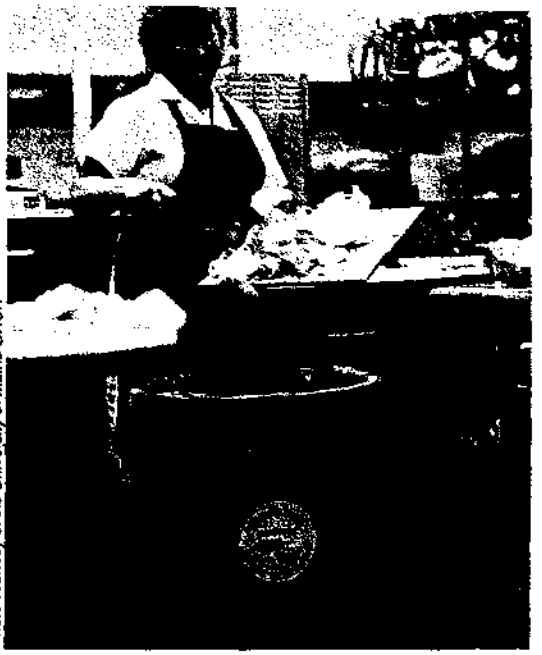

Photo courtesy of the University of Maine CRICR

Vegetative food scraps are separated by kitchen staff and collected in designated bins in each of the University of Maine's five dining facilities.

Focus On Food

BIOCYCLE SURVEY

NATIONWIDE INVENTORY OF FOOD RESIDUALS COMPOSTING

Out of 214 projects, almost half are on site at institutions. More than one-third are commercial operations, including farm-based projects.

Part II

Nora Goldstein and Dave Block

FOOD RESIDUALS composting in the United States is happening on many scales and with differing degrees of complexity. At its simplest, there are small projects at schools and institutions (and in a few cases, resorts) targeting kitchen preparation residuals — primarily vegetative and some baked goods and coffee grounds — and then composting on-site using fairly low tech methods. As they gain confidence — and if their states' regulations allow — project operators may expand into plate scrapings, taking on such feedstocks as cooked meats, sauces and soups, and soiled paper.

Moving up the scale, there are larger on-site projects handling pre and postconsumer food residuals using more complex composting systems. At the next tier are facilities that accept residuals from other generators. Some of these are strictly commercial operations, while others are based on farms and

Table 1. 1997 Food Residuals Composting Projects

Location/Composter	*Status/Technology Volume (on annual basis): Food Residuals — (Total Throughput)*[1]	*Feedstock*
ALABAMA		
Montgomery/ Alabama Correctional Facilities (5 prison sites)	Operational (1996) Static pile; n/a	Cafeteria kitchen prep; plate scrapings; soiled paper; sawdust; wood chips; animal bedding
ALASKA		
Sitka/Sitka Tribal Enterprises	Operational (1996) Aerated windrow; n/a	Fish and hatchery residuals; carcasses; wood chips
ARIZONA		
Phoenix/Western Organics Inc.	Operational Windrow; n/a	Food processing by-products; yard trimmings; biosolids; pallet scraps; recycled gypsum; manure
ARKANSAS		
Russellville/ CDR Environmental	Operational ASP; 25,000 tons (85,000 tons)	Food residuals from processors, grocery stores; yard trimmings; wood chips; paper mill sludge; biosolids
CALIFORNIA		
Arcata/North Coast Quality Compost	Operational (1993) Windrow; n/a	Kitchen prep from schools, cafeterias, restaurants; produce from distributors, supermarkets; brewery grain; yard trimmings; manure
Bloomington/California Biomass	Operational Enc. ASP (Ag-Bag); n/a	Food residuals from hotels; soiled paper; yard trimmings; wood chips
Encinitas/Solano Recyclers	Operational (1994; seasonal) Windrow; 75 tons	Food residuals from restaurants, fairgrounds/racetrack; waxed cardboard; soiled paper; yard trimmings
Fairfield/Potrerd Hills Landfill	Operational (1996) Windrow/aerated windrow; 100 tons (5,000 tons)	Kitchen prep; residuals from breweries, agricultural generators; yard trimmings, manures; animal bedding
Hollister/Herbert Ranch	Operational Aerated windrow/Lubke; 10,000 tons (25,000 tons)	Fruit/vegetable trimmings from food processors, agricultural generators; yard trimmings; manures; animal bedding

Table 1. 1997 Food Residuals Composting Projects (cont'd.)

Location/Composter	Status/Technology Volume (on annual basis)[1]	Feedstock
CALIFORNIA (cont'd.)		
Lamont/Community Recycling & Resource Recovery	Operational (1994) Windrow; 72,000 tons (200,000 tons)	Vegetative food, bakery spoils from supermarkets, restaurants, produce terminals; waxed cardboard; soiled and mixed paper; food pulper slurry; food processing by-products; yard trimmings; manures; animal bedding
Ojai/Flying Heart Farm	Operational (1995) Windrow/vermicomposting 52 cy	Precooked preconsumer food residuals from restaurants; manure; yard trimmings; wood chips
Richmond/West Contra Casa Sanitary Landfill	Operational (1994) Windrow/aerated windrow; 520 tons (15,000 tons)	Food residuals from grocery stores, restaurants, produce terminals, food processors; winery residuals; yard trimmings; sawdust
San Francisco/ San Francisco State University	Operational (1996) In-vessel (Wright); 46 tons (78 tons)	Kitchen prep; plate scrapings; napkins; wood chips
Santa Barbara/ UC-Santa Barbara	Operational (1995) ASP; 20 tons	Kitchen prep; plate scrapings; food pulper slurry; yard trimmings; sawdust; wood chips
Santa Rosa/ UC Cooperative Extension	Pilot/demonstration (1997) In-Vessel (GMT); n/a	Barbecue event plate scrapings; soiled paper; wood chips, manure
COLORADO		
Golden/A1 Organics	Operational (1994) Windrow; 750 cy	Kitchen prep from restaurants, government offices; brewery sludge; grain, cereal; yard trimmings; biosolids
CONNECTICUT		
Enfield/Connecticut Dept. of Corrections, District 1 Complex	Pilot/demonstration (1997) Windrow; 365 tons	Kitchen prep; plate scrapings; wood chips
Hartford/Connecticut DEP	Pilot/demonstration (1996) In-Vessel (GMT); 1 ton	Food residuals (including tea bags, microwave popcorn) from office; yard trimmings
Hartford/Trinity College	Construction In-Vessel (GMT) 200 tons	Kitchen prep; plate scrapings; yard trimmings; sawdust; wood chips
Lebanon/Earthgro, Inc.	Operational (1991) In-vessel (agitated bed); 30,000 tons	Food processing by-products; yard trimmings; sawdust; manure
New Milford/ New Milford Farms	Operational (1990) Aerated windrow; n/a	Food processing by-products; waxed cardboard; yard trimmings; sawdust; wood chips
Storrs/Mansfield Public Works Department	Operational (1995) Biostack compost bin; (.5 cy)	School cafeteria fruit/vegetable trimmings; leaves
FLORIDA		
Homestead/S. Dade Soil & Water Conservation District	Operational (1997) Windrow/ASP; n/a	Kitchen prep, plate scrapings from correctional facility; Brazilian pepper mulch
Lake Buena Vista/Reedy Creek Energy Services	Operational (1993) ASP; 8,030 tons	Kitchen prep, plate scrapings from theme park restaurants, hotels; wood debris; manure; animal bedding; yard trimmings; biosolids; wood chips
Orlando/Environmental Earthworm Projects, Inc.	Operational (1995) Vermicomposting; 3,360 tons	Fruit/vegetable trimmings from food processors; composted yard trimmings
GEORGIA		
Athens/University of Georgia	Pilot/demonstration (1996) Windrow; aerated windrow; vermicomposting; In-vessel (GMT) and bins; n/a	Food residuals from processors, agricultural generators; waxed cardboard; soiled paper; yard trimmings; sawdust; wood chips; manures; animal bedding; paper mill sludge; biosolids

