



Independent coverage of composting, wood recycling and organics management



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New Jersey passes food waste bill

More than six months after New Jersey Gov. Phil Murphy conditionally vetoed a food waste bill that he said was “weakened” by amendments, Murphy has signed legislation that would stop large generators of food waste from sending it to incinerators or landfills. AB 2371 goes into effect in 18 months.

The bill requires generators of more than 52 tons of food per year to separate food waste and send it to the closest authorized food waste processing facility within 25 miles.

Beginning in about 18 months, each large food waste generator that is located within 25 road miles of an authorized food waste recycling facility and generates an average projected volume of 52 or more tons per year of food waste must:

- Source separate its food waste from other solid waste; and
- Send the source separated food waste

(See New Jersey, page 4)

Research: Organic agriculture can curb nitrogen pollution

The media, in covering climate change, typically focuses on carbon emissions, said Dr. Jessica Shade, director of science programs at The Organic Center, based in Washington, D.C. However, Shade said, nitrogen - particularly reactive nitrogen - is an often overlooked part of the equation.

According to Shade, nitrous oxide (N₂O), is a potent greenhouse gas with more than 300 times the global warming potential of carbon dioxide. Agriculture is the largest human source of N₂O, contributing more than two thirds of N₂O emissions, Shade said, adding that synthetic fertilizer application on conventional crops - especially corn and soybeans - is one of the leading sources of N₂O emissions in agriculture, and also leads to nitrate leaching into groundwater.

On behalf of The Organic Center, Shade is co-author of a new study led by researchers at the University of Virginia, which concludes that organic farming



(See Nitrogen, page 15)

Mushroom composter busted for stormwater discharges

The San Francisco Bay Regional Water Quality Control Board has ordered Monterey Mushrooms Inc. to pay \$911,800 for discharging polluted stormwater into Fisher Creek, harming water quality and threatening aquatic life, the board said.

The company, which is the largest grower of fresh mushrooms in North America, discharged more than 650,000 gallons of polluted water from its Morgan Hill facility into Fisher Creek. Nearly half of the penalty - \$440,364 - will fund

a Santa Clara Valley Open Space Authority project to restore 3.5 acres of habitat along the creek, downstream of the Morgan Hill facility.

“This penalty sends a clear message that Monterey Mushrooms must

(See Mushroom, page 8)

Highlights

- n **Biochar tested as ‘kickstarter’ to degrade agricultural mulch**
- n **National compost prices**

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Food waste

EPA recognizes seven New England food waste projects

The U.S. EPA has awarded seven local New England organizations with recognition for their work keeping wasted food out of landfills and incinerators and putting it to better use.

EPA gave national recognition to Keene State College, in Keene, N.H.; the Katharine Lee Bates Elementary School, in Wellesley, Mass.; and Signature Bread, in Chelsea, Mass.

Further, EPA gave regional recognition to the R.I. Dept. of Health: Rhode to End Hunger Initiative, in Providence, R.I.; the Island Grown

Initiative to reduce food waste reduction and redirection project Marthas Vineyard, Mass.; the Central Vermont Solid Waste Management District food waste reduction for greener schools, in Montpelier, Vt.; and the Center for Ecotechnology, in Florence, Mass. for their project “Help Hartford County’s Hungry” in Hartford County, Conn.

The awards are part of EPA’s Food Recovery Challenge (FRC). The Food Recovery Challenge takes part in the efforts of the “Winning on Reducing Food Waste Initiative,” a partnership including EPA, the U.S. Department of Agriculture, and the Food and Drug Administration, to reduce food loss and waste through combined federal action.

“Food Recovery Challenge participants are leaders in showing how preventing food waste and diverting excess wholesome food to people is an environmental win and a cost-saving business decision.” said EPA

Administrator Andrew Wheeler. “Their accomplishments serve as excellent examples to other companies, governments, organizations and communities.”

The recipients of the recognition were:

- **Keene State College** modified its food waste composting program in its common dining area in December 2017 to include all kitchen waste and post-consumer food waste. This significant expansion of collected and composted food waste was a critical step toward achieving the school’s ambitious goal of qualifying as a zero-waste campus by 2030. In a year, Keene State more than doubled the amount of food waste composted. The weight of compost collected increased from 41.76 tons in 2017 to 110.66 tons in 2018. The reduced cost for composting, compared to landfilling, saved the school \$4,324. As a result, Keene State College expanded composting to other food service vendors



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in the Student Center beginning the summer of 2019.

• Students of **Katharine Lee Bates Elementary School** partnered with local organizations to ascertain what was being wasted in their cafeteria and how to reduce that waste. A fifth-grade leadership team formed and developed recycling areas and signage, as well as taught fellow students about waste reduction and sustainable waste management at a school assembly. Students worked with town and school officials to create a program for single-stream recycling and food waste diversion in the cafeteria. That program has expanded to diverting unused liquids to an anaerobic digestion facility.

