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Recycling on Long Island 2009

A report on municipal programs in Nassau and Suffolk
Counties

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Table of Contents

Executive Summary i

I. Introduction..... 1

a. Historical Context 1

b. Description of Long Island 2

II. Municipal Waste Management: Town Profiles 5

 Town of Hempstead 6

 Town of North Hempstead..... 9

 City of Long Beach..... 12

 City of Glen Cove 14

 Town of Oyster Bay..... 16

 Town of Babylon 20

 Town of Huntington..... 23

 Town of Islip..... 27

 Town of Smithtown 31

 Town of Brookhaven 34

 Town of Riverhead 37

 Town of Southampton..... 40

 Town of Southold 43

 Town of East Hampton 47

 Town of Shelter Island..... 50

III. Summary Tables 53

IV. Discussion..... 57

a. Factors Affecting Comparisons 57

b. 2009 Recycling Rates 60

c. Recycling Trends..... 64

V. Conclusion and Directions for Future Research 75

References..... 77

a. Acknowledgements 77

b. Websites 77

c. Additional References 78

Maps:

Map 1-Long Island Map

Map 2- Population Density of Nassau and Suffolk Counties

Tables:

Table 1- Summary of Facilities

Table 2- 2009 Municipal Waste Management Data (in tons)

Table 3- 2009 Municipal Recyclables Data (in tons)

Table 4- Endpoints for MSW and Recyclables

Table 5- Materials Recycled by Each Municipality

Figures:

Figure 1- 2009 Computed Recycling Rates, by Municipality

Figure 2- 2009 Per Capita Per Day Recycling Rates, in lbs., by Municipality

Figure 3- 2009 Per Capita Per Day Recycling Rates, in lbs., by Municipality

Figure 4- Hempstead Recycling Rates

Figure 5- Huntington Recycling Rates

Figure 6- Brookhaven Recycling Rates

Figure 7- Southold Recycling Rates

Figure 8- Trends in Long Island Wide Recycling

Figure 9- Trends in Recycling Rates in Aggregated Long Island Data and Two US Computations (USEPA and *BioCycle*)

Executive Summary

Solid waste management has evolved considerably on Long Island, NY, over the past several decades. As recycling programs have matured, a variety of system designs for collection and processing have been developed. This study documents and highlights the differing program designs which are in place throughout Long Island, with particular emphasis on the collection and management of residential wastes. Program designs include the types of materials targeted, and collection and processing techniques. We discuss the various components of each Town or City's recycling program including materials recycling, e-waste collection, household hazardous waste collection, yard waste composting, public education and outreach, and other special programs. There exist significant differences in program scopes and materials across the municipalities; nonetheless, we created a systematic assessment of municipal recycling. Data sets were generated to estimate Long Island-wide recovery rates in 2009. Rates ranged from 10% (Riverhead) to 85% (Southampton), with the East End municipalities generally having much higher recycling rates than western municipalities. The data were also analyzed in terms of per capita per day recycling. Once again, the East End municipalities (and Glen Cove) had the greatest rates. Various explanations for these trends are discussed, including the presence of Pay-As-You-Throw systems, drop-off recovery programs, robust composting programs and, possibly, some accounting issues. Lastly, trends demonstrating the growth of Long Island recycling programs through the early 1990s, and their subsequent general decline from peak levels in the late 1990s-early 2000s, are discussed. We have identified a number of reasons why individual programs may show declining rates, such as more precise accounting of recycling activities, decreases in education efforts, and a failure to document all recycling efforts, especially composting and commercial recycling activities. It is clear that Long Island municipalities can do more to enhance their programs and ultimately, improve recycling rates, although the best means to accomplish improvements is not easily determined. Certainly, expanding public outreach is a necessary component.

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I. Introduction

a. Historical Context

Municipal solid waste (MSW) management has evolved considerably on Long Island over the past several decades. Beginning in the late 1980s, concerns regarding the environmental effects associated with perceived increases in waste generation and decreasing local landfill capacity led to growing public interest in recycling. In particular, the Long Island Garbage Barge (1986) focused national attention on waste management practices. Additionally, the Long Island Landfill Law (1983), which mandated the closure of landfills on Long Island to unprocessed solid wastes by 1990, contributed to the need to change the way MSW was managed on Long Island. As a result, in step with general changes across North America (Sidique et al., 2010; Loughlin and Barlaz, 2006) and sometimes in national leadership roles, local municipalities implemented recycling and waste reduction programs to decrease the disposal rates. By 1994, all 15 municipalities in Nassau and Suffolk Counties had mandatory source separation programs in place. These laws required that all newspaper and glass, metal, and certain plastic containers be recycled (Tonjes and Swanson, 2000).

As recycling programs have matured and evolved in the past several decades, a variety of system designs for collection and processing have been developed (Chester et al., 2008; Ferrara and Missios, 2005). Long Island municipalities have adopted different approaches to managing MSW. Still, all programs require the recycling of newspaper, and glass, metal and some plastic containers. They all target additional materials as well, although the particulars vary.

Differences in design options for programs include the types of materials targeted and collection and processing techniques. Some communities provide drop-off sites for recyclables, while others provide curbside collection, and others do both. All of the Towns and Cities in Nassau and the western Suffolk Towns provide residential collection of waste and recyclables; some also manage some commercial wastes. In eastern Suffolk, however, which tends to be less densely populated, drop-off systems at local transfer stations are utilized (although individuals and businesses may enter into private contract to receive collection services). Some municipalities pay for waste management programs through property taxes, while others use Pay-As-You-Throw (PAYT) volume-based pricing, in which MSW may only be disposed of in special, pre-purchased bags.

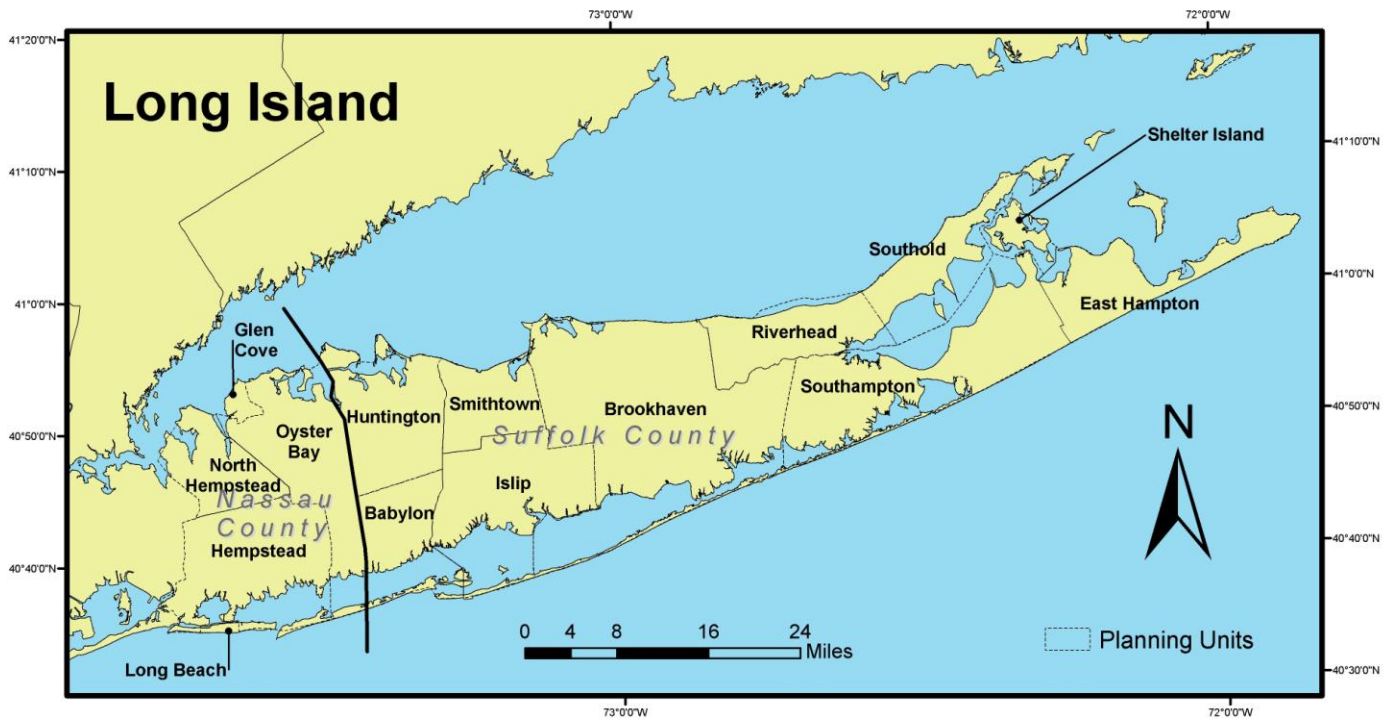
Here we document the differing program designs across Long Island, with particular emphasis on the collection and management of residential wastes. We describe each Town or City's recycling program, including materials recycled and composted, and other special programs such as e-waste collection, household hazardous waste collection, and public education and outreach programs. We also report MSW and recycling data from 2009. By creating this comprehensive assessment of municipal practices, we have established a context to assess recycling performance.

b. Description of Long Island

Long Island, part of New York State, extends approximately 125 miles east-northeast into the Atlantic Ocean from Manhattan, and is 25 miles across at its widest (Map 1). It is divided into four counties: Kings, Queens, Nassau, and Suffolk. Kings (Brooklyn) and Queens Counties are boroughs of New York City, so studies of Long Island often only include Nassau and Suffolk

Counties (as we have done here). Nassau and Suffolk Counties are primarily suburban, although western Nassau is very densely populated, and there still is extensive agriculture and undeveloped open space in eastern Suffolk. In 2009, Long Island's population was 2,871,518 (Nassau County had 1,360,126 residents and Suffolk County had 1,511,392) (LIPA, 2009).