A program in western Massachusetts diverts organics from grocery stores and other generators and then takes them to various farms for composting.

take only a limited amount of off-farm residuals. Others are operated by food processors, or take the bulk of their residuals from food processors. Some of the commercial operations represent the largest facilities listed in Table 1.

As is evident in Table 2, the bulk of the composting projects identified in BioCycle's 1997 Food Residuals Composting Survey — 187 out of 214 — fall into the categories just described. Of the remaining listings, 21 are municipal projects that take or plan to accept food residuals. Some municipal operations are fairly large as well, such as the site operated by the Blue Stem Solid Waste Agency in Cedar Rapids, Iowa. The other six projects include four involving research by universities, Cooperative Extension and a conservation district and two that are operated by nonprofit organizations, one in Chicago and the other in New York City.

The total numbers reported in this article (Part II) differ slightly from the totals contained in Part I of this report. The discrepancy is due to more accurate analysis of the projects listed (e.g. finding that some were not actually processing food residuals at this time). The numbers reported in Part II (see summary in Table 3) represent the most accurate data as of July, 1997. The total of 214 projects is broken down as follows: 176 fully operational; 22 pilot/demonstrations; six in construction; two in permitting; and eight in planning.

Part I of this report included discussions about the types of generators serviced (e.g. supermarkets, produce terminals, schools, food processors) and the feedstocks and amendments composted at the projects listed. It also looked at how states regulate these facilities. This article provides details on composting methodology and project size, tipping fees, regulatory requirements and use of structures, operational challenges, compost markets and current progress.

COMPOSTING METHODOLOGY, PROJECT SIZE

Table 4 summarizes the composting methods used by projects listed in Table 1. By far, windrows are the most popular technology

(113 operating projects). In-vessel systems are a distant second with 22 operating projects. Fourteen utilize the aerated static pile method, nine compost in aerated windrows, eight employ vermicomposting, four use low-tech bins and two compost in enclosed aerated static piles (the Ag-Bag system).

Fifteen projects use a combination of technologies. For example, Unisyn Biowaste Technology in Waimanalo, Hawaii processes about 14,000 tons/year of food residuals, grease trap waste, soiled paper, manures and other feedstocks in anaerobic digesters. After the digestion phase, the remaining material is composted in aerated static piles. Seven projects use a combination of windrows/aerated windrows. One project in Jamaica Plain, Massachusetts — located at the Franklin Park Zoo — combines four different methods with the various feedstocks it receives.

Projects reported amounts processed either in tons or cubic yards. Data was requested on food residuals throughput only, paper throughput, and the total amount of feedstocks composted at the site on an annual basis (to give an idea of what proportion food residuals represent). Amounts from those responding to this question are included in Table 1. Sixty-eight projects providing tonnage data report a total of 360,000 tons of food residuals processed. Twenty projects providing data in cubic yards report a total of 19,000 cubic yards processed.

Only a handful of the facilities listed accept large amounts of food residuals each year. Two process over 70,000 tons/year; two are in the 25,000 to 30,000 ton range. Seven handle between 10,000 and 15,000 tons and five take between 6,000 and 8,000 tons annually. Eight facilities accept between 1,000 and 5,000 tons/year, seven between 500 and 1,000 tons/year, 15 between 100 and 500 tons/year, six between 50 and 100 tons/year, 10 between 10 and 50 tons/year, and six under 10 tons/year. In short, more than half of the projects providing tonnage data process under 500 tons/year of food residuals.

Of the 20 projects reporting cubic yard (cy) throughput, one is over 5,000 cy/year, another is at 3,600 cy/year, and two take about 2,000 cy/year. Seven projects are in the 500 to 1,000 cy/year range, six are between 100 and 500 cy/year, and three are under 100 cy/year.

TIPPING FEES

The national average tipping fee, according to *BioCycle*'s State of Garbage in America Survey (April, 1997), is about $32/ton

Table 2. Summary by Type of Operator

Commercial sites (not on farms)	64
On-site at correctional facilities	52
On-site at other institutions	37
Farm-based operations	22
Municipal sites accepting food residuals	21
Sites handling food processing residuals	7
On-site commercial, resorts	5
University or conservation district research	4
Urban composters/nonprofits	2

Table 1. 1997 Food Residuals Composting Projects (cont'd.)