• **Signature Bread** has pursued projects including diverting dough and bread waste to composting operations or livestock feed; using a food waste compactor with an integrated scale to measure waste; and working with food banks and other local hunger relief organizations to find creative ways to

donate excess bread. In 2018, Signature Breads processed more than 3,000 tons of bread and dough into animal feed, and over a longer period of time they have donated more than four tons of frozen bread to hunger relief organizations.

• **Center for EcoTechnology (CET)** learned that a significant barrier to donating edible food is liability concerns from businesses, schools, hotels and other institutions that have significant food waste. CET worked with Connecticut state agencies to produce “Food Donation by Connecticut Schools,” a document with guidelines to help K-12 schools identify opportunities to donate food internally and externally. CET collaborated with the state agencies to ensure consistency across agency policies. The document consolidates federal and state regulations on share tables and partnerships with external food rescue organizations, including

(See Recognize, page 4)



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Food Waste

Recognize

From page 3

information on liability protection and health codes.

- **Island Grown Initiative** was recognized for its Food Waste Reduction and Redirection Project, an island-wide effort on Martha's Vineyard that works with food that was once taken away as waste and gives it to the hungry or composts it. The project, funded partially by an EPA Healthy Community Grant, created a community report explaining the cost to municipal budgets and to the environment of disposing food waste off the island. The project also helped residents, schools and businesses reduce food waste and separate significantly more food waste from trash. As a result of this project, all town transfer stations now accept food waste, tripling food waste collection from the previous year. Four years ago, all of Martha's Vineyard food waste was shipped off the island as trash. The drastic change is largely due to the efforts of the Initiative and the island community which rallied around the idea that food waste is a valuable resource that can feed the island's hungry, hens or soil.

- **Rhode Island Department of Health** was recognized for its "Rhode to End Hunger Initiative" in 2018 to promote food donation during department inspections and other outreach opportunities to restaurants and other food service organizations. In the Initiative, the department became the first state agency to use the MEANS Database, a nonprofit food rescue platform. The statewide effort connects food donors with local organizations to eliminate food insecurity. The department's trained food safety inspectors continue to partner with public health scholars, community partners and the MEANS Database team on the Rhode to End Hunger. The initiative prevented 30,680 pounds of food from being disposed in Rhode Island's Central Landfill in 2019. This effort has been successful due to

connections built with local and national agencies.

- Since 2004, the **Central Vermont Solid Waste Management District** (CVSWMD) has worked with its 27 schools to implement food scrap hauling and food waste prevention services. The district's 2019 project, "Food Waste Reduction for Greener Schools in Central Vermont," focused directly on reducing wasted edible food and milk in schools in five Vermont towns: Barre Town, Bradford, East Montpelier, Montpelier, and Williamstown. During the 2018-19 school year, participating schools decreased food waste by an average of 17.4 percent and milk waste by 41 percent. Every school surveyed also reduced the portion of food disposed of in their trash, and participating schools as a group decreased the weight of food in the trash by 45 percent.

In 2018, EPA New England worked with 53 New England-based Food Recovery Challenge participants to reduce wasted food, by diverting about 50,000 tons of food for donation or composting. More than 1,000 businesses, governments and organizations participated in EPA's Food Recovery Challenge in 2019. Participants prevented or diverted more than 815,000 tons of food from entering landfills or incinerators, saving participants up to \$42.3 million in avoided landfill tipping fees.

Legislation/regulation

New Jersey

From page 1

to an authorized food waste recycling facility that has available capacity and will accept it.

If a large food waste generator is not located within 25 road miles of an authorized food waste recycling facility, or the authorized food waste recycling facility will not accept the generator's food waste, the large food waste generator may send the food waste for final disposal at a solid waste facility as provided in the approved district solid waste management plan for the solid waste management district in which the

generator is located.

Any large food waste generator that is obligated to source separate and recycle its food waste shall be deemed to be in compliance with the new law if it:

- Performs enclosed on-site composting or anaerobic or aerobic digestion of its source separated food waste, or
- Recycles food waste using an alternative authorized food waste recycling method.

A large food waste generator may petition the Department of Environmental Protection (DEP) for a waiver of the requirements if the cost of transporting the food waste plus the fee charged by an authorized food waste recycling facility located within 25 road miles of the large food waste generator is at least 10 percent more than the cost of transporting the food waste for disposal as solid waste plus the disposal fee charged for solid waste disposal in the state for non-contract commercial waste.

An authorized food waste recycling facility is a Class C recycling center within the state that is authorized to accept, store, process or transfer food waste or compostable material.

An alternative authorized food waste recycling method includes:

- Recycling food waste at the site at which it is generated as authorized by DEP;
- Treating food waste at the site at which it is generated pursuant to a permit issued by DEP;
- Sending food waste for offsite use for agricultural purposes, including as animal feed;
- Sending food waste offsite for treatment with sewage sludge in an anaerobic digester for renewable natural gas or biogas recovery as authorized by DEP; or
- Any other method of recycling or reuse of food waste as authorized by DEP.

