percent and 62 percent, respectively. Piling in comparison, the food scrap recovery rate is less than three percent.

Across the nation states are exploring ways to reduce pollution and encourage alternative methods of waste management such as recycling. Although some food scrap management programs are being implemented at the local level (universities, business locations, etc.), more can be done to help reduce the need for food scrap disposal.

Ohio EPA has developed this Web site and **accompanying brochure** to identify resources that you might find helpful when deciding whether to implement programs to address food scraps. There are several options to help address food scraps, including:

- Preventing the generation of food scraps.
- Converting food scraps to animal feed.

U.S. Waste Generation by Category

Category	Percentage
Paper	35.2%
Yard trimmings	12.1%
Food scraps	11.7%
Plastics	11.3%
Metals	8.0%
Rubber, leather and textiles	7.4%
Wood	5.8%
Glass	5.3%
Other	3.4%

Source: U.S. EPA

Answer Place
Have questions?
Need help?
Click here to visit the Answer Place.

Agency Links
Public Participation
Offices & Programs
Small Business Assistance

Office Links
Forms & Publications
Rules & Laws
Food Scrap P2
Food Donations
Technology and Success Stories
Regulations for Food Scrap Composting
Composting at Home
Funding
Other Helpful Links
Food Scrap Home Page

Permit Wizard

OHIO EPA Rules and Laws

http://www.epa.state.oh.us/rules.html

Ohio EPA Food Scraps Init

AASHE: Asso...r Education Apple .Mac Amazon eBay Yahoo! News (916) findacomposter Apple (87)

OhioEPA Ohio Environmental Protection Agency
 50 West Town Street, Suite 700 Columbus, OH 43215 (614) 644-3020

Chris Korleski, Director

Air Land Water Pollution Prevention Public Information

Answer Place
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- Small Business Assistance
- Forms & Publications
- Rules & Laws
- Employment Opportunities
- News & Events
- Partnerships
- About Ohio EPA
- Clean Ohio Fund
- E-Check

Permit Wizard

Ohio EPA Rules Index

This site is designed to allow you to access current and pending rules within our program divisions. It will also give access to rule packages which are cross program in nature such as the PTI/P.E. Signature rules, which affect a number of divisions. In addition to links to the individual Ohio EPA programs, the site also has links to outside sites which may be of use to individuals interested in rules or the **rule-making process**. These sites include the Register of Ohio, which contains all state agency rule proposal packages and the Joint Committee on Agency Rule Review, which is the legislative committee responsible for the review and processing of all state agency rules.

If you would like a hard copy of any of Ohio EPA's rules and regulations, please see the Small Business Assistance Office's "**Getting Copies of Ohio EPA's Regulations.**" All State of Ohio rules and regulations are available **online through LAWriter**. Because the online documents may not be updated as soon as changes are made, we recommend that you follow the links below to see specific rules and regulations by division to ensure that you are referencing the most current version.

If you have any questions regarding the Ohio EPA rule-making process, please feel free to contact **Edward Kitchen**, Ohio EPA Rules Coordinator, at (614) 644-2782. To receive notification of rule changes, please complete the form below.

Agency-Wide Rule Issues

- Industrial Waste Development and Beneficial Use Rule Development
- Diesel School Bus Retrofit Grant Rules
 - Rule References
 - General Program Information

PTI/P.E. Signature Rules

These rules can be found in the applicable program area's rules and laws pages. Please click on the appropriate link below for specific rule references.

Division of Surface Water



CENTRAL VERMONT SOLID WASTE MANAGEMENT DISTRICT

802-229-9383 or 800-730-9475
Fax: 802-229-1318
137 Barre Street, Montpelier, Vermont 05602

RESIDENT SERVICES

MEMBER TOWN SERVICES

BUSINESS SERVICES

SCHOOL SERVICES

RESOURCES

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HOME

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Zero Waste

- [Zero Waste for Residents](#)
- [Zero Waste for Businesses](#)
- [Zero Waste for Municipalities/Schools](#)
- [Zero Waste Fact Sheet](#)
- [CVSWMD Zero Waste Plan](#)
- [ZW Communities, Organizations and Businesses](#)

We're Working Toward Zero Waste!

The Central Vermont Solid Waste Management District has committed to helping its 22 member communities to work toward Zero Waste.

Zero Waste won't eliminate discards. Rather, working toward Zero Waste means that we will strive to capture all of the resources in such products so they can be reused and recycled in this region, instead of wasted by burying them in a landfill or burning them in an incinerator. Reducing waste up front through good product choices is also a critical component of a Zero Waste effort.

Click on the other tabs at the top of the page for the programs and services the District provides to help residents, businesses and member municipalities take steps toward this goal.

See the Zero Waste sections for more information about our efforts and this growing international movement.



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