Location/Composter	*Status/Technology Volume (on annual basis)[1]*	*Feedstock*
GEORGIA (cont'd.)		
Atlanta/ Georgia Department of Corrections (5 prison sites)	Operational (1993) Windrow/aerated windrow; n/a	Cafeteria kitchen prep, plate scrapings from prisons, schools; waxed cardboard soiled paper; food pulper slurry; food processing by-products; yard trimmings sawdust; wood chips
HAWAII		
Waimanalo/Unisyn Biowaste Technology	Operational (1986) Anaerobic digestion/ASP 14,000 tons (21,000 tons)	Food residuals from commercial, institutional generators and food processors; grease trap waste; soiled paper; food pulper slurry; yard trimmings; wood ; chips; manures; animal bedding
ILLINOIS		
Chicago/Resource Center	Operational Windrow; n/a	Kitchen prep, plate scrapings from supermarkets, restaurants, university; waxed corrugated; yard trimmings; manures
INDIANA		
Northfield/GreenCycle Organics Recycling	Operational (1995) Windrow; 1,800 cy	Food residuals from salad manufacturer; waxed cardboard; yard trimmings; animal bedding
IOWA		
Anamosa/Iowa State Men's Reformatory	Construction Windrow; 465 tons	Kitchen prep; plate scrapings; yard trimmings
Cedar Rapids/Bluestem SWA	Operational (1990) ASP; (75,000 tons)	Food processing by-products; newsprint mixed paper; yard trimmings; wood chips; paper mill sludge; biosolids
Cedar Rapids/Kirkwood Community College	Operational (1996) Aerated windrow; .75 tons	Kitchen prep; floral trimmings; sawdust; wood chips; yard trimmings; manures; animal bedding
Des Moines/Metro Waste Authority	Pilot/demonstration (1997) Enclosed windrow; (8,000 tons)	Food residuals from produce terminals; waxed cardboard; soiled paper; yard trimmings; wood chips
Prole/Organic Technologies Corporation	Operational (1992) Windrow; 1,500 tons (35,000 tons)	Supermarket, food processing, agricultural residuals; grain; animal feed; soiled paper; waxed cardboard; manure; yard trimmings; sawdust; wood chips animal bedding
KANSAS		
Lawrence/University of Kansas	Pilot/demonstration (1997) Windrow; n/a	Kitchen prep from dormitory; animal bedding
MAINE		
Addison/Elliott Batson	Operational Windrow; 500 cy	Seafood processing residuals; sawdust; yard trimmings
Augusta/Hatch Hill Project	Operational (1991) Static pile; (300 tons)	Kitchen prep from school; leaves
Blaine/Smith Farms	Operational (1990) Windrow; (700 tons)	Food processing by-products from agricultural generators; sawdust; wood chips
Eliot/Bartlett Farm Services, Inc.	Operational Windrow inside greenhouse; (7,800 cy)	Manure; ground newspaper; yard trimmings; brush chips; bone gel; plans for food residuals
Fort Fairfield/Fort Fairfield Compost Facility	Operational Windrow; n/a	Cull potatoes; wood ash; sawdust; paper mill sludge; biosolids
Freedom/ Walter Lamont	Operational Windrow; 500 cy	Sea urchin residuals; sawdust
Gouldsboro/Duerr Bros. Landscaping	Operational Windrow; n/a	Herring, salmon, sea urchin residuals; yard trimmings; sawdust
Jonesport/ Arnold Pearlman	Operational Windrow; n/a	Fish processing residuals; sawdust

Table 1. 1997 Food Residuals Composting Projects (cont'd.)

Location/Composter	Status/Technology Volume (on annual basis)[1]	Feedstock
MAINE (cont'd.)		
Liberty/J&L Compost	Operational Windrow; n/a	Seafood residuals; sawdust
Lisbon/Ricker Farm	Operational (1995) Windrow; 95 tons (230 tons)	Kitchen prep, paper napkins, towels from college cafeterias; leaves; manure
Machias/Maine Wild Blueberry Co.	Operational Windrow; 250 cy	Blueberry processing residuals; herring cuts; leaves
Marion Township/ Washington County/ Coast of Maine	Operational (1993) Windrow; 450 cy	Salmon, mussel, herring residuals; yard trimmings; sawdust; manure
Monmouth/Chick Orchards	Operational (1993) Aerated windrow; 500 cy	Apple pomace; yard trimmings; manure
Montville/C.B. Company	Operational (1995) Windrow; 900 cy	Sea urchin residuals; sawdust
New Sharon/Cape Cod School	Operational (1996) Static pile in bins; n/a	Kitchen prep; straw; leaves; hay
New Sharon/Living Acres	Operational (1980) ASP; 600 tons	Food processing by-products; sawdust; manure; animal bedding
Orono/ University of Maine	Operational (1993) Windrow; 30 tons (1,700 cy)	Kitchen prep, plate scrapings from dining halls, other food services on campus; yard trimmings; lumber scraps; wood chips; animal bedding; manure
Pittston/Webb Family Farms	Operational Windrow; 750 cy	Mussell residuals; sawdust; manure
Plymouth/Soil Preparation, Inc.	Operational In-vessel (ROT Box); n/a	Fish residuals; septage; wood chips
Presque Isle/ Aroostook Cull Potato Compost Project	Pilot/demonstration; Windrow; n/a	Cull potato residuals; sawdust
Rockport/Land & Sea Composting	Operational; Windrow; 500 cy	Mussel and fish residuals; manure; yard trimmings
Southwest Harbor/ Doug Gott & Sons	Operational Windrow; n/a	Crab chum; sawdust
Southwest Harbor/ EMR, Inc.	Operational Windrow; n/a	Crab chum; sawdust
Stonington/ Carl Woodward	Operational Windrow; n/a	Crab chum; sawdust
Thorndike/Knox Ridge Holstein Farm	Operational (1994) Windrow; 400 tons	Fish residuals; food processing by-products; manure; animal bedding
Windham/Maine Correctional Center	Operational (1993) Windrow; 300 cy	Food residuals from supermarkets, prison cafeteria; manure; yard trimmings; wood chips; animal bedding
MARYLAND		
Eden/Banks of Eden Farm	Operational (1994) Vermicomposting; 480 cy	University cafeteria plate scrapings; seaweed; wood ash; algae ; DAF (from poultry processing); yard trimmings
Gambrills/Top Pro	Operational (1990) Static pile; 877 tons	Food residuals from produce terminals; tea grounds; waxed cardboard; yard trimmings; wood chips
Hurlock/New Earth Services, Inc.	Operational (1992) Windrow; 11,000 tons (22,000 tons)	Food residuals; brewery grain; crab chum; sawdust; wood chips; manure
MASSACHUSETTS		
Amesbury/ Agresource, Inc.	Operational Windrow; n/a	Seafood processing by-products; yard trimmings; sawdust; manure; biosolids
Amherst/University of MA-Amherst	Operational (1996) In-vessel (Wright)/windrow; 200 tons	Kitchen prep; plate scrapings; plant cuttings; soil from greenhouse; yard trimmings; sawdust; wood chips; manure; animal bedding

Table 3. Survey Totals

Operational	176
Pilot/Demonstration	22
Construction	6
Permitting	2
Planning	8
Total Projects	214

(1996 data), down from $34/ton in 1995. Regionally, tipping fees vary from a low of $20 in the Rocky Mountain states to a high of $54 in the mid-Atlantic region. And trends are pointing to even lower tipping fees in some areas. In New Jersey, for example, it is expected that the flow control system that has kept tipping fees in the $100/ton range will be dismantled by October, 1997. Some in the waste management industry are predicting tipping fees will fall to the $50/ton to $60/ton range. "The savings may become less appealing for some generators who currently participate in source separation and composting programs," says Steven Fass of Refuse Environment Services, who has worked with many generators to set up organics diversion programs. Clearly, the trend toward lower fees narrows the range that composting facilities can charge.

Out of 40 facilities reporting their per ton tipping fees, 10 are in the $10 to $20/range, 11 are between $21 and $30/ton and 10 are between $31 and $40/ton. Four are in the $41 to $50/ton range and two report tipping fees between $51 and $75/ton. Only three projects charge tipping fees below $10/ton.

Thirteen projects provided per cubic yard tipping fee information. The bulk — nine facilities — are below $10/cy. Three are in the $10 to $20/cy range and one is $22/cy.