Food waste includes food processing vegetative waste, food processing residue generated from processing and packaging operations, overripe produce, trimmings from food, food product overruns from food processing, soiled and unrecyclable paper generated from food processing and used cooking fats, oil, and grease but doesn't include food

donated by the generator for human consumption or any waste generated by a consumer after the generator issues or sells food to the consumer.

The new law establishes, within DEP, a Food Waste Recycling Market Development Council to consist of the DEP commissioner, the president of the Board of Public Utilities, the commissioner of transportation, the secretary of agriculture, the state treasurer and the attorney general, along with six citizens appointed by the governor. Of the appointed members, two shall be actively engaged in the composting industry, of whom one shall be a representative of the National Waste and Recycling Association and one shall be a representative of the National Biosolids Partnership or equivalent entities, two shall be actively engaged in the recycling or solid waste collection industry, of whom one shall be a representative of the Association of New Jersey Recyclers or equivalent entities; and two shall represent the general

public.

The council is mandated to prepare a report on the existing markets for any products and energy produced from food recycling facilities, food waste composting facilities and anaerobic and aerobic digestion facilities that accept food waste material, and investigate the feasibility of providing preferences for products or energy produced from food recycling facilities, food waste composting facilities and anaerobic and aerobic digestion facilities in the state procurement process.

The state's Sierra Club isn't completely thrilled with the legislation.

"Signing the food waste bill into law is one step forward and two steps backwards," said Jeff Tittel, director of the New Jersey Sierra Club.

Tittel said the Sierra Club is concerned that DEP can grant a waiver to allow food waste to go to incinerators and landfills, and that biogas is defined as a Class I renewable energy.

"Defining biogas as a Class I renewable

energy is not accurate," Tittel said. "Biogas releases greenhouse gases because it requires burning and it is not renewable because it is generated from waste. Class I renewables should be forms of energy that are actually renewable, like solar, wind, waves and geothermal. We believe that biogas should be defined as a different form of energy, perhaps Class II or something else. Class I renewable energy should continue to define forms of clean, renewable energy that do not produce greenhouse gases."

Tittel noted that during the health pandemic, supply chains have been severely impacted and food waste is increasingly growing.

"Requiring large food waste generators to compost food will help get it out of our waste stream and reduce our greenhouse gases," he said. "More importantly, it will help get food waste out of landfills and reduce wasted natural resources and money."

(See New Jersey, page 8)

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National Compost Prices

The prices listed below are intended to indicate the value of mature compost products sold by compost producers and retailers in noted regions. Prices listed are based on surveys and publicly posted prices.

Your input on published prices is encouraged. Contact Ken McEntee, editor, at (440) 238-6603. Fax: (440) 238-6712. EMail: ken@recycle.cc. Address: 9815 Hazelwood Avenue, Cleveland, OH 44149. Notes on listings.

- Each listing includes a high price obtained, a low price obtained and an average of all prices obtained within a particular market.

- Market areas: Thirteen market areas have been targeted to provide a cross section of compost product markets in

the U.S. Where regions are not identified by a specific city, "Chesapeake" refers to the region stretching between Norfolk, Va. to Baltimore, Md. "Texas" incorporates several major cities in the state. "Northwest" represents the Seattle and Portland, Ore areas. "SF-Bay" refers to the San Francisco Bay area. SoCal is Southern California, including the Los Angeles and San Diego areas. Denver includes Colorado, Wyoming and Montana.

- "Food waste" compost: This category refers to compost products that include food waste, regional specialties and other feedstocks not specifically covered in other categories.

- Manures: Chicken manures may include other poultry

manures, such as turkey and duck manure. Cow manures may include manures marketed as steer and dairy manure. Horse manure is included in this category as well.

- Absence of a regional listing within a given category indicates not enough information for a valid listing.

Additional data will be added as more information is obtained.

- Bulk retail prices do not include municipal operations that give compost away for free.

Bulk Retail (yard)

Yard waste compost	Average	High	Low
NE	\$ 32.55	\$ 77.00	\$ 17.50
Chesapeake	\$ 24.50	\$ 30.00	\$ 17.00
SE	\$ 21.88	\$ 29.95	\$ 16.00
Florida	\$ 16.42	\$ 26.00	\$ 10.50
Cleveland	\$ 19.90	\$ 28.00	\$ 12.50
Iowa	\$ 21.57	\$ 53.00	\$ 7.50
Minneapolis	\$ 17.09	\$ 28.00	\$ 8.00
Texas	\$ 29.71	\$ 40.00	\$ 15.00
Denver	\$ 20.31	\$ 31.00	\$ 12.00
Northwest	\$ 24.05	\$ 55.00	\$ 10.00
SF-Bay	\$ 21.92	\$ 30.00	\$ 10.00
SoCal	\$ 14.75	\$ 24.00	\$ 8.00