Map 1: Long Island Map



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II. Municipal Waste Management: Town Profiles

The following profiles describe MSW management by 15 municipalities across Long Island. A profile was made for each of the ‘Solid Waste Planning Units’ (13 Towns and 2 Cities) These planning units have been given the responsibility and authority by the State to manage local wastes. The profiles show primary features of waste management programs, such as disposal means, materials recycled, e-waste collected, household hazardous waste programs, and public education and outreach programs. The reports include data from 2009 for recyclables and other waste materials, recycling percents, and pounds of waste generated as per person per day. Each profile also includes the percent change of the municipality’s recycling rate from a base year (1998). 1998 was selected as the base year because we wanted to see the recycling rate change over the past decade or so, and 1998 was the most complete dataset for this time period.

Our information was collected from municipal sources and state records. Each profile was provided to the municipalities for review and comment. Population data are from the Long Island Power Authority (LIPA) 2009 Population Survey. This recycling report, in some ways, is an update to an earlier Stony Brook University study for 2006 (Tonjes, 2007). These two reports share similar formats, and use the same historical data sets. The Recycling Report Cards, prepared in 2007 and 2008 by The Citizens Campaign for the Environment, were also used to frame some of the issues addressed here.

Nassau County

Town of Hempstead

Background:

Municipality	Population	Land Area (miles²)	Density (people/mile²)
Hempstead	766,952	120	6,389

- Largest town by population in Nassau County and New York State. The Town is comprised of 20 villages and most of them use the Town system. Suburbanization began in the 1920s and was complete by the early 1960s. Single family housing predominates but is very dense.

Facilities:

-Town operates 2 transfer stations; a Town waste collection district operates a Materials Recycling Facility (MRF). There is a privately owned and operated Waste-To-Energy (WTE) facility on Town property in Westbury.

Collection:

- The Town collects wastes and recyclables from portions of the Town using municipal crews. All receive two MSW and one recyclables collection per week.

- 16 communities and 5 waste collection districts participate in the Town system through contractual agreement with private haulers. 16 villages also participate in the Town system, using a combination of contract haulers and municipal employees.

- The Town collects the following materials for recycling:

- Paper: newspaper, magazines, junk mail and corrugated cardboard
- Containers: glass and metal containers, #1 and #2 plastics

-The Town collects yard waste separately on Wednesdays.

- The Town offered 10 STOP collection days at 9 locations in 2010. The Town provides drop-off service for appliances, batteries, automobile parts, waste oil, paints, furniture and other non-hazardous waste at commercial disposal rates at its Homeowner Disposal Area located in Merrick.

-The Town offers Clean-Up Day collection of non-hazardous household wastes on designated days and also offers special pick-up services to its residents to dispose bulky items such as furniture at no additional cost. In 2010, two E-Cycling days were scheduled to allow residents to drop-off electronic waste such as obsolete computers, computer components, televisions, VCRs and DVD players.

Waste Management:

- Municipal solid waste is sent to Covanta WTE facility in Westbury.

- Ash from the WTE facility is disposed in the Town of Brookhaven ashfill.

- Collected C&D debris goes to a Winters Brothers facility in Babylon.

-In 2009, recyclables were brought to the following locations:

- Westbury Paper Stock (Westbury) for curbside recyclables
- Gershow Recycling (Medford) for white goods and bulk metal
- Reliable Wood Products (Jersey City, NJ) for yard waste
- E-Scrap Destruction (Islandia) for electronic waste

2009 Data:

Waste Management:

Incinerated (tons)	Recycled (tons)	Total (tons)	Recycling Percent	Percent Change Since 1998	lbs/person/day
544,540	159,816	704,356	23%	-7%	5.03

Recycling:

Curbside Paper (tons)	Curbside Containers (tons)	Bulk Metal* (tons)	Yard Waste (tons)	Other Recycling (tons)
43,711	23,780	25,548	66,602	175

*Note: includes 20,933 tons of metal recovered at Covanta WTE plant

Town of North Hempstead

Background:

Municipality	Population	Land Area (miles²)	Density (people/mile²)
North Hempstead	226,109	53.6	4,219

-The Town has the lowest population density and the highest per capita income in Nassau County. The Town includes 31 villages that have separate governments and all but three of them use Town services. The Town passed a flow control ordinance in 2009. This allows the Town to legally require that all wastes generated within the Town be managed at Town facilities. The Town has implemented this ordinance.

Facilities:

-The Town has a transfer station, operated by Omni Recycling of Westbury in Roslyn.

-The Town operates a drop-off facility in Roslyn.

Collection:

- The Town provides waste collection services to the Town-run garbage districts through contracts with private carters.

- In 2010, the Town offered 4 STOP collection days at two locations.

-The Town curbside recycling program is in effect in all garbage districts.

- The Town collects the following materials for recycling:

- Paper: newspaper, magazines, junk mail and corrugated cardboard
- Containers: glass and metal containers, #1, #2 and #5 (caps) plastics

- The Town also offers resident-drop off services for the Town residents at its Roslyn facility.

Residents can return electronic waste, batteries, CFL bulbs and other permitted recyclables free-of-charge. A \$5 fees is incurred on the initial 100 lbs of general refuse, furniture, and residential C&D debris and yard waste; each additional 20 lbs are charged \$1.

Waste Management:

-The Town's collected MSW is sent off Long Island under contract for disposal.

-In 2009 recyclables were brought to the following locations:

- Omni Recycling (Westbury) for curbside recyclables (paper and containers)
- Hillside Composting Facility (Tremon, P.A.) for yard waste
- Gershow Recycling (Medford) for scrap metal
- E-Scrap Destruction (Islandia) for electronic waste

2009 Data:

Waste Management:

Transported (tons)	Recycled (tons)	Total (tons)	Recycling Percent	Percent Change Since 1998	lbs/person/day
135,769	35,964	171,733	21%	-24%	4.16

Recycling:

Curbside Paper (tons)	Curbside Containers (tons)	Bulk Metal (tons)	Yard Waste (tons)	Other Recycling (tons)
7,850	4,874	113	16,576	6,551

*Note: The Town of North Hempstead's Transported figure includes residential and commercial municipal solid waste. If only residential waste was included, the Town's recycling rate would be increased to 29%.

City of Long Beach

Background:

Municipality	Population	Land Area (miles²)	Density (people/mile²)
Long Beach	36,201	2.1	17,239

-Long Beach is the most urbanized municipality on Long Island.

Facilities:

- Waste collected by the City is sent directly to the Town of Hempstead's Merrick transfer station, where it is then shipped to the Covanta Hempstead Resource Recovery Facility.

- Jamaica Ash and Rubbish manages materials (C&D debris and recyclables) collected at the transfer station.

Collection:

-Household waste is collected by the Sanitation and Recycling Department twice a week. In addition, a maximum of four large, bulk items may be collected per pick-up. Commercial waste is also collected by the Department, although a few large commercial generators contract private haulers.

-The Sanitation and Recycling Department collects recyclables once per week.

- The Town collects the following materials for recycling:

- Paper: corrugated cardboard, soft covered catalogs, magazines, newspaper, mail, paper bags, computer paper, and office paper
- Containers: glass containers, #1-#5 plastic bottles, metal containers, and aluminum foil

- All electronic items have to be disposed by residents at the Big Blue receptacle in front of the recreation center.

-The City initiated a STOP program as a joint venture with the Town of Hempstead.

Waste Management:

-Waste collected by the City is hauled directly to the Town of Hempstead’s Merrick transfer station. Hempstead then ships the waste to the Hempstead Resource Recovery Facility.

-The City owns a transfer station for C&D debris and recyclables. Jamaica Ash and Rubbish was awarded the contract for 2009.

2009 Data:

Waste Management:

Incinerated (tons)	Recycled (tons)	Total (tons)	Recycling Percent	Percent Change Since 1998	lbs/person/day
20,758	3,064	23,822	13%	-43%	3.61

Recycling:

Curbside Paper (tons)	Curbside Containers (tons)	Bulk Metal (tons)	Other Recycling (tons)
1,895	1,078	50	41

City of Glen Cove

Background:

Municipality	Population	Land Area (miles²)	Density (people/mile²)
Glen Cove	27,654	6.6	4,190

Facilities:

-The City no longer has any municipal waste management facilities. There is a private transfer station in the City where municipally managed wastes are delivered.

Collection:

- Collection is provided by the Public Works Department within the City for all residents and most businesses using compactors or dumpsters. Large businesses hire private contractors.

- Municipal collection includes two waste and one recyclables collection per week.

- The City collects the following materials for recycling:

- Paper: all paper recyclables (tied together in a bundle)
- Containers: glass and metal containers, #1-#7 plastics (placed in Town recycling buckets)

- Bulk materials and appliances are collected once per week if the residents call ahead.

- Yard waste is also collected once per week. The City of Glen Cove does not accept grass clippings.

- The City is responsible for picking up waste and recyclables from schools.

Waste Management:

-MSW is transported off-Long Island for disposal under a contract with Winter Brothers.

-Recyclables are also managed by Winters Brothers.

2009 Data:

Waste Management:

Transported (tons)	Recycled (tons)	Total (tons)	Recycling Percent	Percent Change Since 1998	lbs/person/day
51,775	11,408	63,183	18%	-25%	12.52

Recycling:

Curbside Paper (tons)	Curbside Containers (tons)	Bulk Metal (tons)	Yard Waste (tons)	Other Recycling (tons)
4,806	1,249	79	5,018	256*

*Note: includes 256 tons of concrete

Town of Oyster Bay

Background:

Municipality	Population	Land Area (miles²)	Density (people/mile²)
Oyster Bay	303,285	104.4	2,905

-The Town manages MSW from the entire Town, except for 16 of 18 incorporated villages. These villages opted out of the Town management district in the early 1990s. These villages comprise 40% of the Town area and 13% of the population. The Town therefore manages waste for 87% of the population and 60% of the area of the Town.

Facilities:

-The Town operates a transfer station at its Solid Waste Disposal Complex in Old Bethpage.