REGULATORY REQUIREMENTS, COMPOSTING STRUCTURES

Many food residuals composting projects — especially those on-site at institutions or on farms — often only have to meet basic environmental management requirements (e.g. managing surface runoff and having an adequate pad to protect against groundwater contamination) to receive permission from the state to start an operation. In some cases, these types of sites might have to comply with a quantity limit to be in this minimum regulatory status. A number of states also have streamlined the permitting process for commercial-scale facilities handling source separated organics — typically preconsumer vegetative residuals, yard trimmings, manures and some paper streams. These sites might have to meet another level of environmental control, such as putting in a paved surface or gravel pad, or a leachate control system.

The survey asked project operators to indicate which requirements they had to meet to operate their facilities. Of those responding to this question, 48 checked off leachate/surface runoff control and 34 had to comply with a specified annual quantity

limit. Twenty-seven operations needed to put in a paved or gravel pad and 10 had to build total enclosures of their composting areas (active and/or curing). Seven covered the compost areas (i.e. roofs only). Nineteen are required to incorporate food residuals within a specified time into the pile (e.g. 24 hours after delivery). This is done primarily for odor and vector management, as well as leachate control. Odor control steps were required to be taken at 17 sites.

Project managers listed other requirements that were not on the survey form. These included installing a clay liner under the composting surface; testing wells; only being allowed to compost food residuals generated on-site; planning for dust control; and having the site inspected. One project is required to screen compost to ensure there are no food particles before it leaves the composting pad. Facilities in Texas have to comply with pathogen reduction requirements.

Primarily because of wanting protection from the weather but also because of odor management and possible regulatory compliance, composting facilities will put up open-side buildings or totally enclosed structures. The survey form asked for information about the installation of structures at food residuals composting sites. Of those responding, 58 said they had no structures at all. Forty-one said they had structures for the following aspects of their operation: Feedstock receiving and mixing (25); active composting (31); amendment storage (15); curing (25); screening (22); and end product storage (19).

OPERATIONAL CHALLENGES

Operators reported a wide range of challenges at their facilities, but in only a few cases have they led to significant site management problems. Contaminants in incoming feedstocks were cited most frequently (41). When asked to specify, almost each respondent indicated they were getting some form of plastic in their feedstock. This included plastic cutlery, film, netting from produce, milk bags, swizzle sticks and straws, bags and gloves. The only non-plastic contaminant mentioned was rocks in the yard trimmings!

The second most significant challenge —

At the University of Maine composting site, students unload food residuals into the center of a windrow then build the rest of the pile on top of them.

Table 1. 1997 Food Residuals Composting Projects (cont'd.)

Location/Composter	*Status/Technology Volume (on annual basis)[1]*	*Feedstock*
MASSACHUSETTS (cont'd.)		
Bolton/Agracomp, Inc.	Operational Windrow; n/a	Produce, bakery residuals; yard trimmings; manure
Forestdale/Watts Family Farms	Operational (1993) Windrow; 300 cy	Restaurant kitchen prep; aquaculture residuals; yard trimmings; sawdust; wood chips; manure; animal bedding
Greenfield/Martin's Farm	Operational (1996) Windrow; n/a	Supermarket, restaurant, school and produce terminal food and seafood residuals; waxed cardboard; soiled paper; newsprint; mixed paper; yard trimmings; sawdust; wood chips; manure
Hadley/Food Bank Farm	Operational Windrow/static pile; 30 tons	Produce residuals; leaves; organics dropped off by residents
Ipswitch/Appleton Farms	Operational (1986) Windrow; 3,600 cy	Shrimp and crab shells; seaweed; apple pomace; manure
Jamaica Plain/Greenleaf Composting Co., Inc.	Operational (1993) Windrow/ASP/aerated windrow/ vermicomposting; 500 tons	Restaurant, university kitchen prep, plate scrapings; food pulper slurry; yard trimmings; wood chips; manure from zoo; animal bedding
Northampton/Center for Ecological Technology (on farms)	Operational (1996) Windrow; (4,428 tons)	Fruit/vegetable trimmings from supermarkets, produce terminals; kitchen prep, plate scrapings from schools, hospitals; waxed cardboard; newsprint; mixed paper; food pulper slurry; food processing by-products; yard trimmings; sawdust; wood chips; manure; animal bedding
Northampton/Smith Vocational Agricultural High School Farm	Operational (1994) Windrow; (1,800 tons)	Fruit/vegetable trimmings from supermarkets; food and soiled paper from hospitals, schools; kitchen prep from restaurants; waxed cardboard; yard trimmings; manure; animal bedding
Shelburne Falls/ Vipassana Meditation Center	Operational (1997) In-Vessel (GMT); 2.25 tons	Kitchen prep; plate scrapings; sawdust
Springfield/Full Cycle Composting Inc.	Operational (1997) Windrow; n/a	Food processing residuals; yard trimmings
Westminster/Mass Natural Fertilizer Co.	Operational (1987) Windrow; n/a	Food processing by-products; seafood; paper mill sludge; brewery sludge; manure; wood chips; animal bedding
MICHIGAN		
Ann Arbor/University of Michigan	Pilot/demonstration (1997) Windrow; n/a	Fruit/vegetable trimmings, coffee grounds, egg shells from three residence halls; yard trimmings
Mackinac Island/ Mackinac Island DPW	Operational (1993) ASP; (3,000 cy)	Kitchen prep, plate scrapings from restaurants, hotels; soiled paper; yard trimmings; manure
MINNESOTA		
Benson/Swift County	Operational (1990) Aerated windrow; (3,600 tons)	Food residuals from restaurants, supermarkets, hotels; residential organics; waxed cardboard; soiled paper; yard trimmings; wood chips
Graceton/Lake of the Woods County	Operational (1990) Windrow; (1,200 tons)	Food residuals from ICI generators; residential organics; waxed cardboard; soiled paper, newsprint; mixed paper; yard trimmings; sawdust; wood chips; manure; animal bedding
Hutchinson/City of Hutchinson	Operational (1995) In-vessel (NaturTech); n/a	Supermarket residuals; soiled paper; manure; wood shavings/chips; leaves

Table 1. 1997 Food Residuals Composting Projects (cont'd.)

