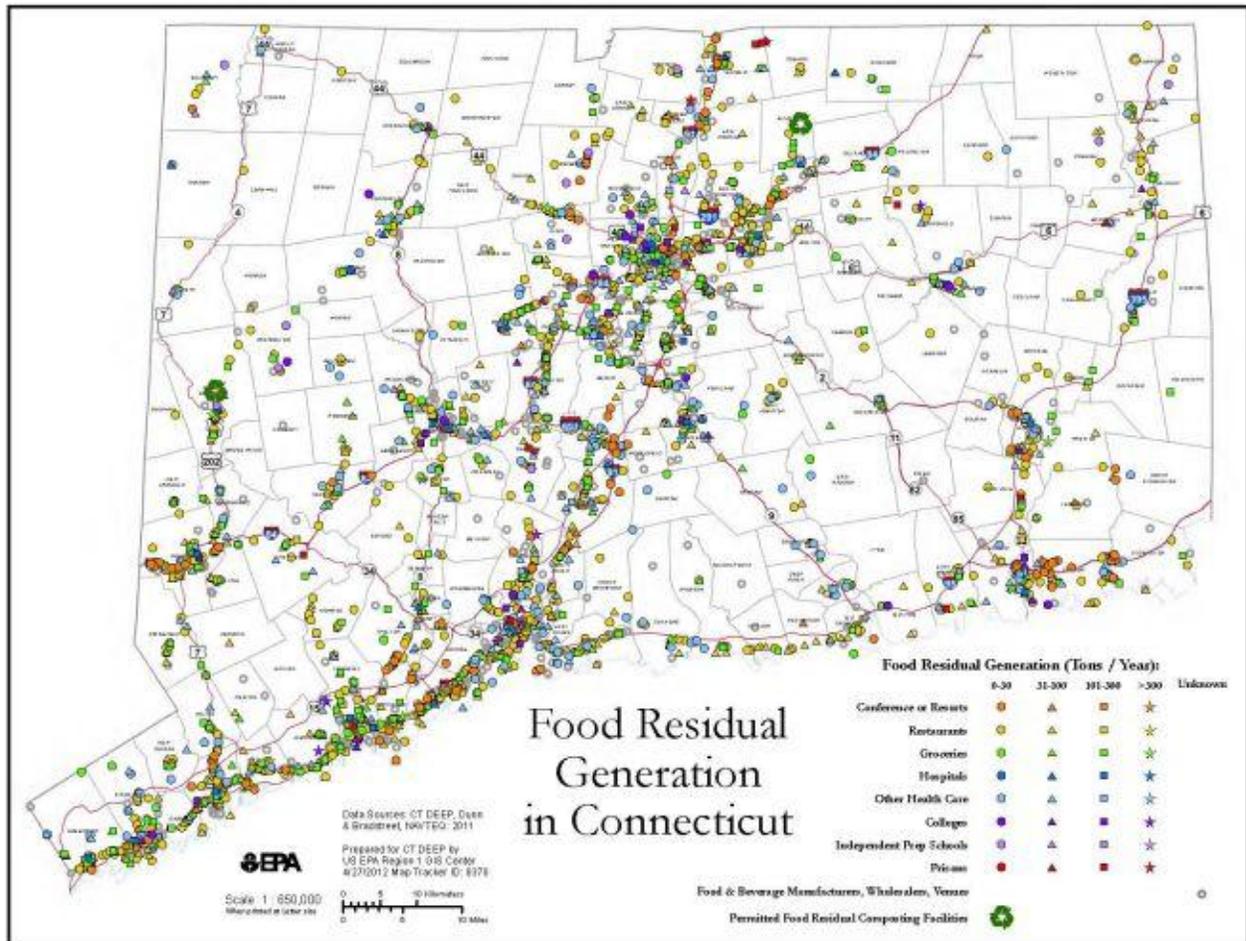


Updated Mapping of Food Residual Generation in Connecticut

Final Report - Spring 2012



Updated for the Connecticut Department of Energy & Environmental Protection by:

U.S. EPA Region 1
Office of Administration and Resource Management

Objective

This project updates the database of Connecticut's Source Separated Organic Materials (SSOM) originally created in September 2001 for the then Connecticut Department of Environmental Protection by consulting firm Draper/Lennon. These materials, more commonly known as food residuals or food scrap, currently makes up the second largest portion of the municipal solid waste stream, second only to paper products.¹ As more and more of these food residuals continues to enter the waste stream, it becomes clear that a focal point of modern waste disposal will be the reallocation of food residuals from resource recovery facilities to more economically and ecologically balanced uses. The update of this database will play a critical role in this process of diverting food from the municipal solid waste stream.