Food waste compost	Average	High	Low
NE	\$ 39.12	\$ 64.00	\$ 17.50
Chesapeake	\$ 23.00	\$ 30.00	\$ 15.00
SE	\$ 28.11	\$ 35.00	\$ 24.00
Florida	\$ 17.50	\$ 22.00	\$ 13.00
Iowa	\$ 25.00	\$ 65.00	\$ 15.00
Minneapolis	\$ 12.33	\$ 16.00	\$ 9.00
Texas	\$ 30.21	\$ 48.95	\$ 15.00
Denver	\$ 15.00	\$ 15.00	\$ 15.00
Northwest	\$ 20.55	\$ 30.00	\$ 15.00
SF-Bay	\$ 23.61	\$ 38.00	\$ 14.00
SoCal	\$ 30.50	\$ 45.00	\$ 16.00

Leaf humus	Average	High	Low
NE	\$ 24.98	\$ 30.00	\$ 19.95
Chesapeake	\$ 27.49	\$ 30.00	\$ 23.95
Cleveland	\$ 19.27	\$ 26.00	\$ 8.00

Composted biosolids	Average	High	Low
NE	\$ 30.00	\$ 40.00	\$ 20.00
Chesapeake	\$ 24.98	\$ 35.00	\$ 12.00
SE	\$ 12.14	\$ 28.00	\$ 4.00
Florida	\$ 13.14	\$ 22.00	\$ 8.00
Cleveland	\$ 24.77	\$ 30.00	\$ 19.50
Iowa	\$ 12.67	\$ 21.00	\$ 8.00
Texas	\$ 21.28	\$ 30.00	\$ 10.00
Denver	\$ 9.00	\$ 10.00	\$ 7.00
Northwest	\$ 17.91	\$ 26.00	\$ 7.00
SoCal	\$ 13.36	\$ 22.00	\$ 3.50

Composted chicken manure	Average	High	Low
NE	\$ 45.00	\$ 50.00	\$ 40.00
Chesapeake	\$ 25.00	\$ 25.00	\$ 25.00
SE	\$ 42.00	\$ 42.00	\$ 42.00
Minneapolis	\$ 17.00	\$ 17.00	\$ 17.00
Texas	\$ 37.23	\$ 47.50	\$ 26.95
Denver	\$ 25.65	\$ 28.00	\$ 24.00
SF-Bay	\$ 16.00	\$ 16.00	\$ 16.00
SoCal	\$ 44.00	\$ 75.00	\$ 27.00

Composted cow manure	Average	High	Low
NE	\$ 45.50	\$ 46.00	\$ 45.00
SE	\$ 31.33	\$ 45.00	\$ 12.00
Cleveland	\$ 24.00	\$ 24.00	\$ 24.00
Iowa	\$ 42.00	\$ 60.00	\$ 16.00
Minneapolis	\$ 29.33	\$ 32.00	\$ 26.00
Texas	\$ 29.33	\$ 47.50	\$ 15.00
Denver	\$ 21.71	\$ 30.00	\$ 12.00
Phoenix	\$ 20.00	\$ 20.00	\$ 20.00
Northwest	\$ 23.85	\$ 33.75	\$ 17.45

SF-Bay	\$ 26.00	\$ 26.00	\$ 26.00
SoCal	\$ 17.25	\$ 24.00	\$ 12.00

Wood waste mulch	Average	High	Low
NE	\$ 21.35	\$ 38.00	\$ 12.50
Chesapeake	\$ 21.13	\$ 28.00	\$ 12.00
SE	\$ 18.78	\$ 34.95	\$ 12.00
Florida	\$ 17.50	\$ 18.00	\$ 17.00
Cleveland	\$ 25.56	\$ 36.25	\$ 14.00
Iowa	\$ 32.50	\$ 40.00	\$ 25.00
Minneapolis	\$ 26.00	\$ 35.00	\$ 20.00
Texas	\$ 16.19	\$ 27.00	\$ 9.00
Denver	\$ 18.74	\$ 25.00	\$ 12.48
Phoenix	\$ 17.61	\$ 22.95	\$ 10.00
Northwest	\$ 19.00	\$ 35.00	\$ 7.50
SF-Bay	\$ 18.14	\$ 30.00	\$ 8.00
SoCal	\$ 20.50	\$ 50.00	\$ 6.00

Colored wood mulch	Average	High	Low
NE	\$ 28.00	\$ 28.00	\$ 28.00
Chesapeake	\$ 28.67	\$ 33.00	\$ 25.00
SE	\$ 27.13	\$ 42.00	\$ 15.00
Florida	\$ 20.33	\$ 22.00	\$ 19.00
Cleveland	\$ 24.87	\$ 28.99	\$ 21.95
Iowa	\$ 30.00	\$ 30.00	\$ 30.00
Minneapolis	\$ 36.80	\$ 49.00	\$ 30.00
Texas	\$ 26.08	\$ 32.50	\$ 18.00
Denver	\$ 33.28	\$ 33.28	\$ 33.28
Northwest	\$ 35.00	\$ 35.00	\$ 35.00
SF-Bay	\$ 34.00	\$ 36.00	\$ 28.00
SoCal	\$ 32.50	\$ 35.00	\$ 30.00