Location/Composter	Status/Technology Volume (on annual basis)[1]	Feedstock
MINNESOTA (cont'd.)		
Mankato/South MN Composting Co.	Operational (1996) Windrow/In-vessel (NaturTech); 625 tons (5,000 tons)	Fruit/vegetable trimmings, baked goods from restaurants and institutional generators; processed food residuals; grain waste; yard trimmings; sawdust; wood chips
Preston/Fillmore County RRC	Operational (1992) Aerated windrow; 2,400 tons	Food residuals from commercial, institutional generators (including liquids); residential organics; soiled paper
St. Paul/ SKB Environmental	Construction Enc. ASP (Ag-Bag); (10,000 tons)	Fruit/vegetable trimmings and/or kitchen prep from commercial generators; soiled paper
MISSOURI		
Aurora/Environmental Concepts & Design	Pilot/demonstration Windrow; 1,750 tons	Egg shells from farms, hatcheries; yard trimmings; wood chips
Springfield/ City of Springfield	Planning (pilot) Windrow; n/a	Residuals from produce terminals, food processors; yard trimmings; wood chips
St. Louis/St. Louis Produce Market	Planning In-vessel (NaturTech); 1,500 tons	Residuals from produce terminals; wood chips
Whiteman Air Force Base/ Whiteman AFB	Operational (1996) In-vessel (Ag-Renu); 200 tons (1,200 tons)	Kitchen prep; plate scrapings; residuals from base grocery store; shredded paper; nonrecyclable OCC; yard trimmings
NEW HAMPSHIRE		
Belmont/ Belmont High School	Pilot/demonstration (1995) Bins; n/a	Kitchen prep from school; leaves
Epping/ERRCO	Operational (1996) Static pile; n/a	Kitchen prep, plate scrapings from schools; soiled paper; yard trimmings
Hanover/Dartmouth College	Construction In-vessel (ROT Box); n/a	Food residuals from supermarkets, produce terminal; kitchen prep, plate scrapings from schools, university; waxed cardboard; soiled paper; yard trimmings; biosolids
Keene/Keene Transfer Station	Operational (1995) Windrow; 25 tons (825 tons)	University kitchen prep; yard trimmings
Nashua/PK's Nursery	Operational (1994) Windrow/In-vessel (prototype); n/a	Fruit/vegetable trimmings from supermarkets; kitchen prep, plate scrapings from restaurants; newsprint; mixed paper; yard trimmings; wood chips; manures
New Boston/New Boston Central School	Pilot/demonstration Bins; n/a	Kitchen prep from school; leaves
NEW JERSEY		
Egg Harbor Twp./Atlantic County Utilities Authority	Planning pilot Windrow; n/a	Food residuals from supermarkets; yard trimmings
Freehold/American Soil, Inc.	Operational Windrow; n/a	Fruit/vegetable trimmings from supermarkets, food processors; waxed cardboard; soiled paper; yard trimmings
Mount Holly/ Burlington County	Construction In-vessel (IPS); (53,000 tons)	Food residuals; yard trimmings; biosolids
Newark/Newark Recycling & Composting Co.	Planning In-vessel; n/a	Food residuals from ICI generators; waxed cardboard; soiled, mixed paper; food pulper slurry; yard trimmings; sawdust; wood chips; biosolids
Wrightstown/ Woodhue, Ltd.	Operational (1985) Windrow; 75,400 tons (117,500 tons)	Fruit/vegetable trimmings, deli, nonmeat foods from supermarkets, produce terminal, military base; food processing by-products; waxed cardboard; soiled paper; newsprint; mixed paper; yard trimmings; wood chips; sawdust

checked off by 32 projects — was the weather, e.g. freezing conditions or getting excess moisture. Also ranked higher were generator education/training (23), odors during composting (22), getting the product dry enough to screen (19) and high moisture in incoming feedstocks (17). Other issues are compost marketing (13), equipment breakdown (12), setting competitive tip fees (11), odor in incoming feedstocks (11), vectors (10) and public acceptance of the site (10).

Operators listed other challenges that weren't on the survey list. These include: educating the public about the separation and composting process; keeping the material wet enough (and conversely, said another, controlling moisture!); keeping the costs down; coordinating collection with delivery to the composting site; inadequate bin size for the current throughput; having enough compost to meet demand; availability of spare parts for an in-vessel system and getting timely service from the vendor; maximizing space in the facility; and operator training.

COMPOST MARKETS

Given the pool of composting projects in this 1997 inventory, it is not surprising that compost used on-site by the institution or resort (48) or applied on the farm (37) ranked high among the responses given to a question about compost markets and end users. Also high on the list was compost marketed to landscapers (53). Forty projects checked off selling compost directly to the public, 37 sell to nurseries, 26 direct it to public works projects and 23 sell compost to soil blenders. Many projects market to any combination of the above end users (i.e. landscapers, nurseries, soil blenders, the public, etc.). Because individual correctional facilities didn't respond directly from states where there are multiple projects (e.g. Georgia and New York), it is likely that the "used on-site by the institution" category is substantially higher — probably closer to 80.

Out of 33 facilities providing compost pricing data, 25 sell compost for under $20/cy. Thirteen are in the $15 to $19/cy range, seven are between $10 and $14/cy, and five sell for under $10/cy. The highest price mentioned was $98/cy, while the remaining projects were between $20 and $35/cy. Only nine projects gave a dollar/ton figure for compost pricing. Five were $10/ton or under and three were between $20 and $35/ton. One project reports it sells its compost for $100/ton.

The survey asked operators what the annual compost production rate is at their site. Thirty-one supplied an answer, ranging from highs of 250,000 cy, 150,000 cy and 100,000 cy to lows of 42 cy, 5 cy and 3 cy. The total amount reported is 814,250 cy/year of compost produced.

CHECKING THE PROGRESS

BioCycle has been tracking developments with food residuals composting for over five years. Our initial focus was on grocery re-

Photo courtesy of Southern Minnesota

Fruit and vegetable trimmings, baked goods, processed food residuals, grain waste, yard trimmings, sawdust and wood chips are composted in NaturTech containers at a composting site in Mankato, Minnesota.

tailers and produce terminals — two sectors that had done some studies and identified that a significant portion of their waste stream could be separated fairly easily and directed to composting. The potential for diversion seemed astounding at the time. A 1991 report by the Grocery Industry Committee on Solid Waste's Composting Task Force concluded that the industry as a whole is a larger producer of unsalable food products that are potentially very compostable. When tallied, the report estimated that food residuals plus wet and waxed corrugated from retailers alone accounts for 6.6 million tons/year of waste. A typical store was said to produce 1,000 to 1,500 pounds/week of organic food materials from produce alone. At the time, produce terminals and fresh food processors (e.g. salad manufacturers) also were cited as excellent candidates for organics diversion.

Much of the composting industry's initial focus, therefore, was on these sectors of generators. While some grocery chains established source separation programs, their development never really materialized on the scale expected. One major stumbling block was inadequate composting capacity within a reasonable distance from high concentrations of generators. "Right after the grocery industry study, many stores were willing to take a look at it," says Steve Fass. "Some stores flat out succeeded, some did okay, and others were net losers. But overall, we haven't seen any momentum develop among generators. I think it would have been a whole different story if there were facility capacity on line. The generators are there, the food waste is there and there is a collection infrastructure."

In some regions, however, grocery stores have gotten involved in programs. Despite the anticipated drop in tipping fees in New Jersey, a core group of grocery stores continues to divert organics to several composting sites. Over 750 stores are participating in a program in southern California. In Maine, Hannaford Bros. Co. is diverting grocery residuals to both composting and animal feed operations. The company recently bought a chain of stores in the south and expects to establish organics diversion programs there as well. In Wisconsin, three Erickson's Diversified Corporation's More 4

Table 1. 1997 Food Residuals Composting Projects (cont'd.)