Collection:

- The Town provides garbage collection services to the Town-run waste districts through the Department of Public Work's Division of Sanitation and Recycling.

- The Town offers 8 STOP collection days at 5 locations per year (in Massapequa, Syosset, Sea Cliff, Hicksville, and Old Bethpage).

-The paper and container recyclables, as well as yard waste, are collected curbside in separate collections using separate crews and equipment. Only commingled plastic, glass, and metal are to be placed in a yellow pail provided for free by the Town; the paper is bundled in twine and placed alongside the yellow pail. A recycling truck and crew first pick up the paper and container recyclables. Then, later in the day a sanitation truck and crew pick up the yard waste.

- The Town provides recyclables collection to any business or school located on a residential recyclables collection route. The program for schools is free.

- The Town collects the following materials for recycling:

- Paper: newspaper, magazines, junk mail and telephone books
- Containers: glass and metal containers, #1 and #2 plastics

- Yard waste (bagged leaves and grass clippings, stumps, wood bundles, etc.) is also collected by the Town. In the spring of 2010, the Town started a curbside yard waste program.

-The Town offers residents Homeowner Cleanup Days for disposal of non-hazardous accumulated debris (tires, large metal items, yard waste, clean broken concrete, boats, trailers, etc.).

- The Town initiated the first Electronic Waste Recycling Program on Long Island. It is held on the same day and at the same locations as the STOP programs.

-The Town has a recycling educator who reaches out to school-aged children as well as adults. Over 35,000 students have been taught about recycling over the years. The Town also sends out mailings to residents reminding them about how the waste management program operates. Additionally, they send out a welcome package to new residents letting them know about the Town's programs.

-The Town also has a traveling educational display which is used at about 30 educational events each year. The educational program promotes curbside recycling, as well as the STOP and e-waste programs, prescription medicine collections, and other special programs.

-The Town's recycling vendor changed since 2009, so the Town is anticipating improvements to be made to recycling programs, including expanding recycling efforts in parks and at public events.

Waste Management:

- All waste from the transfer station is sent off Long Island under a contract for disposal.

-In 2009 recyclables were brought to the following locations:

- Gershow Recycling (Medford) for white goods and bulk metal
- Brookhaven MRF for commingled containers
- Tully Environmental and Natural Soil Products (Goodspring, PA) for yard waste
- American Retroworks (also known as Good Point Recycling) (VT) for electronic waste
- Giove Inc. (Kew Gardens) for mixed paper
- The Battery Guys for batteries
- Long Island Waste Oil (Mt. Sinai) for used motor oil
- Starlight Propane (Bay Shore) for propane tanks
- Casings (Greene County) for tires

- C&D and other recyclables are sent to various vendors.

- In addition to the municipal recycling, the Town reported 93,642 tons of materials recycled by the private vendors that obtain waste removal permits to manage MSW in the Town of Oyster Bay. This amount includes 82,820 tons of C&D, 6,343 tons of corrugated cardboard, and other materials in various quantities.

2009 Data:

Waste Management:

Transported (tons)	Recycled (tons)	Total (tons)	Recycling Percent	Percent Change Since 1998	lbs/person/day
142,531	20,085	162,616	12%	-45%	2.94

Recycling:

Curbside Paper (tons)	Curbside Containers (tons)	Bulk Metal (tons)	Yard Waste (tons)	Other Recycling (tons)
4,400	8,626	741	6,018	300

*Note: Including documented commercial recycling would increase the Town's recycling rate to 44%.

Suffolk County

Town of Babylon

Background:

Municipality	Population	Land Area (miles²)	Density (people/mile²)
Babylon	218,679	52.3	4,181

-The Town of Babylon has the only commercial collection district on Long Island. The collection district provides partial collection service to businesses within the Town.

Facilities:

-The Town owns and operates a center where residents may drop recyclables.

-The Town operates an ashfill.

-Covanta Energy owns and operates a WTE facility on Town land.

Collection:

-The Town has separate, but Town-wide, residential and commercial waste collection districts.

These are bid out, and have been won by a consortium of local carters since the early 1990s.

-Residential MSW is collected twice per week and commercial MSW is collected once per week.

-Businesses can opt to supplement Town collection services through private contracts (many do).

-Recyclables are collected in a blue recycling container or a clear plastic bag (containers one week, paper the next) and yard waste is also collected.

- The Town collects the following materials for recycling:

- Paper: newspaper, corrugated cardboard, magazines, telephone books, and junk mail
- Containers: glass and metal containers, #1 and #2 plastics

-These above items, along with waste oil, car batteries, rocks/bricks, household batteries, oil filters, concrete, and tires may be dropped off at the Town recycling center. The facility also accepts bikes for its Adopt-a-Bike program.

-Yard waste is collected 12 months of the year, once per week.

-A limited amount of residential C&D is collected (up to two items) on the second garbage day of the week.

Waste Management:

-MSW is disposed of at the Covanta Babylon WTE plant.

-In 2009 recyclables were brought to the following locations:

- ACA Waste Service, Dematteo Salvage, Detail Carting Co., V. Garafalo, Jamaica Ash and Rubbish, Jet Sanitation Corp., Manhattan Beer Distributors, Mets Roll Off Service Inc., National Waste Service LLC., Unique Sanitation Corp., Westbury Paperstock, Winters Brothers Recycling, Omni Recycling (Babylon) and All American Recycling Corp. for paper recyclables
- Dematteo Salvage and Omni Recycling (Babylon) for containers
- Omni Recycling (Babylon) for white goods

- Gershow Recycling (Medford) for metals
- Omni Recycling (Babylon) for yard waste
- Metal Green Recycling (Corona, NY) for electronics

2009 Data:

Waste Management:

Incinerated (tons)	Recycled (tons)	Total (tons)	Recycling Percent	Percent Change Since 1998	lbs/person/day
237,587	42,109	279,696	15%	-46%	7.01

Recycling:

Curbside Paper (tons)	Curbside Containers (tons)	Bulk Metal (tons)	Yard Waste (tons)	Other Recycling (tons)
8,843	4,360	4,600*	23,956	350

*Note: includes 4,376 tons of metal recovered at Covanta WTE plant

Town of Huntington

Background:

Municipality	Population	Land Area (miles²)	Density (people/mile²)
Huntington	204,784	94	2,179

-The Town manages all residential wastes in the unincorporated areas of the Town. The villages of Lloyd Harbor, Huntington Bay, Northport, and Asharoken are not included in the Town program.

Facilities:

-The Department of Environmental Waste Management operates a Recycling Center and Hazardous Household Waste Facility in Huntington Village. The facility accepts residential waste for recycling or special handling.

-There is a residential drop-off facility located in Kings Park. The site is owned by the Town of Smithtown, but both the Town of Huntington and the Town of Smithtown may use it.

-The Covanta WTE plant in East Northport receives and processes Huntington and Smithtown's solid waste.

Collection:

- A mix of municipal contract carters collect materials in the Town's collection districts.

- MSW is collected twice per week.

- Containers are collected every other week by the Town and paper recyclables are collected on the alternate weeks. Along with curbside materials, up until January 1, 2011, batteries were also collected.

-The Town collects the following items for recycling:

- Paper: corrugated cardboard, newspapers, junk mail, chipboards, and magazines
- Containers: glass, metal, and #1-#7 plastic containers

-The Town's Recycling Center and Hazardous Household Waste Facility accept residential waste for recycling and household hazardous wastes, including oil based paint cans. Debagged grass clippings are also accepted.

-Residents may also drop-off C&D, yard waste (no grass), appliances, and recyclables at the Kings Park drop-off facility operated by the Town of Smithtown.

-Up to four bulk items may be placed at the curb for collection on the second garbage pick-up day each week. To dispose of large metal items (appliances, water heaters, lawn mowers, etc.) the carter must be contacted directly.

- Yard waste pick-ups are scheduled weekly except for January and February when they are every other week.

- MSW and mixed paper (OCC, office paper, junk mail, chipboard, etc.) are collected separately six days per week from businesses in the Business Improvement District (BID) in the village of Huntington area.

-Bottles and cans are collected two days per week from businesses in the BID as well.

Waste Management:

-MSW collected by the Town is brought to the WTE plant in East Northport.

-In 2009 recyclables were brought to the following locations:

- DeMatteo Salvage (West Babylon) for source separated corrugated cardboard
- Omni Recycling (Westbury) for glass containers, tin/aluminum, plastic containers, commingled (containers only), and other source-separated paper
- Omni Recycling (Babylon) for yard waste
- Gershow (Medford) and Town of Smithtown Transfer Station (Northport) for bulk metal (from residents)
- Gershow Recycling for metal recovery from the WTE facility
- H&M Leasing (Copiague) for textiles
- e-Revival (Lyndhurst) for electronics
- General Environmental (Amityville) for waste oil/gas and antifreeze
- Starlite Propane (Bay Shore) for propane tank recycling
- Schwing Electric (Farmingdale) for fluorescent bulbs and HID lights

2009 Data:

Waste Management:

Incinerated (tons)	Recycled (tons)	Total (tons)	Recycling Percent	Percent Change Since 1998	lbs/person/day
110,841	40,351	151,192	27%	-21%	4.07

Recycling:

Curbside Paper (tons)	Curbside Containers (tons)	Bulk Metal (tons)	Yard Waste (tons)	Other Recycling (tons)
10,180	5,790	2,986	21,245	150

*Note: The Town of Huntington's Incinerated figure includes residential and commercial municipal solid waste. If only residential waste was included, the Town's recycling rate would be increased to 29%.

Town of Islip

Background:

Municipality	Population	Land Area (miles²)	Density (people/mile²)
Islip	333,978	105.3	3,172

- Islip established the first comprehensive curbside recycling collection program on Long Island.

Facilities:

- The Town owns and operates a Multi-Purpose Recycling Facility in Holbrook.

-The Town owns and operates a yard waste composting site in Ronkonkoma.

-The Town owns a WTE facility, operated by Covanta, in Ronkonkoma.