Bulk wholesale (yard)

Yard waste compost	Average	High	Low
NE	\$ 21.50	\$ 48.00	\$ 11.00
Chesapeake	\$ 13.39	\$ 16.00	\$ 8.00
SE	\$ 16.66	\$ 25.00	\$ 8.65
Florida	\$ 9.75	\$ 13.00	\$ 8.00
Cleveland	\$ 12.50	\$ 15.00	\$ 10.00
Iowa	\$ 14.00	\$ 19.00	\$ 8.00
Minneapolis	\$ 12.00	\$ 17.00	\$ 7.00
Texas	\$ 17.25	\$ 24.00	\$ 9.00
Denver	\$ 13.05	\$ 14.10	\$ 12.00
Northwest	\$ 14.79	\$ 35.00	\$ 7.50
SF-Bay	\$ 13.71	\$ 22.00	\$ 7.00
SoCal	\$ 7.33	\$ 10.00	\$ 6.00

Food waste compost	Average	High	Low
NE	\$ 25.79	\$ 48.00	\$ 11.00
Chesapeake	\$ 10.50	\$ 15.00	\$ 8.00
SE	\$ 20.65	\$ 30.00	\$ 15.00
Florida	\$ 10.50	\$ 13.00	\$ 8.00
Iowa	\$ 13.40	\$ 20.00	\$ 10.00
Minneapolis	\$ 12.00	\$ 12.00	\$ 12.00
Texas	\$ 17.50	\$ 24.00	\$ 8.50
Denver	\$ 11.33	\$ 15.00	\$ 7.00
Northwest	\$ 17.25	\$ 20.00	\$ 15.00
SF-Bay	\$ 12.67	\$ 26.00	\$ 5.00

Composted biosolids	Average	High	Low
NE	\$ 15.33	\$ 20.00	\$ 10.00
Chesapeake	\$ 9.31	\$ 15.00	\$ 5.00
SE	\$ 10.93	\$ 15.00	\$ 5.00
Florida	\$ 10.50	\$ 13.00	\$ 8.00
Texas	\$ 15.99	\$ 20.00	\$ 9.00

Denver	\$ 13.00	\$ 13.00	\$ 13.00
Northwest	\$ 16.75	\$ 21.00	\$ 12.00
SoCal	\$ 10.50	\$ 17.00	\$ 3.00

Composted cow manure	Average	High	Low
NE	\$ 36.00	\$ 36.00	\$ 36.00
SE	\$ 21.38	\$ 31.50	\$ 7.00
Iowa	\$ 35.00	\$ 35.00	\$ 35.00
Texas	\$ 25.00	\$ 25.00	\$ 25.00
Denver	\$ 12.05	\$ 14.10	\$ 10.00
Northwest	\$ 22.00	\$ 22.00	\$ 22.00
SF-Bay	\$ 34.25	\$ 34.50	\$ 34.00
SoCal	\$ 5.00	\$ 6.00	\$ 4.00

Wood waste mulch	Average	High	Low
NE	\$ 15.75	\$ 33.00	\$ 8.00
Chesapeake	\$ 15.80	\$ 17.00	\$ 13.00
SE	\$ 14.60	\$ 24.95	\$ 5.00
Florida	\$ 14.00	\$ 15.00	\$ 13.00
Iowa	\$ 30.00	\$ 40.00	\$ 20.00
Minneapolis	\$ 18.50	\$ 20.00	\$ 17.00
Texas	\$ 10.83	\$ 14.00	\$ 8.00
Denver	\$ 7.66	\$ 8.32	\$ 7.00
Northwest	\$ 15.00	\$ 15.00	\$ 15.00
SF-Bay	\$ 12.33	\$ 14.00	\$ 9.00
SoCal	\$ 9.25	\$ 15.00	\$ 5.00

Colored wood mulch	Average	High	Low
NE	\$ 22.00	\$ 22.00	\$ 22.00
Chesapeake	\$ 20.50	\$ 22.00	\$ 19.00
SE	\$ 19.00	\$ 25.00	\$ 15.00
Florida	\$ 16.00	\$ 16.00	\$ 16.00
Iowa	\$ 25.00	\$ 25.00	\$ 25.00
Minneapolis	\$ 27.00	\$ 35.00	\$ 19.00
Texas	\$ 20.67	\$ 24.00	\$ 18.00
Denver	\$ 17.66	\$ 21.32	\$ 14.00
Northwest	\$ 22.00	\$ 22.00	\$ 22.00
SF-Bay	\$ 21.00	\$ 22.00	\$ 19.00
SoCal	\$ 22.50	\$ 25.00	\$ 20.00