Location/Composter	*Status/Technology Volume (on annual basis)[1]*	*Feedstock*
NEW YORK		
Baldwinsville/ Anheuser-Busch Co.	Operational (1989) In-vessel (IPS); 14,000 tons	Brewery residuals; sawdust
Bronx/Metropolitan Transfer Station	Pilot/demonstration In-vessel (DBS); n/a	Restaurant kitchen prep; wood chips
Bronx/St. Barnabus Hospital	Operational In-vessel (Wright); 75 tons (110 tons)	Kitchen prep; plate scrapings; soiled paper; wood chips
Buskirk/Wilmot Farms/ Agricycle	Operational Windrow; 5,200 cy (17,000 cy)	Grocery store food residuals; waxed cardboard; manure; paper mill sludge; yard trimmings
Centerport/Assoc. For Resource Conservation (on farms)	Operational (1996) Windrow; 500 tons	Fruit/vegetable trimmings from produce terminals; bakery sludge; yard trimmings
Claryville/Frost Valley YMCA Camp	Operational (1991) Windrow/ASP; 71.5 tons	Kitchen prep, plate scrapings from camp; sheet rock scraps; waxed cardboard; soiled paper; yard trimmings; wood chips; manure; animal bedding
Claverack/Terra Nova (on farms)	Operational Windrow; n/a	Supermarket food residuals; yard trimmings
East Hampton/ Town of East Hampton	Operational In-vessel (IPS); n/a	Food residuals from commercial and institutional generators, residents; soiled paper; newsprint; mixed paper; yard trimmings; biosolids
Flushing/New York Flushing Hospital	Pilot/demonstration (1996) In-vessel (GMT); 20.9 tons	Cafeteria kitchen prep; plate scrapings; newsprint; mixed paper; sawdust; wood chips
Flushing/New York Hospital Medical Center of Queens	Operational (1995) Vermicomposting; n/a	Preconsumer fruit, vegetable trimmings; newsprint; mixed paper; sawdust
Ithaca/Ithaca College	Operational (1993) ASP; 150 cy	Kitchen prep, plate scrapings (including liquids); sawdust; wood chips
Loudonville/Capital Compost & Waste Reduction	Planning In-vessel (Wright); 7,000 tons (10,500 tons)	Food residuals from commercial, institutional generators; waxed cardboard; soiled paper; yard trimmings; wood chips
Malone/Grasslands, Inc.	Operational (1996) Enc. ASP (Ag-Bag); 900 tons	Food and soiled paper from restaurants, resorts, schools, supermarkets, university; cotton mattresses from prison; waxed cardboard; soiled paper; newsprint; mixed paper; wood chips; manure
Manhattan/Lower East Side Ecology Center	Operational (1991) Windrow/vermicomposting; 24 tons	Food residuals (voluntary dropoff); sawdust
Millerton/McEnroe Organic Farms Assoc.	Operational Windrow; 1,800 cy	School kitchen prep; animal bedding
New Paltz/Mohonk Mountain House Resort	Operational (1992) Windrow; 100 tons (250 tons)	Kitchen prep; plate scrapings; yard trimmings; sawdust; wood chips; manure; animal bedding
NY State Department of Corrections (30 prison sites serving 47 prisons)	Operational (1990) 27 Windrow; 3 ASP; 6,059 tons (10,250 tons); 1 ASP in construction; In-vessel (Wright) in planning	Prison cafeteria kitchen prep; plate scrapings; waxed cardboard; soiled paper; newsprint; mixed paper; yard trimmings; wood chips; manure
Oswego/Oswego County	Operational (1991) Windrow; 150 tons (850 tons)	Salmon residuals from sports fishing; wood chips; paper mill sludge
Rikers Island/ New York City Dept. of Sanitation	Operational (1996) In-vessel (IPS); n/a	Kitchen prep, plate scrapings from prison cafeterias; waxed cardboard; soiled paper; yard trimmings; wood chips
Rochester/Rochester Institute of Technology	Pilot (1994) Static pile; 7 cy (10 cy)	Fruit/vegetable trimmings from university kitchen; sawdust; wood chips

Table 1. 1997 Food Residuals Composting Projects (cont'd.)

Location/Composter	Status/Technology Volume (on annual basis)[1]	Feedstock
NEW YORK (cont'd.)		
Skaneateles/Blue Heron Compost Facility	Operational (1993) Windrow/ASP/static pile; 6,000 tons (7,000 tons)	Food residuals from commercial, institutional generators; brewery residuals; waxed paper; yard trimmings; manure; animal bedding; paper mill sludge
Staten Island/ The Parsonage	Operational (1996) In-vessel (GMT); 6 tons	Restaurant kitchen prep; sawdust; wood chips
NORTH CAROLINA		
Asheville/Buncombe Solid Waste Dept.	Pilot/demonstration Windrow; n/a	Fruit/vegetable trimmings from produce terminals; food processing by-products; mixed paper; yard trimmings; wood chips
Balsam Grove/Hoover Aquatic Farms	Operational (1993) ASP; (186 cy)	Fish mortalities and processed fish residuals; sawdust; wood chips
Le Jeune/Camp Le Jeune	Pilot/demonstration Windrow; 390 tons (1,400 tons)	Military base kitchen prep, plate scrapings; waxed cardboard; yard trimmings; manures
Lincolnton/National Fruit Co.	Operational (1986) Windrow; n/a	Apple culls from orchard; wood chips; manure
Vandemere/Bayboro Dehydrating Company	Operational Windrow; n/a	Crab and fish processing residuals; newsprint; mixed paper; yard trimmings
OHIO		
Brooklyn Heights/Rosby Resource Recovery	Operational (1997) Windrow; n/a	Fruit/vegetable trimmings from produce terminal; shredded pallets; waxed cardboard and OCC; yard trimmings
Huron/Barnes Nursery	Pilot Windrow; 49.5 tons	Food processing residuals; waxed cardboard; soiled paper; yard trimmings; wood chips; manures; animal bedding
OREGON		
Arlington/Waste Management of OR	Operational (1997) Windrow; 2,000 tons	Food residuals from commercial, institutional generators, food processors; waxed cardboard; soiled paper; yard trimmings; wood chips; biosolids
Oregon City/Oregon Soils Corp.	Operational (1991) Vermicomposting; 15,000 tons	Supermarket kitchen prep; waxed cardboard; yard trimmings
PENNSYLVANIA		
Jermyn/Lackawanna Conservation District	Pilot/demonstration (1995) Windrow; 15 tons (40 tons)	Vegetative and bakery residuals from grocery stores; university kitchen prep; manure; animal bedding
New Cumberland/ New Cumberland Defense Supply Depot	Pilot/demonstration (1997) ASP; n/a	Kitchen prep from defense installation, prison; wood chips
Pittsburgh/AgRecycle	Permitting Windrow; n/a (Currently composts yard trimmings)	Supermarket, produce terminal residuals; food processing by-products soiled paper; newsprint; mixed paper; yard trimmings; wood chips; landscape debris; paper mill sludge
Slippery Rock/Slippery Rock University	Pilot/demonstration (1996) Windrow; n/a	Campus cafeteria food residuals (including dough)
RHODE ISLAND		
Charlestown/Earth Care Farm	Operational Aerated windrow; (6,000 tons)	Fish processing residuals; yard trimmings; manure; animal bedding
SOUTH CAROLINA		
Florence/JWH Industries	Operational (1993) Vermicomposting; n/a	Farmer's market fruit, vegetables, corn stalks; waxed cardboard
TENNESSEE		
Nashville/State Dept. of Corrections (five prison sites)	Operational (1995) Windrow; n/a	Food residuals from cafeterias; sawdust; finished compost; straw
TEXAS		
Austin/Del Valle Correctional Facility	Operational (1997) In-vessel (Wright); 146 tons (200 tons)	Kitchen prep; plate scrapings; soiled paper; wood chips

grocery stores in Wisconsin have been participating in a pilot.