-The Town owns and operates a C&D landfill in Hauppauge.

Collection:

- Islip has 68 Contractual Bid Areas (districts), 7 of which are serviced by municipal employees of the Islip Resource Recovery Agency. The current solid waste collection contracts have recently been extended through the 2014 calendar year.

- Paper/cardboard and glass, plastic and metal containers are collected separately on alternate Wednesdays.

-The Town collects the following items for recycling:

- Paper: newspapers, magazines and brown corrugated cardboard
- Containers: food and beverage cans, glass bottles and jars, and #1-#2 plastic bottles

-Bulk metal items (washer, dryer, refrigerators, bikes, etc.) and all other metal items are collected curbside every Wednesday.

-MSW is collected twice per week.

-E-waste is collected curbside on the last Wednesday of every month.

-The Town Multi-Purpose Recycling Center (MRF) accepts waste oil, batteries, e-waste, and household hazardous wastes.

-The Town Animal Shelter accepts drop-off e-waste and batteries.

-The Town compost site manages yard waste, leaves, trees, and brush collected curbside or dropped off at the facility. Grass is accepted but not collected curbside. The finished compost and wood mulch are given to residents free of charge. Waste oil is also collected at the facility.

-The Town has a full-time Recycling Educator on staff and has made a film to promote recycling.

Waste Management:

- MSW collected by Town-contracted carters is brought to the Town's WTE facility.

- The Town composts its own yard wastes at the Town compost facility.

- In 2009 recyclables were processed at the Town's Multi-Purpose Recycling Center (MRF) and marketed through:

- Giove Company Inc. (Kew Gardens) for newspaper and mixed paper
- Winter Brothers (West Babylon) for corrugated cardboard
- Recycling in Communities (RIC) (Brentwood) and Gershow Recycling (Medford) for tin/aluminum containers and bulk metal (from residents)
- RIC for plastics
- Island Environmental (Bay Shore) for mixed plastic
- Glass is used as cover material, according to a NYSDEC-approved Beneficial Use Determination, at the Blydenburgh Landfill
- Other recyclables that were managed:
 - E-Green management, LLC (Islip Terrace, NY) for electronics & e-waste
 - Planet Earth Recycling & Recovery (Wantagh, NY) for waste oil
 - Gershow Recycling for bulk metal (including ferrous recovered from the WTE plant)

2009 Data:

Waste Management:

Incinerated (tons)	Recycled (tons)	Total (tons)	Recycling Percent	Percent Change Since 1998	lbs/person/day
172,383	71,757	244,140	29%	-22%	4.01

Recycling:

Curbside Paper (tons)	Curbside Containers (tons)	Bulk Metal (tons)	Yard Waste (tons)	Other Recycling (tons)
9,170	4,476	9,351	48,695	65

Town of Smithtown

Background:

Municipality	Population	Land Area (miles²)	Density (people/mile²)
Smithtown	120,367	53.6	2,246

-The Town manages solid wastes and recyclables in all unincorporated areas of the Town, as well as in the three villages (Head of the Harbor, Nissequogue, and the Village of the Branch).

Facilities:

- The Town of Smithtown operates the Smithtown Municipal Services Facility in Kings Park where recyclables are processed.

- It also operates a transfer station at the Municipal Service Facility for residential C&D (no MSW).

- The Town has an inter-municipal agreement with the Town of Huntington that allows it to share the use of a Covanta WTE plant in East Northport.

Collection:

- All 1/2/3 family homes receive collection services provided by contracted crews.

-MSW is collected curbside twice per week.

- Curbside recyclables (paper and containers) are collected separately on alternate weeks.

-Residents may also drop-off recyclables, yard waste, C&D, and other special wastes, such as e-waste, at the Town Municipal Services Facility.

-The Town Highway Department collects residential yard waste (no grass clippings) for all unincorporated areas of the Town.

-The Town has 2 household hazardous waste collection days per year at the transfer station.

Waste Management:

-MSW and non-hazardous industrial wastes are processed at the Covanta WTE facility in Huntington.

-C&D debris are disposed at Town of Islip's Blydenburgh Road Clean Fill.

-The Town chips its own wood into chips and mulch, which may be picked up by residents free of charge.

- In 2009 recyclables were brought to the following locations:

- WM Recycle America (Williamsburg) for paper and plastics
- Franza Universal Scrap Metal (Farmingdale) for metals
- Trinity Transportation/Hillside Recycling Facility (Islandia) for yard waste
- Supreme Computer & Electronics Recycling (Lakewood, NJ) and e-Scrap Destruction (Islandia) for Electronics
- Blydenburgh Road Clean Fill (Islip) for concrete
- MSF-Phase II-Cell 6 Capping & Closure Project (for glass containers)

2009 Data:

Disposal:

Incinerated (tons)	Recycled (tons)	Total (tons)	Recycling Percent	Percent Change Since 1998	lbs/person/day
107,727	34,064	141,791	24%	-18%	6.45

Recycling:

Curbside Paper (tons)	Curbside Containers (tons)	Bulk Metal (tons)	Yard Waste (tons)	Other Recycling (tons)
6,891	708	798	25,617	50

Town of Brookhaven

Background:

Municipality	Population	Land Area (miles²)	Density (people/mile²)
Brookhaven	491,818	259.3	1,897

-The Town manages all residential waste in unincorporated portion of Town but it does not manage wastes in most of its villages.

-The Town does not manage commercial or industrial wastes except materials brought to Town facilities.

-The Town has the greatest population in Suffolk.

Facilities:

-The waste management facility in Yaphank contains a transfer station, MRF, yard waste processing center, landfill, residential drop-off site, STOP facility for HHW, C&D processing center, and a Landfill-Gas-to-Energy facility.

-The Town owns and operates yard waste composting sites in Holtsville and Manorville.

Collection:

-All 1/2/3 family homes receive collection services provided by the Town through contract with private companies. The Town is divided into 35 waste districts.

-MSW is collected curbside twice per week.

- Curbside recyclables (paper and containers) are collected on alternate Wednesdays.

-The Town collects the following materials for recycling:

- Paper: newspaper, corrugated cardboard, magazines, junk mail, phone books (tied or in a brown bag)
- Containers: glass, #1 and 2 plastics, metal, aerosol cans in Town distributed containers

-Leaves and brush are collected together in a separate pickup (no grass clippings allowed) 19 weeks per year.

-Yard waste may be dropped off at the yard waste composting sites.

-White goods and bulk wastes are collected separately by arrangement.

-Curbside recyclables, lead-acid batteries, waste oil, scrap metal, home electronics, and tires may be dropped off at the Town residential drop-off site.

-E-waste collection days are held several times per year in various areas of the Town.

-The Town operates a STOP facility which is open 1 day per week (2 days in the summer) for HHW.

-Collection for businesses, institutions, villages, condos, co-ops, multi-family units, and schools is not provided, although they are required by law to recycle all Town recyclables.

Waste Management:

-MSW is sent to Covanta’s Hempstead WTE facility; the Town landfills the plant’s ash in exchange.

-The MRF processes paper and containers for market. The Town MRF also receives recyclables from the Towns of East Hampton, Southampton, and Riverhead. The Towns of Hempstead and Oyster Bay also sent recyclables to Brookhaven’s MRF for some periods during 2009, although not for the full year.

-The Town chips its own wood and uses its 2 composting facilities for yard waste drop-off. Long Island Compost manages leaves and brush collected curbside.

-The landfill accepts incinerator ash, non-recoverable C&D materials, and other materials such as boats and animal carcasses.

2009 Data:

Waste Management:

Incinerated (tons)	Recycled (tons)	Total (tons)	Recycling Percent	Percent Change Since 1998	lbs/person/day
201,820	85,730	287,550	30%	-11%	3.20

Recycling:

Curbside Paper (tons)	Curbside Containers (tons)	Bulk Metal (tons)	Yard Waste (tons)	Other Recycling (tons)
16,737	10,310	2,155	45,748	10,780*

*Note: includes 2,880 tons of concrete

Town of Riverhead

Background:

Municipality	Population	Land Area (miles²)	Density (people/mile²)
Riverhead	34,185	67.4	507

-The Town privatized residential waste management operations January 1, 1997. Private companies have contractual obligations for residential collections. The current Town contractor is Maggio Sanitation which provides residential collection for MSW, recyclables, and yard waste.

Facilities:

- Maggio Sanitation collects and transports all materials to its transfer station in Yaphank.
- The Town manages a yard waste drop-off facility. The yard waste facility only manages materials that are dropped off, not those collected by Maggio.

Collection:

- MSW is collected by Maggio once per week, recyclables once per week, and bulk materials once per week.
- Curbside recyclables (paper and containers) are collected on alternate weeks by Maggio.

- The Town accepts the following materials for recycling:

- Paper: newspaper, corrugated cardboard, magazines, junk mail, phone books, catalogs (bound, tied, or in brown bag)
- Containers: glass, all plastics, metal cans (materials must be placed in resident's containers marked with Town decal [2 decals/household/year])

-Leaves and brush are collected in separate pickup (no grass clippings allowed but they may be brought to Town composting site for a fee).

-The Town operates STOP collection 2 days per year at the Highway Department yard.

-Collection for businesses, institutions, condos, co-ops, multi-family units, and schools is not provided, although they are required by law to recycle.

Waste Management:

- All waste is managed through Maggio facilities.

-Yard waste is managed at the Town composting site (only that that is dropped off by residents, not collected by Maggio).

2009 Data:

Waste Management:

Transported (tons)	Recycled (tons)	Total (tons)	Recycling Percent	lbs/person/day
16,987	1,835	18,822	10%	3.02

*Note: We do not have good historical data to compare changes in the Riverhead recycling rate.

Recycling:

Curbside (tons)
1,835

*Note: Riverhead recycling data does not include yard waste or recycling other than curbside.