Bag Retail

Compost (40# bag)	Average	High	Low
NE	\$ 6.87	\$ 8.00	\$ 4.50
Chesapeake	\$ 3.73	\$ 5.49	\$ 2.15
SE	\$ 4.00	\$ 4.00	\$ 4.00
Iowa	\$ 1.99	\$ 1.99	\$ 1.99
Cleveland	\$ 2.45	\$ 2.99	\$ 2.10
Iowa	\$ 3.12	\$ 7.99	\$ 1.50
Texas	\$ 4.25	\$ 6.99	\$ 1.99
Denver	\$ 3.59	\$ 4.75	\$ 1.73
Phoenix	\$ 4.71	\$ 5.99	\$ 2.77
Northwest	\$ 4.29	\$ 5.99	\$ 2.99
SoCal	\$ 5.39	\$ 6.25	\$ 3.90

Composted cow manure(40#bag)	Average	High	Low
NE	\$ 6.53	\$ 9.87	\$ 3.85
Chesapeake	\$ 5.97	\$ 7.95	\$ 3.99
SE	\$ 5.16	\$ 6.97	\$ 3.34
Florida	\$ 1.98	\$ 1.99	\$ 1.97
Cleveland	\$ 3.27	\$ 3.99	\$ 2.49
Iowa	\$ 2.18	\$ 2.49	\$ 1.75
Minneapolis	\$ 3.70	\$ 7.00	\$ 1.99
Texas	\$ 4.59	\$ 6.99	\$ 1.99
Phoenix	\$ 2.99	\$ 3.99	\$ 2.49
Northwest	\$ 3.99	\$ 3.99	\$ 3.99
SF-Bay	\$ 7.00	\$ 7.00	\$ 7.00

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Legislation/regulation

New Jersey

From page 5

Now that the bill has been enacted into law, Tittel said, “it is important that the state moves forward in getting the mechanisms in place to enforce it.”

“We need to phase out from incinerating our food waste because many of the incinerators in the state are not zero carbon,” he said. “Of the waste they burn, around one third comes from plastic, which comes from fossil fuels. These facilities need to burn natural gas and plastic to make the fire hot enough to burn wet garbage and food waste. Which means adding more food waste will put more carbon and more particulates in our air.”

Tittel noted that using composted food waste as fertilizer enriches soil, helps retain moisture and suppress plant diseases and reduces the need for chemical fertilizers. It also encourages

the production of beneficial bacteria and fungi that break down organic matter.

“This law will help curb New Jersey’s food waste problem,” he said. “In order to reduce and utilize our food waste, New Jersey cannot burn it. Instead we need to be composting and using anaerobic digestion to reduce and reuse food waste in a sustainable way.”

Mushroom

From page 1

improve their operations and protect the aquatic life in Fisher Creek and drinking water uses of the underlying groundwater,” said Lisa Horowitz McCann, assistant executive officer of the control board.

The board’s investigation found that in March 2016, Monterey Mushrooms discharged 258,000 gallons of polluted stormwater from one of its compost storage areas to a ditch that flowed into Fisher Creek. Inspectors found deficiencies in stormwater management

practices that resulted in stormwater coming into contact with compost, becoming polluted and then running off the facility.

The investigation also found that in February 2017, Monterey Mushrooms pumped 400,000 gallons of polluted water from a pond to Fisher Creek. The discharge contained ammonia more than five times the U.S. EPA’s water quality criterion intended to protect aquatic life.

A copy of the order is available on the San Francisco Bay Board’s enforcement website.

Fisher Creek flows into Coyote Creek, which flows into San Francisco Bay. These waters provide habitat for aquatic life. When improperly managed, compost waste can degrade water quality with nutrients, pathogens, and other pollutants, the control board said. Excess nutrients can lead to conditions that suffocate fish or cause toxic algal blooms. If released to groundwater, nutrients can

(See Mushroom, page 13)

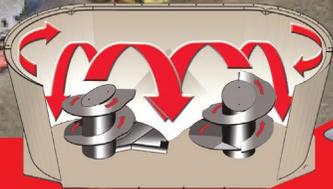
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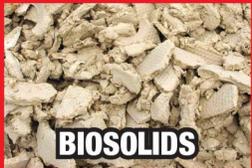
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Legislation/regulation

Mushroom

From page 8

also harm drinking water supplies.

As a result of the board's enforcement action, as well as a separate action brought by the Santa Clara County District Attorney's Office, Monterey Mushrooms has improved its compost management by increasing process water storage and minimizing the amount of process water on-site.



landfill emissions for the environment, contaminated soil and unnecessary transportation costs for growers."

The idea of using polyethylene film as mulch in plant production dates back to the 1950s. Thousands of square miles of agricultural land today utilize polyethylene mulch for crop production worldwide. Over the last several decades, however, polyethylene—the polymer used for such things as grocery bags, shampoo bottles, and children's toys—has become an environmental plague throughout the planet, RIT said.