This project hopes to facilitate improved distribution and use of SSOM by: 1) establishing an updated database of SSOM generators available for public use, 2) creating a map to illustrate the locations of SSOM generators and existing food scrap compost facilities and 3) creating a database that can be used for mapping. One of the primary goals of this mapping project is aiding municipalities and businesses in planning for improved use of food residuals, such as composting. In theory, a municipality could begin by identifying potential locations for compost facilities within its borders. Then, by using the Food Residual Density Map, the municipality could identify the location which best serves the haulers collecting food from generators in their vicinity. The hauling industry benefits from the map as well, as the map will prove useful in route planning and the improved coordination of waste pickup. Lastly, the general public will find that the map shows the location of composting facilities that may be a source for purchasing compost.

Methods

The first step in updating the SSOM database involved analyzing the initial report's methodology. The original lists² of SSOM generators sent from the Connecticut Department of Energy and Environmental Protection (DEEP) to EPA included nine categories of waste generators. Upon review it was helpful to slightly reorganize these categories. One of the categories, Health Care was rearranged and divided. We combined all nursing homes, rehabilitation facilities and specialty hospitals under the title Health Care; and created a Hospitals section which covers the acute care hospitals. Then we omitted one section from the original report, Major Private Employers, and added three categories altogether; Restaurants, Venues, and Compost Facilities. Major Private Employers, which consists of businesses and corporations that have cafeterias such as insurance companies, were omitted because we were unable to conduct the necessary research on whether they offer food services. The new grouping allows for a further characterization and accuracy of food residuals. The final list of categories used in this report includes eleven categories, which are following:

- Manufacturers
- Wholesale Distributors
- Health Care
- Hospitals
- Independent Prep Schools
- Colleges and Universities

¹ <http://www.epa.gov/osw/nonhaz/municipal/index.htm>

² Draper Lennon initial report for CT DEEP: http://www.ct.gov/dep/cwp/view.asp?a=2718&q=325382&depNav_GID=1645

- Correctional Facilities
- Resorts and Conference Facilities
- Grocery Stores
- Restaurants
- Venues
- Compost Facilities

The next step involved reviewing data from new sources. The new data sources are detailed in a section below. Data that did not qualify for the new list because it did not meet the criteria or size requirement was deleted. Sources were required to meet the following requirements to be included on the database:

Category Parameters	
Category	Criteria/Size Requirement
Manufacturers	Greater than 5 employees
Distributors	Greater than 5 employees
Health Care	All Nursing Homes and Rehab Facilities
Hospitals	All acute care hospitals
Independent Prep Schools: Boarding only	Greater than 250 students
Colleges and Universities	All, boarding and day
Correctional Facilities	All State facilities included
Resorts and Conference Facilities	All facilities included
Grocery Stores	Greater than 15 employees
Restaurants	Greater than 10 employees
Venues	Included all sports arenas, all amusement parks, all malls, all speedways, and public airports
Compost Facilities	All facilities licensed to accept food residuals

The steps to combine data sets were fairly similar for each category. Microsoft Excel was used to perform the following procedures. Each category had multiple data sets which contributed to its final list. After receiving all data sets,³ each one was reviewed to remove any items that did not meet the above criteria/size requirements. When using the SIC code approach, many of the SSOM did not fit into the type it was labeled as and these entries were deleted, or placed in the proper category. Once all the data sources had been edited down to meet the requirements, they could be combined with

³ See “Lessons Learned” section for recommendations on gathering sources.

Draper/Lennon data⁴ to provide a large list of data sources, however this resulted in duplicate entries. The next step involved removing the duplicates. First the data was sorted by name, and duplicates were removed and then sorted by address and duplicates were removed again. It was necessary to do the matching by name and address to identify any facilities that were identified by slightly different names or the same facility that may have changed locations. This process is repeated for each category to fully update the database.

Waste Estimation

In order to gauge the amount of waste produced by each individual facility, waste estimation equations provided by Draper/Lennon were used. The following table outlines the equation used for each data source:

Food Residuals Generation Estimates by Generator Category	
Health Care	Food waste (lbs/yr = N of beds * 3.0 meals/bed/day * 0.6 lbs food waste/meal * 365 days/yr
Hospitals	Food waste (lbs/yr) = N of beds * 5.7 meals/bed/day * 0.6 lbs food waste/meal * 365 days/yr
Colleges, Universities, and Independent Preparatory Schools	
Residential Institutions	Food waste (lbs/yr) = 0.35 lbs/meal * N of students * 405 meals/student/yr
Non-Residential Institutions (e.g., community colleges)	Food waste (lbs/yr) = 0.35 lbs/meal * N of students * 108 meals/student/yr
Correctional Facilities	Food waste (lbs/yr) = 1.0 lb/inmate/day * N of inmates * 365 days/yr
Supermarkets	Food waste (lbs/year) = N of employees * 3,000 lbs/employee/yr
Restaurants	Food waste (lbs/year) = N of employees * 3,000 lbs/employee/yr

Sources without estimates include Manufacturers, Distributors, Resorts and Conference Facilities, Venues and Compost Facilities. Manufacturers, Distributors, and Venues proved too diverse in food residuals quantity and type to give a meaningful formula. Also excluded from estimation is the Resorts and Conference Facilities category, which relied on a factor, known as “Number of meals per seat per day.” This value required specific research into each facility and was outside the scope of this project. No formula was created to estimate the amount of food residuals received by Compost Facilities for two reasons: no original estimation formula existed, and a formula could not be created without extensive research.