Town of Southampton

Background:

Municipality	Population	Land Area (miles²)	Density (people/mile²)
Southampton	60,007	140	414

-The Town has a PAYT program, and limits the amount of waste it manages.

Facilities:

-The Town owns and operates 4 residential drop-off facilities (Sag Harbor, Hampton Bays, Westhampton, and North Sea) for residential MSW, residential C&D (North Sea only), and recyclables. Commercial and carter-collected wastes are not managed at Town facilities.

-Compost facilities for yard wastes excluding grass are located at the Hampton Bays, Westhampton, and North Sea facilities.

Collection:

-The Town does not provide collection services. Waste generators must contract with private carters for waste pickup or bring their own wastes to the Town facilities.

-The Town does not provide transfer or disposal facilities for private waste haulers which serve residents, commercial institutions, or industrial institutions.

-Self haulers must use Town bags that are sold at more than 25 locations throughout the Town. The bags cost \$14.50 for 5 large bags and \$7.50 for 5 small bags. There are no other permits or

fees. This pay per bag system promotes recycling since recyclable disposal is free and garbage bags must be bought for a fee.

- The Town accepts the following materials for recycling:

- Paper: newspaper, corrugated cardboard, office paper, junk mail, catalogs, magazines, phone books, soft covered books, stationary, paperboard, kraft paper and bags
- Containers: glass containers, #1 and 2 plastic containers, aluminum and tin cans, metal, aluminum foil
- Other: clothing, white goods, yard waste, waste oil, propane tanks, tires and electronic waste

-The Town operates STOP collection 4 days per year (1 at each transfer station).

-The Town sponsors a Great East End Clean-Up Day in the Spring, which is a free, annual event where residential volunteers clean up public lands. Waste Management provides supplies and disposes of the collected debris.

-The Town holds two clean up periods (Fall and Spring) where residents may bring brush in free of charge.

Waste Management:

-In 2009 recyclables were brought to the following locations:

- Brookhaven MRF for commingled containers
- Gershow Recycling (Medford), Crown Recycling (Calverton), Olympic Fibers Corp. (Coram), Town of Islip Recycling Facility (Holbrook), and A&R Labosco (Flushing) for paper recyclables
- Gershow Recycling (Medford) for bulk metal
- Star Lite Propane Gas Corp. (Bay Shore) for propane tanks
- E-scrap Destruction (Islandia) for e-waste
- Casings Inc. (Catskill) for tires
- Long Island Waste Oil (Mount Sinai) for waste oil

-Yard waste (excluding grass) is managed at the Town composting sites (no brush may be brought to Westhampton and no leaves or brush may be brought to Sag Harbor).

2009 Data:

Waste Management:

Transported (tons)	Recycled (tons)	Total (tons)	Recycling Percent	Percent Change Since 1998	lbs/person/day
5,441	30,255	35,696	85%	+66%	3.25

Recycling:

Curbside Paper (tons)	Curbside Containers (tons)	Yard Waste (tons)	Other Recycling (tons)
2,381	1,442	26,310	122

Town of Southold

Background:

Municipality	Population	Land Area (miles²)	Density (people/mile²)
Southold	23,175	53.8	431

-The Town instituted the first Long Island PAYT program in 1993.

Facilities:

-The Town owns and operates a transfer station for residential and commercial MSW, C&D, and recyclables in Cutchogue.

-The transfer station accepts wastes from all generators and private haulers.

-The Town operates a compost facility for yard waste (excluding grass) in Cutchogue.

Collection:

-The Town does not provide collection services. Waste generators must contract with private carters for waste pickup or bring their own wastes to the Town transfer station.

-There are permit fees required to use the transfer station.

-The Town collects yard waste during designated Fall and Spring clean up periods.

- The Town accepts the following materials for recycling:

- Paper: newspaper, corrugated cardboard, mixed paper
- Containers: glass containers, #1-7 plastics, aluminum and tin cans, aluminum foil
- Other: used oil, tires, batteries, empty aerosol cans, empty paint cans, textiles, scrap metal and yard waste

- Southold employs a PAYT system for residential household wastes. All residents must use special bags sold by the Town which are priced to cover the cost of disposing the waste and other system costs. The bag program applies both to self-haulers as well as residents who have private, curbside pickup. The carters who pick up 'Town bag' trash at the curb may dump these loads at the Town transfer station free of charge, i.e., without paying a tip fee (the Town received its revenue for disposal of the load when the residents bought the bags). The Town makes three bag sizes available (small, medium, and large), and they are sold at retail outlets throughout the Town as well as at the transfer station and Town Hall. The bags are required for regular household waste, not bulky items or items that cannot easily be bagged (bulky items are weighed at the vehicle scales for a tip fee). The PAYT system promotes recycling since recycling is free but bags for disposal are an explicit cost.

-Private carters may also bring waste to the transfer station in Town bags for a fee based on weight.

-In 2004, the Town required biodegradable paper bags for leaves brought to the Town composting site. As with the Town garbage bags, the leaf bags are sold at retailers throughout the Town.

-The Town operates STOP collection 4 days per year.

-The Town operates Home Exchange Area where residents may exchange usable goods, particularly furniture.

Waste Management:

- All waste from the transfer is sent off Long Island under contract for disposal through Trinity Transportation.

-Residential C&D goes to Brookhaven landfill.

-Yard waste is managed at the Town composting site.

-In 2009, recyclables were brought to the following locations:

- Town of Islip Resource Recovery Agency (Islip) and Gershow Recycling for paper
- Gershow Recycling and PK Metals (Coram) for bulk metals
- The Town Transfer Station manages glass containers itself
- Omni Recycling (Babylon) for all commingled containers
- E-Scrap Destruction (Islandia) for e-waste
- Pegasus (Deer Park) for tires
- PK Metals (Coram) for car batteries
- Strebel's Waste Oil (Westhampton Beach) for waste oil

2009 Data:

Waste Management:

Transported (tons)	Recycled (tons)	Total (tons)	Recycling Percent	Percent Change Since 1998	lbs/person/day
9,979	12,199	22,178	55%	+14%	5.24

Recycling:

Curbside Paper (tons)	Curbside Containers (tons)	Yard Waste (tons)	Bulk Metal (tons)	Other Recycling (tons)
1,977	1,126	8,527	220	349*

*Note: includes 132 tons of concrete

Town of East Hampton

Background:

Municipality	Population	Land Area (miles²)	Density (people/mile²)
East Hampton	21,822	74	295

-The Town's Solid Waste Management Plan (since modified) was based on local research by Barry Commoner showing 80% recycling was feasible. The Town operated an in-vessel solid waste composting facility for nearly five years in support of this plan in the 1990s.

Facilities:

-The Town owns and operates 2 residential drop-off facilities (East Hampton and Montauk) for residential MSW, residential C&D (East Hampton only), and recyclables. Both sites also accept commercial MSW and recyclables.

-The Town operates a composting site at East Hampton for yard waste including grass.

Collection:

-The Town does not provide collection services; waste generators must contract with private carters for waste pickup or bring their own wastes to Town transfer stations. Residents who bring their own waste are required to purchase self-hauler permits annually for \$70. Carters are required to pay a tipping fee.

- The transfer stations accept the following materials for recycling:

- Paper: all paper recyclables
- Containers: glass, #1 and 2 plastics, aluminum and tin cans
- Other: batteries, appliances, tires, clothing, batteries, bulk metals, and yard waste (yard waste from Montauk is transported to East Hampton site).

-The Town operates STOP collection 2 days per year (1 at each transfer station).

-The Town operates a Home Exchange Area where residents may exchange usable goods.

-E waste is collected separately to eliminate it from the MSW stream.

-All Village waste from within the Town is also brought to Town sites.

-Commercial haulers are permitted to use Town facilities but not all do.

Waste Management:

- All waste from the transfer stations is sent off Long Island under contract for disposal.

-Residential C&D goes to the Brookhaven landfill.

- In 2009 recyclables were brought to the following locations:

- Brookhaven MRF for mixed containers
- DeMatteo Salvage (West Babylon) for paper and cardboard
- Gershow Recycling (Medford) for metals
- Yard waste is managed at the Town composting site

2009 Data:

Waste Management:

Transported (tons)	Recycled (tons)	Total (tons)	Recycling Percent	Percent Change Since 1998	lbs/person/day
21,822	7,760	29,582	26%	-47%	7.43

Recycling:

Curbside Paper (tons)	Curbside Containers (tons)	Bulk Metal (tons)	Yard Waste (tons)	Other Recycling (tons)
1,204	470	458	5,523	105

Town of Shelter Island

Background:

Municipality	Population	Land Area (miles²)	Density (people/mile²)
Shelter Island	2,546	12.1	210

-Shelter Island has the lowest population of any Town on Long Island.

-It is an island community- all collected waste and recyclables, except yard waste, concrete, and glass, are transported off island through contract with a private company via ferry.

-The Town has a PAYT system.

Facilities:

-The Town owns and operates a transfer station for residential and commercial MSW, a recycling area, and a waste processing facility. This site includes a drop-off area for recyclables and HHW.

-The Town operates a yard waste composting site.

Collection:

-The Town does not provide collection services. Waste generators must contract with 1 of 2 private carters for waste pickup or bring their own wastes to the Town transfer station.

-Shelter Island employs a PAYT system for residential household waste. All residents must use special bags sold by the Town which are priced to cover the cost of disposing of wastes and other system costs. Bags are sold at 4 locations throughout the Island. This pay per bag system

promotes recycling since recyclable disposal is free and garbage bags must be bought for a fee (\$3.75 for large, \$2.50 for medium, and \$1.75 for small).

-The transfer station accepts the following materials for recycling:

- Paper: newspaper, corrugated cardboard, office paper, magazines
- Containers: glass, metal and plastic containers
- Other: scrap metal, leaves, wood chips. Brush and stumps, furniture, C&D, propane tanks, batteries, junk cars, and white goods are also accepted for a fee.

-The transfer station accepts HHW during a designated day every month (first Saturday of the month).

- Residential electronics may be dropped off 7 days per week.