The goal of the four-year research project is to develop an economical alternative to polyethylene mulch in the form of a biodegradable plastic mulch that maintains a conducive climate for plant growth; has flexibility to allow mechanical installation; remains intact during cropping season; uses a trigger mechanism (such as spraying) to activate accelerated biodegradation; and undergoes complete biodegradation after tilling into soil.

According to Thomas Trabold, associate professor and Sustainability Department head at RIT, the project will fill research gaps in understanding the properties of bioplastic materials that enable enhanced degradation under aerobic conditions in soil by modifying the bioplastic material formulation and move toward solutions using "triggers."

Among the methods to help kickstart degradation will be the utilization of "biochar," a high-carbon, fine-grained residue derived from thermochemically treating organic biomass to improve agriculture production.

"By returning organic carbon to the soil, we're confident that it will improve soil health," Trabold said.

Using biochar in combination with bioplastics marks an evolution of

research that Diaz-Acosta and Trabold—in conjunction with the New York State Pollution Prevention Institute (NYSP2I)—are already working on to develop bioplastic packaging materials suitable for aerobic and/or anaerobic degradation when combined with food scraps to reduce waste to the landfill.

Their latest collaborative research will utilize field trials conducted with Cornell Cooperative Extension of Monroe County at farms nearby RIT, and in the American Packaging Corporation Center for Packaging Innovation on the Henrietta campus. Additional partners include Wegmans Food Markets.

RIT researchers will now aim to create agricultural films that can perform during the growing season and then "truly disappear" once the season ends, Diaz-Acosta said.

"That's the panacea we are seeking to achieve here," he said.

"RIT has a long history of working

(See Mulch, page 15)

Biochar

Biochar tested as 'kickstarter' to degrade agricultural mulch

The Rochester Institute of Technology (RIT) is researching using biochar in combination with bioplastics to identify a sustainable alternative to conventionally used plastics in farming, RIT said.

The research on the use of degradable mulching films is being funded by a federal grant matched by the state of New York and RIT. The Foundation for Food and Agriculture Research (FFAR) has awarded the university a \$779,982 grant, which was matched with \$334,355 in funding from the Empire State Development's (ESD) Division of Science, Technology and Innovation program and \$445,627 from RIT.

"While there are a number of biodegradable films available today, they have not been heavily adopted—particularly here in the United States," said principal investigator Carlos Diaz-Acosta, associate professor of packaging science in RIT's College of Engineering Technology. "The main reason is these plastic films don't degrade in the timeframe promised, producing harmful

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Case study:

Trommel screen helps landscaper evolve business, create efficiency

By Ashlee Stevenson

Christopher Joyce, president of Joyce Landscaping Inc., in Cape Cod, Mass., spends the spring and summer months attending to customer needs, but the situation is different in the winter. The pace of work is slower, yet it's a time when valuable preparatory work is done for the busy warm-weather months.

Ideally, the right winter preparations help make work during the warm-weather months as efficient as possible.

That goal of expanded efficiency — and the growth opportunity it could create — was a big reason Joyce made the decision to purchase a Vermeer trommel screen in 2011.

He originally saw year-round screening as a way to make his business more efficient after having used Vermeer stump grinders for decades. With a large customer base, he saw growing demand for handling a high volume of yard waste. Having used a smaller trommel screen in the past, Joyce knew how it could benefit his daily operations.

What he didn't anticipate was the profound effect the machine would have on his business in general.

"They use it every day, and they handle a lot of material with it," said Bill McGowan, Vermeer Northeast territory manager who works with Joyce Landscaping. "They've grown quite a bit — almost doubled in size — since working with this machine."

Creating new efficiency

The ability to handle yard waste material year-round with the Vermeer trommel screen, turning it into loam soil

that can be used in landscaping projects, has not only enabled Joyce to keep his crew working 12 months a year — it's also enabled him to make more efficient use of his time when landscaping jobs pile up during warm-weather months.

"We bring in raw materials from jobsites, screen them and take them back to other jobsites," Joyce said. "For us, this trommel screen is a no-brainer because we need to screen year-round and can't shut down when it's cold or wet. We need tens of thousands of yards of this material each year, and this machine allows us to prep for landscaping jobs better. We're not paying to get rid of these raw materials since we are processing them ourselves, and we don't have to go out and buy finished, screened loam in the marketplace."

The trommel screen has not only helped generate cost savings and made Joyce Landscaping a more efficient operation, it's also added a "green" component to the company's work, a high priority for Joyce. Producing his own screened loam has helped recycle and reuse materials that he'd otherwise be disposing of differently, and paying to do so, he said.