A demonstration program underway in San Francisco, which originally started out targeting produce markets, expanded collection to grocery stores. "Five different grocery store chains are participating now, with at least 10 individual stores," says Amy Ma, organics recycling associate in the San Francisco recycling office. "We hope to expand collection to restaurants in the fall." About 1,000 tons of produce from about 30 produce markets and retailers were diverted between June, 1996 and April, 1997.

In Portland, Oregon, the Metro waste department launched a commercial organics pilot earlier this year. The agency teamed up with Waste Management Inc. of Oregon, Oregon Soils Corp., and generators to collect and compost organic residuals. Over the course of the 12-month pilot, 1,000 tons of vegetative food residuals will be collected from grocery stores, produce distribution centers, restaurants and institutional kitchens. Waste Management of Oregon is experimenting with approaches to collection of compostables from 37 Safeway stores and transport to an outlying open-air compost operation. The compostable material is back-hauled by the grocery chain to its distribution center, where it is collected and taken to a Metro transfer station for inspection and then reloaded into transfer trailers. Next, the material is transported to the company's yard trimmings composting site in Arlington. Oregon Soils Corp., a vermicomposting operation, will collect fruit and vegetables residuals from area grocery stores and mix it with yard trimmings.

Texas expects to see growth in the diversion of commercial organics as more private composters and municipal programs are taking advantage of the state's new regulations that make it fairly simple to compost vegetative residuals. "I do see an expansion of the composting industry in Texas since a year ago," says Scott McCoy of the Texas Natural Resource Conservation Commission. "As the message gets out, we see more

Table 4. Composting Methods

Operational, Pilot/Demonstration	
Windrow	113
In-Vessel	22
Aerated static pile	14
Static pile	11
Aerated Windrow	9
Vermicomposting	8
Bins	4
Enclosed ASP	2
Combination of methods	15
Construction, Planning, Permitting	
In-Vessel	8
Windrow	4
Enclosed ASP	2
Aerated static pile	1
Static pile	1

and more composting happening. In just Austin alone, there are a half-dozen new businesses in composting showing up. Primarily, they are processing wood, yard trimmings, vegetative materials and manure."

MUNICIPAL CONNECTION

While the bulk of food residuals composting activity is being done by private firms, farmers and institutions, there is an increasing trend of municipal programs expanding into handling food residuals (versus initiating pilots that contract with private companies for composting). For example, the City of Hutchinson, Minnesota started a biosolids composting project several years ago using the NaturTech container technology. In May, 1997, Hutchinson received a $100,000 grant from the Minnesota Office of Environmental Assistance to test the feasibility of collecting and composting food residuals. The grant is paying for the containers and collection. "Starting in July, food residuals will be collected from two grocery stores, plus two employee cafeterias at 3M and one at Hutchinson Technology," says Gary Plotz, city manager. Ground wood from pallets accepted by the city from 3M will be mixed with the food residuals. In September, the program will expand to pick up food residuals from four school cafeterias. Next spring, households are scheduled to be added.

In Texas, several cities have branched out

Table 1. 1997 Food Residuals Composting Projects (cont'd.)

Location/Composter	*Status/Technology Volume (on annual basis)[1]*	*Feedstock*
TEXAS (cont'd.)		
Austin/The Summit	Operational (1996) Windrow; 78 cy	Assisted living center's kitchen prep; waxed cardboard; soiled paper; wood chips
Austin/Texas Disposal Systems	Operational Windrow; n/a	Residuals from produce terminals; sugar water from pharmaceutical company; shredded paper from IRS; yard trimmings
Big Springs/City of Big Springs	Operational (1993) Windrow; (3,000 cy)	Kitchen prep, plate scrapings from detention center; soiled paper; yard trimmings; wood chips
Brownsville/City of Brownsville	Operational Windrow; n/a	Onions, onion skins from packing houses; yard trimmings
Fort Worth/Silver Creek Materials Inc.	Operational Windrow; 13,375 tons (80,000 tons)	Supermarket residuals; liquids: beer, wine, liquor, milk, juices, sodas, vinegar; food processing by-products; waxed cardboard; soiled paper; newsprint; mixed paper; yard trimmings; sawdust; wood chips; manure
Gladwater/Vital Earth Resources	Operational (1971) In-vessel (Eweson); n/a	Brewery residuals; newsprint; mixed paper; manure; biosolids
Houston/Natures Way Resources	Planning Static pile; n/a (currently composts non-food, non-paper feedstocks listed)	Food residuals from supermarkets, restaurants (including liquids); waxed cardboard; soiled paper; yard trimmings; wood chips; manure; land clearing debris
Plano/City of Plano Solid Waste Dept.	Operational Windrow; n/a	Food/vegetable, floral trimmings; yard trimmings

Table 1. 1997 Food Residuals Composting Projects (cont'd.)