Waste Management:

-Winters Brothers is contracted to manage furniture, wet garbage, plastic recyclables, and newspaper. Recyclables are brought to Babylon Paperstock.

-Pratt Industries manages metal containers and cardboard, which are brought to their facility in Staten Island

-Yard waste (grass, leaves, brush, manure) are managed at Town composting site. The Town subcontracts out for stumps to be ground and made into marketable material.

-The Town manages concrete and glass in the Town and uses them for various projects.

-The Town hauls C&D materials to the Brookhaven landfill.

-Tires are brought by the Town to S&M Recycling.

2009 Data:

Waste Management:

Transported (tons)	Recycled (tons)	Total (tons)	Recycling Percent	Percent Change Since 1998	lbs/person/day
995	1,693	2,688	63%	+30%	5.79

Recycling:

Curbside Paper (tons)	Curbside Containers (tons)	Yard Waste (tons)	Other Recycling (tons)
464	178	807	244*

*Note: includes 237 tons of concrete

III. Summary Tables

Table 1 shows a summary of the facilities in each municipality.

Table 1. Summary of Facilities

Municipality	Waste-To-Energy (within Town)	Transfer Station/Recycling Center (operated by Town)	Transfer Station/Recycling Center (operated by private contractor)	Compost Site	Residential Drop-Off Site	Landfill
Hempstead	√	√			√	
North Hempstead		√			√	
Long Beach		√				
Glen Cove						
Oyster Bay		√				
Babylon	√				√	√
Huntington	√	√			√	
Islip	√	√		√		√
Smithtown		√			√	
Brookhaven		√	√	√	√	√
Riverhead			√	√		
Southampton		√		√	√	
Southold		√		√	√	
East Hampton		√		√	√	
Shelter Island		√		√	√	

Municipal waste management in Nassau and Suffolk Counties in 2009 has been summarized in Tables 2 and 3. Table 4 (see Appendix) shows a summary of local MSW and recyclable facilities where materials from Long Island municipalities are managed. It can be seen that several facilities, such as Gershow Recycling and E-Scrap Destruction, receive materials from multiple municipalities. Map 2 shows the population density of each Town or City on Long Island.

Table 2. 2009 Municipal Waste Management Data (in tons)

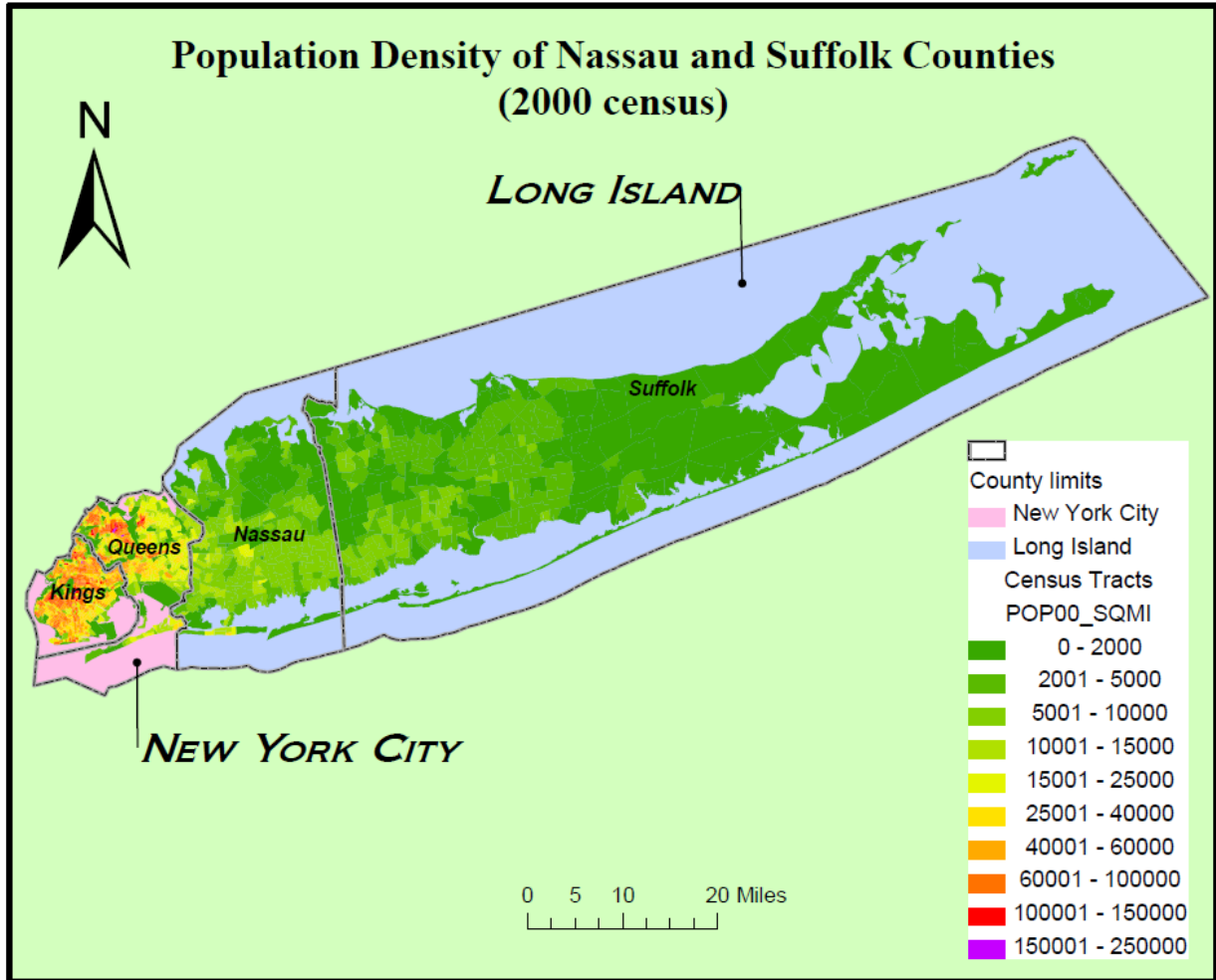
Municipality	Incinerated	Landfilled	Transported	Recycled	Total
Hempstead	544,540	0	0	159,816	704,356
North Hempstead	0	0	135,769	35,964	171,733
Long Beach	20,758	0	0	3,064	23,822
Glen Cove	0	0	51,775	11,408	63,183
Oyster Bay	0	0	142,531	20,085	162,616
Babylon	237,587	0	0	42,109	279,696
Huntington	110,841	0	0	40,351	151,192
Islip	172,383	0	0	71,757	244,140
Smithtown	107,727	0	0	34,064	141,791
Brookhaven	201,820	0	0	85,730	287,550
Riverhead	0	0	16,987	1,835	18,822
Southampton	0	0	5,441	30,255	35,696
Southold	0	0	9,979	12,199	22,178
East Hampton	0	0	21,822	7,760	29,582
Shelter Island	0	0	995	1,693	2,688
Total	1,395,656	0	385,299	558,090	2,339,045
Percent	59%	0%	17%	24%	

Table 3. 2009 Municipal Recycling Data (in tons)

Municipality	lbs/person/day	Paper	Containers	Metal	Yard Waste	Other	Percent	Percent Change*
Hempstead	5.03	43,711	23,780	25,548	66,602	175	23%	-7%
North Hempstead	4.16	7,850	4,874	113	16,576	6,551	21%	-24%
Long Beach	3.61	1,895	1,078	50	0	41	13%	-43%
Glen Cove	12.52	4,806	1,249	79	5,018	256	18%	-25%
Oyster Bay	2.94	4,400	8,626	741	6,018	300	12%	-45%
Babylon	7.01	8,843	4,360	4,600	23,956	350	15%	-46%
Huntington	4.07	10,180	5,790	2,986	21,245	150	27%	-21%
Islip	4.01	9,170	4,476	9,351	48,695	65	29%	-22%
Smithtown	6.45	6,891	708	798	25,617	50	24%	-18%
Brookhaven	3.20	16,737	10,310	2,155	45,748	10,780	30%	-11%
Riverhead	3.02	1,133	0	702	0	0	10%	-
Southampton	3.25	2,381	1,442	0	26,310	122	85%	+66%
Southold	5.24	1,977	1,126	220	8,527	349	55%	+14%
East Hampton	7.43	1,204	470	458	5,523	105	26%	-47%
Shelter Island	5.79	464	178	0	807	244	63%	+30%
Total		121,642	68,467	47,801	300,642	19,538	24%	-19%

*Note: Percent change represents the percent change in recycling rates from 1998 to 2009. There is no percent change for Riverhead due to incomplete data.

Map 2: Population Density of Nassau and Suffolk Counties



IV. Discussion

a. *Factors Affecting Comparisons*

Currently there is no consensus on how to properly count MSW and quantify recycling and disposal rates (Themelis and Kaufman, 2010; Rhyner, 1998; Lave et al., 1999). These problems arise because those measuring the rates define recycling and MSW differently and use unlike approaches for measuring target rates for recycling or disposal. Additionally, some municipalities allow different materials to be included or excluded in the rates (Simmons et al., 2006; Pillsbury, 1997). The wide range of techniques used to count MSW and/or diversion and recycling make comparisons among programs difficult. For that reason, many regulators have required the use of standardized reporting formats (or have proposed their implementation) (Nevada Department of Conservation and Natural Resources, undated; NYSDEC, 2010b).