Components that work year-round

A key component of the Vermeer trommel screen that makes it effective in making Joyce Landscaping a more efficient, green company lies in the machine's chain drive. That's what enables Joyce's yard foreman Boris Bailey to process landscaping materials — like grass clippings and mixed soils — into screened loam in sufficient quantities to meet customer needs.



"I take the grass in the summer time, mix it with topsoil, roll it in the screen throughout the year and have it ready for our customers," said Bailey, who added that he can prepare more than 15,000 cubic yards of screened loam during the off season in preparation of the following season. "The Vermeer screen is chain-driven, so the weather doesn't slow me down. It's a machine that's easy to work on, so for what we do volume-wise, this machine has been a low-maintenance way for me to handle 600 to 700 yards per day."

A valuable partnership

The partnership Joyce has forged over the years with McGowan, his Vermeer territory manager, has been a critical component to the success of his business's integration of the Vermeer trommel screen. From the day he began speaking with McGowan about the idea of purchasing a trommel screen, Joyce has watched his relationship with Vermeer open new doors for his company. He sees that trend continuing well into the future, both in terms of machinery innovation as well as general industry knowledge and expertise.

"Vermeer helped us figure out how to get a screener like this and walked us through the process of buying such a large piece of equipment, then followed up with very strong support for us," Joyce said. "Bill has always been responsive. It's a very attentive partner for us. Vermeer is a company of constant innovation and they understand our needs. We're all facing labor issues today, and Vermeer as a company really understands that. They understand how they can help as our industry is changing."

Ashlee Stevenson is product marketing lead for Vermeer Corp.

Biochar

Mulch

From page 13

collaboratively with the farming community to identify methods designed to achieve more sustainable agricultural practices,” said Ryne Raffaele, RIT’s vice president for research and associate provost. “These grants from FFAR and ESD are much appreciated as they will enable RIT researchers to look at innovative new ways to eliminate the harmful environmental impacts of landfilling and incineration when it comes to these plastic films.”

Organic agriculture

Nitrogen

From page 1

practices can help prevent the global accumulation of reactive nitrogen, which she said can threaten both people and ecosystems while causing a cascade of environmental problems.

Published this month in the scientific journal *Environmental Research Letters*, the research says that the biggest difference between organic and conventional farming is that organic farming helps reduce the buildup of reactive nitrogen by using recycled nitrogen sources like compost and other natural soil amendments.

Across all food groups, organic production releases around 50% less new reactive nitrogen to the environment.

As a companion piece to the published scientific study, The Organic Center has developed a report titled *How organic can help curb nitrogen pollution: the most overlooked cause of climate change...and most other environmental disasters*, which succinctly describes the findings and puts them into perspective with other research.

According to the report, most nitrogen doesn’t contribute to air or water pollution.

But when that nitrogen goes through a process called “fixing,” it becomes reactive. Reactive nitrogen is what’s used

for plant and animal growth.

Organic agriculture doesn’t use synthetic fertilizer. Instead, all the nitrogen on organic farms comes from recycled sources like compost, or a small amount of new reactive nitrogen from nitrogen-fixing bacteria in the roots of cover crops or other legumes.

Those same sources also build a complex and rich soil able to hold onto nitrogen longer rather than just allowing it to run off the field.

The results of this study show that not only is organic farming adding significantly less to the global pool of reactive nitrogen, it can also help put nitrogen waste that could otherwise contribute to nitrogen pollution back into food production. By using manure and food waste as fertilizer, organic helps keep nitrogen losses from other farm systems from entering the environment.

The study also points to the need for further research to improve our understanding of how organic agriculture could help reduce nitrogen loss to the environment. These include examining:

- Types of nitrogen inputs (new or recycled) used in crop production;
- Nitrogen cycling in grazing-based systems, including the impacts of rotational grazing, pasture best management practices and nitrogen fixation;
- Rates of nitrogen fixation in legumes and their role in nitrogen cycling in legume cropping systems;
- Data on crop residue recycling rates under organic management; and
- The fate of surplus nitrogen from organic amendments to quantify the share of nitrogen really lost into the environment and nitrogen accumulated in the soil.

The Organic Center said multiple studies have shown that organically managed soils are better at supporting soil health than conventionally managed soils.

For example, organic soils have greater biological activity, greater soil stability, more biomass and higher diversity than conventionally managed soils.

These soil health benefits also provide

advantages when it comes to nitrogen pollution.

Organic soils have the potential to store more nitrogen rather than losing it to leaching and runoff. The higher organic matter content allows the healthy soil to hold more positively charged molecules of mineral nutrients such as nitrogen.

This can reduce nitrogen pollution by keeping reactive nitrogen in the soils, where it can be used by crops, instead of being lost to the environment.

Organically managed soils tend to have higher water-holding capacity, porosity and aggregate stability than conventionally managed soils, which can lead to higher yields in extreme weather events such as droughts and flooding.

The bottom line: organic agriculture can help farmers maintain steady yields in the face of extreme weather events associated with climate change.

For more information, visit The Organic Center, at organic-center.org.



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