⁴ Draper/Lennon Data did not need to be edited before combining unless new criteria and size requirements are added.

Data Validation and Mapping

Upon completion, the database was sent to the EPA Region 1 GIS Lab for analysis and preliminary mapping. Points were first mapped by the recorded address. This approach sometimes failed due to an invalid address, in which case the point was mapped by latitude and longitude. To ensure quality control, a sample of points had their addresses and lat/long coordinates cross referenced to compare the precision of the two factors. If both mapping by address and latitude/longitude failed, points were plotted based on their zip code to give a general location and contribute to the demonstration of generator density.

Sources for Data

EPA did not have access to many of the data sources used by Draper/Lennon so alternate approaches were required. The sources listed below are outlined by category. All sources included the original Draper/Lennon list as a data source, and the newly acquired Dun and Bradstreet (DB) data unless indicated otherwise.

General Sources

Draper Lennon initial report

<http://www.ct.gov/dep/lib/dep/compost/ssomfile/ssomreport.pdf>

Dun and Bradstreet

www.dandb.com

Manufacturers

Original data was compared with data obtained using an SIC code search through Dun and Bradstreet data service. Manufacturers no longer in business were removed. New food manufacturers were then cross referenced with the data from the original report, with duplicates deleted.

Wholesale Distributors

The Dun and Bradstreet data provided ample sources to completely replace the previously existing list.

Health Care

The Connecticut Hospital Association provided useful information for data validation of the Draper Lennon report. Other information came from the US News Nursing Homes in Connecticut website.

Information from US News Nursing Homes in Connecticut –

<http://health.usnews.com/senior-housing/nursing-homes/ct>

Hospitals

The hospitals data set used a list of licensed hospitals from the Connecticut Department of Public Health. This source was deemed more reliable and exhaustive than the standard SIC search.

Independent Prep Schools

Private schools were such a small category that in addition to Draper/Lennon lists, the Connecticut Association of Independent Schools in New England website was used to complete the data.

Connecticut Association of Independent Schools

www.caisct.org

Colleges and Universities

The Dun and Bradstreet data was used along with the Connecticut Institute of Higher Education website to check and expand the previous data.

Connecticut Institute of Higher Education

www.ctdhe.org

Correctional Facilities

Information provided by the Connecticut Department of Correction was sufficient to populate this category.

Connecticut Department of Correction

<http://www.ct.gov/doc/cwp/view.asp?a=1502&Q=265422&docNav=|>

Resorts and Conference Facilities

Dun and Bradstreet and Draper/Lennon data, paired with more specific search engine research was used to fill the Resort and Conference Facility category.

Grocery Stores

The Grocery store category used data from DB, Draper Lennon, and an internal EPA list.

Restaurants

The Dun and Bradstreet list was used to completely replace the original Draper Lennon Report.

Venues

Venues were compiled using an SIC code search, as well as research using search engines to find the largest venues. Various types of venues within Connecticut were researched and located online. The venues in this section include all sports arenas, all malls, all amusement parks, all speedways and public airports. Websites used included:

Eastern Connecticut State University – Shopping Center Studies -

<http://www.easternct.edu/~pocock/MallsConn.htm>

State of Connecticut websites

<http://www.ctvisit.com/>

<http://www.ct.gov>

Compost Facilities

Connecticut DEEP data was used to include compost facilities certified to accept food residuals.

Lessons Learned

In order to improve this process for the future, we have included the following issues and solutions we would take if asked to update the database again.

- 1) **Acquire all sources before compiling data.** One of the most time consuming portions of the task involved cross referencing and deleting duplicate data created by adding two data sets together. More time consuming still was combing two sets, only to have a third set added later. This third set either forced the same cross referencing procedure for a second time, or completely replaced the data. Had all data sources been accounted for beforehand, the cross reference process could be done one time, with all three sources combined, or if one of the sets of data was sufficient, the process could be avoided completely.
- 2) **Talk to all parties involved before starting.** Talking to multiple parties generally results in more data sources that can be used in the updating process. Also, discussions with all of the parties allows for increased suggestions towards the procedure, and a better understanding of the rationale behind the project. In this case parties included CT DEEP, EPA GIS Lab, and specific persons within EPA Region 1 who frequently work with the category groups we created.
- 3) **Become familiar with the “Sort” function on Excel.** Getting comfortable using this button frequently allowed for easy arrangement of the data for cross referencing and the elimination of duplicates.

For More Information

Question about how this data was collected and updated may be directed to:

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