Here we did not have a standardized reporting program. Despite significant differences in program scopes and materials included in waste management and recycling assessments, we have created a complete accounting of municipal recycling for Long Island. Because we limited the variation in data sets by excluding certain items, such as commercial recyclables and C&D materials, we believe that some inter-municipality comparisons can be made. This is because we used primary sources for our data and concentrated on comparing similar kinds of efforts. We calculated the recycling rates using the same, simple formula:

$$RR = TR / (TR + MSW)$$

with

RR= recycling rate, expressed as a percent

TR= total recyclables collected

MSW= total MSW collected

Nonetheless, there are limitations to the comparisons because no two programs are exactly the same. Our data sets were also affected by varying amounts of incomplete or missing information. No municipal program clearly manages all the waste generated within its bounds, although Shelter Island and East Hampton seem to manage nearly all. Still, comparisons we made based on per capita rates are affected for these two municipalities because the large summer increases in populations are not reflected in LIPA population reports. Similarly, other factors that clearly affected the data include:

- Hempstead: Sanitation District #1 has its own MRF; some of the villages manage wastes outside of the Town system; most commercial wastes are not managed through the Town; metal tonnages include metals recovered at the WTE incinerator; yard wastes managed by gardening service contractors are not captured by the Town program
- North Hempstead: Some village MSW and recyclables are managed outside of the municipal system as are most commercial wastes; yard wastes managed by gardening service contractors are not captured by the Town program
- Long Beach: Large commercial establishments are not managed through the City system; the City includes C&D management as recycling; the City does not manage any yard wastes (it is not clear yard wastes are disposed in the City collection program)
- Glen Cove: Large commercial establishments are managed outside of the City system; the data include MSW and recyclables collected by Winters Brothers from outside of Glen Cove; yard waste managed by gardening service contractors are not included in the data
- Oyster Bay: Most villages do not manage MSW and recyclables through the Town system; commercial carters are reporting recyclables but not disposed wastes to the Town (we did not include the commercial recyclables in this assessment), and yard wastes managed by gardening service contractors are not captured by the Town program
- Babylon: Some villages do not manage MSW and recyclables through the Town system; although the Town has a commercial collection district, the district clearly does not manage all commercial MSW and does not manage any commercial recyclables; metal tonnages include those recovered at the WTE incinerator; yard wastes managed by gardening service contractors are not captured by the Town program
- Huntington: Some villages do not manage MSW and recyclables through the Town system; although the Town manages some commercial MSW and recyclables, it does not manage most commercial wastes and recyclables; metal tonnages include those recovered at the WTE incinerator; yard wastes managed by gardening service contractors are not captured by the Town program
- Islip: Some villages do not manage wastes and recyclables through the Town system; commercial wastes are not managed through the Town system; metal tonnages include those recovered at the WTE incinerator; some yard wastes managed by gardening service contractors are not captured by the Town program

- Smithtown: Some yard wastes managed by gardening service contractors are not captured by the Town program; village yard waste is not managed by the Town
- Brookhaven: Some village MSW and recyclables are included in Town data while others are not; commercial wastes are not managed through the Town system; some yard wastes managed by gardening service contractors are not captured by the Town program
- Riverhead: The Town did not have data on its yard waste composting efforts and certain recycling efforts like bulk metal collection; commercial wastes are not managed through the Town system
- Southampton: Waste and recyclables collected by carters from residents and businesses are not accounted for in the Town data; large summer increases in population may skew per capita assessments; some yard wastes managed by gardening service contractors may not be captured by the Town program
- Southold: Waste and recyclables managed through a local private transfer station are not included in the Town data; large summer increases in population skew per capita assessments; some yard wastes managed by gardening service contractors may not be captured by the Town program
- East Hampton: It seems likely most waste generated in the Town is managed through Town facilities, although some commercial wastes and some yard wastes managed by gardening service contractors may not be captured by the Town program; large summer increases in population skew per capita assessments
- Shelter Island: It seems likely most waste generated in the Town is managed through Town facilities, although some commercial wastes and some yard wastes managed by gardening service contractors may not be captured by the Town program; large summer increases in population skew per capita assessments

b. 2009 Recycling Rates

Percent recycling rates for Long Island municipalities varied widely in 2009 (Figure 1).

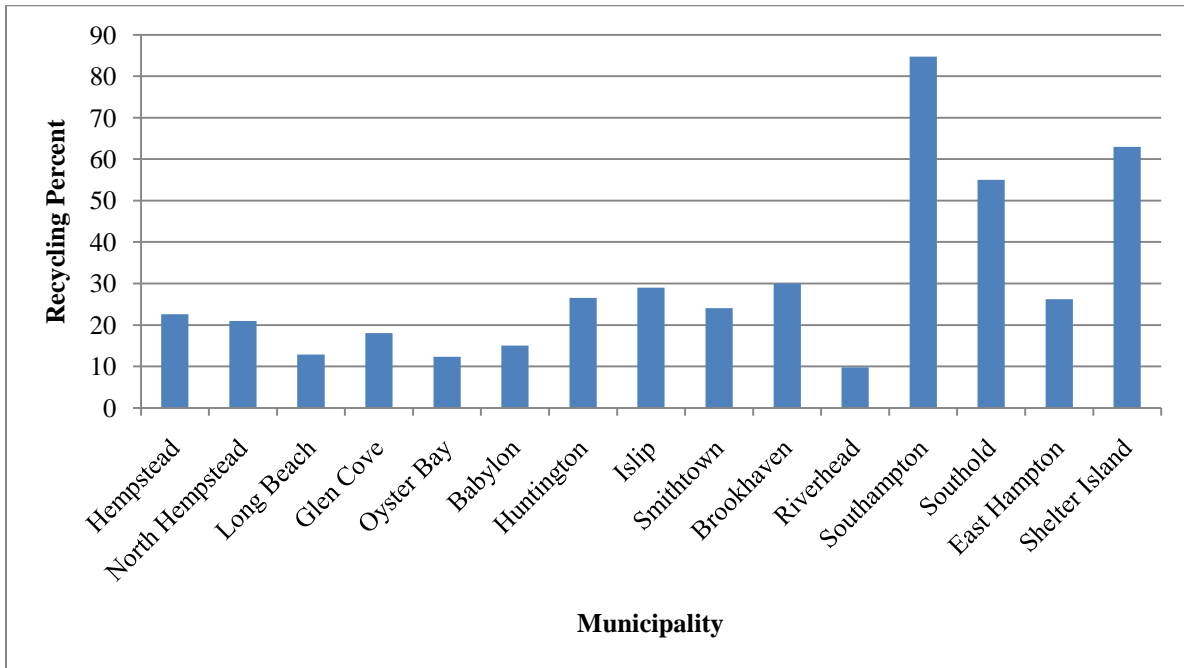


Figure 1. 2009 Computed Recycling Rates, by Municipality

There is a geographical trend, with eastern municipalities generally having higher recycling rates. The mean recycling rate for Nassau County, in the western part of the island, was 20%, while the recycling rate for Suffolk County was 27%. Most of the East End municipalities (Shelter Island, Southampton, and Southold) had the highest recycling rates. These three municipalities (Shelter Island, Southampton, and Southold) have Pay-As-You-Throw (PAYT) systems, where system users pay a volume-based amount each time they dispose of any wastes, but recycling is free of cost. This discourages waste generation generally, and encourages reuse and recycling. PAYT overall tonnage reductions have been found to be 10-20%, approximately evenly allocated among additional recycling, additional yard waste

composting (both at-home and through municipal systems), and waste generation avoidance (Skumatz, 2008). Some believe the effect is greater; the draft version of Beyond Waste (NYSDEC, 2010a) cited the Town of Southold as an example of the benefits associated with adoption of PAYT. In 1993, the Town adopted a per-bag fee schedule (to fund suddenly incurred costs for out-of-State waste transport when the Town ended its challenge to the LI Landfill Law, and closed its landfill) (Tonjes and Swanson, 2000). Waste generation in the Town plummeted, especially compared with 1990 as a base year. Wastes managed decreased by 33%, waste discards decreased by 65%, and the trends continued, so that per capita waste generation rates in the mid-2000s are ~ 40% of rates in the early 1990s (37-44% for 2006 compared to 1990). However, at nearly the same time, the Town of Brookhaven also experienced a similar sharp decrease in waste generation: using Town data sets, waste generation in 1995 was 45% less than that in 1991. For Brookhaven, the cause of the decline was tipping fee increases at the landfill that caused wastes to find cheaper disposal points. Did wastes in Southold also find cheaper disposal options? Potentially. First of all, the base year (1991) waste generation rate was affected by extra brush disposal caused by Hurricane Bob. As Southold began trying to generate revenues for what had earlier been free (or nearly free) disposal, local carters began to transport wastes to cheaper tipping points/transfer stations to the west. Technology changes added to the process: the availability of rental grinders meant land-clearing debris no longer needed to be managed at central stations, but often was ground on-site. C&D wastes found less expensive management routes. It is clear that free recycling and the PAYT program had effects on Southold's waste management system – recycling tonnages have clearly increased, and avoided disposal of yard wastes also tremendously decreased the disposal stream. However, Brookhaven has also continued to experience a decline in its waste generation.

Relative to 1991, 2009 waste generation is 50% less, and overall disposal tonnages are down 57% from the peak year with precise data (1989). Waste generation, on a per capita basis, declined by another 9% from 1995 to 2009. Therefore, it doesn't seem likely that all the changes in Southold's waste stream can be assigned to the implementation of PAYT. Still, it seems natural to assume that some of the increased recycling rates on the East End are associated with PAYT system economics.

The East End Towns (East Hampton, Shelter Island, Southampton, and Southold) do not provide curbside collection for residents. Therefore, if the residents hire private carters, the carters will choose disposal points based on cost effects associated with tipping fees and effort/time. Paying higher disposal fees can make sense if there is an associated saving of substantial time; this is the basis of our assumption that Shelter Island and East Hampton capture most local wastes (including carter-collected materials). The availability of a transfer station with long-distance haul capabilities near the Southold municipal site makes it less likely that the Town of Southold has a monopoly on local disposal. Southampton actively discourages local disposal. Thus, for Southold and Southampton, smaller amounts of MSW for disposal decreases the denominator in the recycling equation, and likely increases overall rates.