Location/Composter	Status/Technology Volume (on annual basis)[1]	Feedstock
TEXAS (cont'd)		
San Antonio/ Gardenville Fertilizer Co.	Operational (1988) Static pile; 8,000 tons	Food processing, brewery residuals; waxed cardboard; yard trimmings; sawdust; wood chips; manure; animal bedding
Wichita Falls/City of Wichita Falls	Operational (1995) Windrow; (10,000 tons)	Beverages from bottlers, juice producers; newsprint; mixed paper; yard trimmings; sawdust; wood chips; manure; animal bedding; biosolids
UTAH		
Provo/Brigham Young University	Operational (1993) Windrow; n/a	Kitchen prep; plate scrapings; waxed cardboard; soiled paper; wood chips
VERMONT		
Burlington/Intervale Foundation	Operational (1988) Windrow; 2,500 tons (8,500 tons)	Food residuals from commercial, institutional generators; liquid residuals from ice cream plant; soiled paper; food pulper slurry; yard trimmings; sawdust; wood chips; manure; animal bedding
Colchester/St. Michaels College	Operational Windrow; n/a	Kitchen prep; yard trimmings
Craftsbury Common/ Sterling College	Operational (1995) Windrow; 8 tons	Kitchen prep; plate scrapings; manure; animal bedding
Middlebury/Middlebury College	Operational (1997) Windrow/ASP; 275 tons	Kitchen prep from cafeterias, catering; plate scrapings; liquids; waxed cardboard; soiled paper; newsprint; mixed paper; food pulper slurry; yard trimmings; sawdust; wood chips; manure; animal bedding
Montpelier/Vermont Compost Company	Operational Windrow; (350 tons)	High-strength dairy residuals; wood chips; manure
Stowe/Trapp Family Lodge	Operational (1994) Aerated windrow; 110 tons	Food from lodge (tea room, kitchen and bakery); leaves and brush; sawdust; wood chips; manure; animal bedding
Vergennes/Basin Harbor Club	Operational Windrow; 65 tons	Kitchen prep; plate scrapings; yard/landscape trimmings; manure; animal bedding
VIRGINIA		
Charlottesville/Rivanna Water & Sewer Auth.	Permitting Enc. ASP (Ag-Bag); n/a	Supermarket, restaurant, university kitchen prep; plate scrapings; food processing residuals; waxed cardboard; soiled paper; newsprint; mixed paper; yard trimmings; wood chips
WASHINGTON		
Leavenworth/ Sleeping Lady	Operational (1995) In-vessel (GMT); 8 tons	Restaurant kitchen prep, plate scrapings; wood chips
North Bend/Echo Glen Children's Center	Operational (1995) Covered ASP; 68 tons	Kitchen prep; plate scrapings; soiled paper; wood shavings
Oak Harbor/Naval Air Station Whidbey Island	Planning In-vessel; n/a	Military base food residuals
Pullman/Washington State University	Operational (1994) Windrow; 170 tons (9,000 tons)	Kitchen prep; plate scrapings; food processing by-products; coal ash; greenhouse debris; yard trimmings; wood chips; manure; animal bedding; biosolids
Puyallup/Land Recovery, Inc.	Operational (1997) In-vessel (NaturTech); 10,000 tons	Food residuals from commercial, institutional generators; waxed cardboard; yard trimmings
Seattle/Cedar Grove Compost Co.	Operational (1989); ASP; (175,000 tons)	Preconsumer food residuals from supermarkets, restaurants; waxed cardboard; newsprint; mixed paper; food pulper slurry; wood crates; yard trimmings

Watermelon, newsprint and other organic materials are diverted from C&S Wholesale Produce in N. Hatfield, Massachusetts to a local farm.

into food residuals at their yard trimmings sites. The city of Plano has arranged with private haulers to collect commercial vegetative materials from five Tom Thumb grocery stores and bring them to its municipal composting site. Brownsville, Texas accepts onions and onion skins from packing houses at its yard trimmings site.

Wichita Falls, Texas took the extra step to accommodate bottlers, beer and wine distributors and other liquid waste generators in the city who no longer could dispose of residuals in the landfill. The city operates a 4,000 ton/year yard trimmings composting facility at its landfill. After some experimentation, Wichita Falls installed a concrete pad with a trench grate floor drain. Packaged liquids (in bottles, cans and plastic bottles contained sometimes in cardboard boxes) are crushed on the pad. Aluminum cans are recovered for recycling; cardboard is diverted to composting. "In our first year and a half, we have processed over 82,000 gallons (345 tons) of juice, beer and soft drinks," says David Lehfeldt with the city. "Our revenues have fully paid for the construction and operational costs of the program." An article on this project will appear in an upcoming issue of *BioCycle*.

FUTURE DIRECTIONS

As the results of the 1997 Food Residuals Composting Survey indicate, the diversion of separated organics from institutional, commercial and industrial generators is alive and well. Food residuals composting is being tried and succeeding in a variety of settings — from inner city hospitals to rural schools, from the kitchens of restaurants to the cafeterias in prisons. Much is being learned about training generators, designing efficient and economical collection routes, and composting these feedstocks without generating odors and producing a quality product.

Still, there are some hurdles to jump. First and foremost is the need for a more widely available, cost-competitive composting infrastructure. Many of the projects listed in the *BioCycle* survey either service their own institutions' need or don't have the capacity to handle large volumes of residuals. Another challenge is to bring more state solid waste and recycling officials into the food residuals diversion loop. It is

evident that in states where regulatory and policy staff have recognized the potential of composting to increase recycling rates — and have tried to streamline regulations to accommodate these types of facilities — there is much more activity and enthusiasm for diversion of commercial, institutional and industrial organics. One final challenge is that existing composting sites who have fine-tuned their processes and developed markets for high quality compost need to receive greater volumes of source separated organics in order to thrive. In some regions, their expansion is blocked by excessive regulatory paperwork and difficulty in working with the local waste management infrastructure that is oriented toward disposal.

Despite these challenges, we continually hear about new food residuals composting projects being started. Growing numbers of yard trimmings operations are gradually moving into food residuals. And efforts are being made by generators, haulers, composters and state composting and recycling officials to find ways to jump the hurdles that are blocking the path to the development of larger facilities. In the final analysis, there is no question that composting of food residuals is here to stay, and will continue to grow at a healthy pace. ■

Conni Kunzler of The Composting Council contributed to preparation of the inventory of food residuals composting projects.

Table 1. 1997 Food Residuals Composting Projects (cont'd.)

Location/Composter	*Status/Technology Volume (on annual basis)[1]*	*Feedstock*
WASHINGTON (cont'd.)		
Yelm/Yelm Earthworms & Casting Farm	Operational (1997) Vermicomposting; (2,000 tons)	Fruit/vegetable trimmings from supermarkets, institutional generators; food processing by-products; yard trimmings; wood chips; manures; animal bedding
WISCONSIN		
Ashland/Northland College	Pilot (1995) Bins (8' x 8'); (10 cy)	Kitchen prep; plate scrapings; sawdust
Bristol/Pheasant Run	Operational (1990) Windrow; 2,750 tons	Cranberry residuals and other food processing organics; manure
Eldorado/Sharp's Squash Farm	Operational (1997) Windrow; 32 tons	Restaurant kitchen prep (including pie dough, egg shells, coffee grounds); yard trimmings
Oneida County/Oneida County Solid Waste Department	Operational Windrow/aerated windrow; ASP (under shed); n/a	Food residuals from supermarkets, restaurants, hotels, school; soiled paper; yard trimmings; wood chips; paper mill sludge
River Falls/University of Wisconsin	Pilot/demonstration (1996) Windrow; 160 tons	Supermarket food residuals; waxed cardboard; manure; animal bedding

[1] The first tonnage or cubic yard number provided by projects represents food residuals throughput only; the second number, in parenthesis, represents total throughput at the site. All numbers are on an annual basis.
cy = cubic yard(s); ICI=Institutional/Commercial/Industrial; Waxed cardboard = waxed corrugated cardboard; GMT=Green Mountain Technologies; IPS=International Process Systems; ROT=Resource Optimization Technologies; Wright = Wright Environmental Systems