The data were also analyzed in terms of per capita per day recycling (Figure 2). The East End Towns (and Glen Cove) have the greatest rates, ranging from ~2 lbs/person/day (East Hampton) to more than 3.5 lbs/person/day (Shelter Island). These rates may be affected by the summer influxes (more waste generated due to more people that are not included in the data sets) and the PAYT systems at the three East End municipalities appear to increase diversions from disposal. In addition, because much East End waste is delivered directly to the transfer stations, there is an opportunity for "retail" waste management – that is, Town employees at the disposal

points can tutor disposers in the best means of managing particular items, thereby increasing recovery rates. The Glen Cove rate appears to be affected by the inclusion of wastes that were actually not generated within the City.

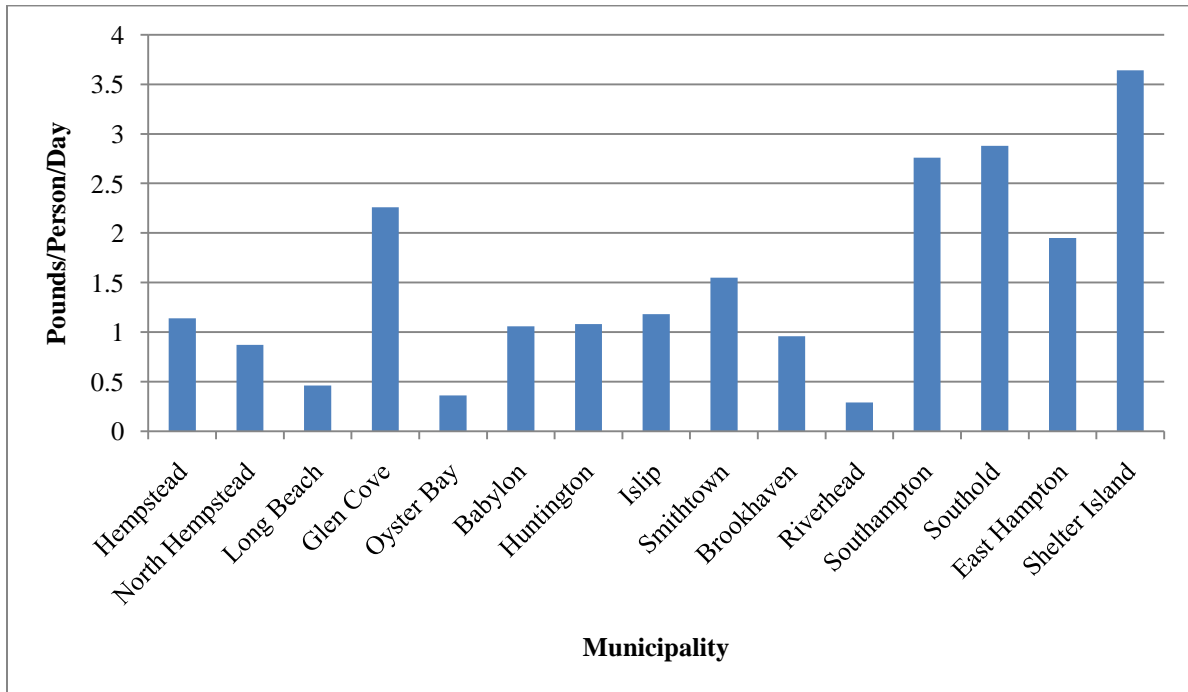


Figure 2. 2009 Per Capita Per Day Recycling Rates, in lbs., by Municipality

Robust composting rates at the East End sites also appeared to be a factor in the excellent recycling rates reported there. We therefore analyzed the data in terms of “curbside” recyclables (paper and containers) per person per day (Figure 3). The curbside recyclables, representing manufactured materials that are intended to be reused in creating new goods, are widely perceived as ‘real’ recyclables (books such as *Why Do We Recycle?* [Ackerman,1997] and *Cradle to Cradle* [McDonough and Braungart, 2002] focus on these kinds of recyclables for those reasons). Shelter Island recovers more than 1 lb/person/day (as does Glen Cove);

Huntington and Southold are the only other municipalities recovering more than 0.5 lbs/person/day of curbside recyclables. These data suggest that most of the curbside programs have similar efficiencies (approximately 0.3-0.4 lbs/person/day), which seems to reflect the similar character of these programs as outlined in the individual municipal sections.

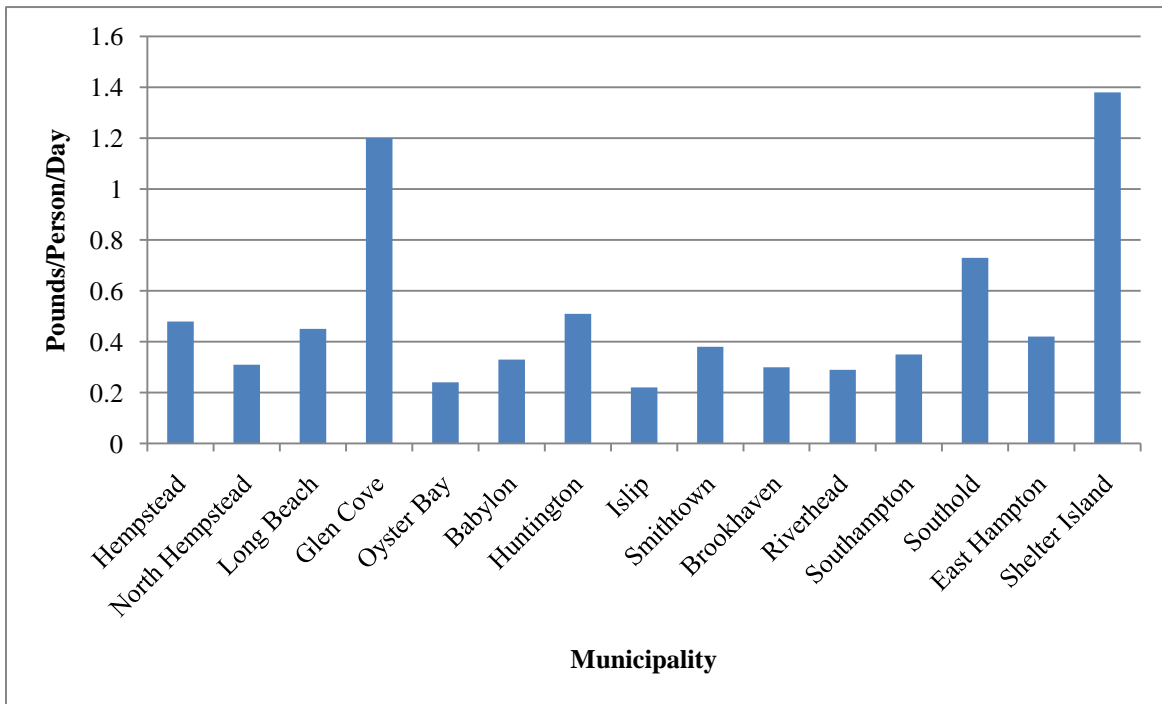


Figure 3. 2009 Per Capita Per Day “Curbside” Recyclables Rates, in lbs., by Municipality

c. Recycling Trends

All Long Island recycling programs grew rapidly in the early 1990s, but subsequently plateaued in growth in the 2000s, as measured by recycling percents (four exemplar trends are shown in Figures 4-7). The rate increases were likely due to greater resident participation and general improvements in program efficiencies. Since the general expansion to comprehensive recycling, (e.g., paper and container source separation for residents and yard waste management) no significant changes have been made to most programs. In fact, if anything, there has been a

trend away from managing particular wastes (grass clipping bans and decreased collection of land-clearing debris). Notably, none of the western Towns have made any efforts to ensure most commercial generated recyclable materials are source-separated and managed through recovery systems. Oyster Bay has made a substantial effort to capture commercially-managed recyclables data, but enforcement efforts of the laws that require source separation are not manifest. Even those municipalities that have some municipal management of commercial recyclables (Hempstead, Long Beach, Glen Cove, Huntington, and Oyster Bay) do not inspect businesses to determine if proper source separation is being undertaken. The East End Towns with drop-off programs receive some portion of commercial source separated materials, but those Towns also do not inspect to determine if all businesses receiving waste services are complying with the local laws specifying source-separation for all waste generators.

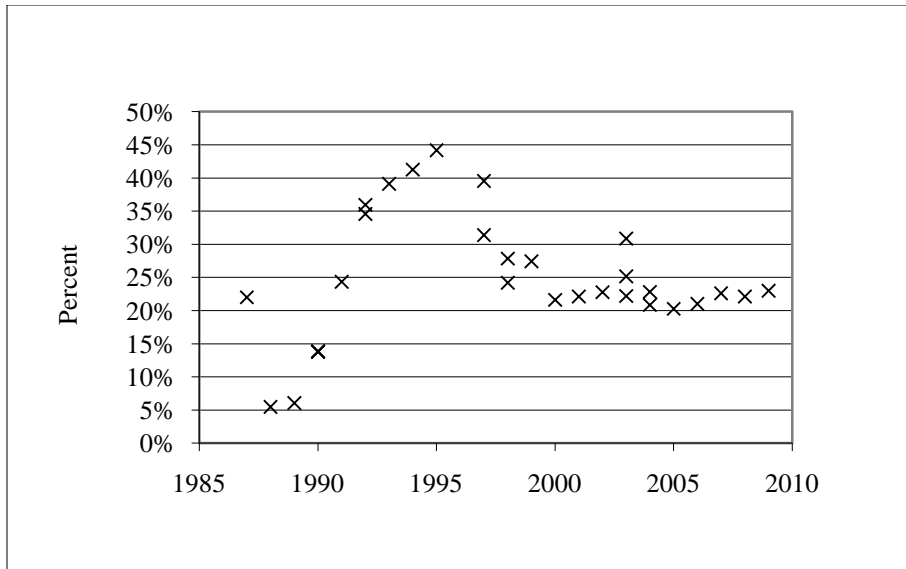


Figure 4. Hempstead Recycling Rates (multiple data points result from accessing different sources of recycling information, or from differing sums of recyclables provided by the Town)

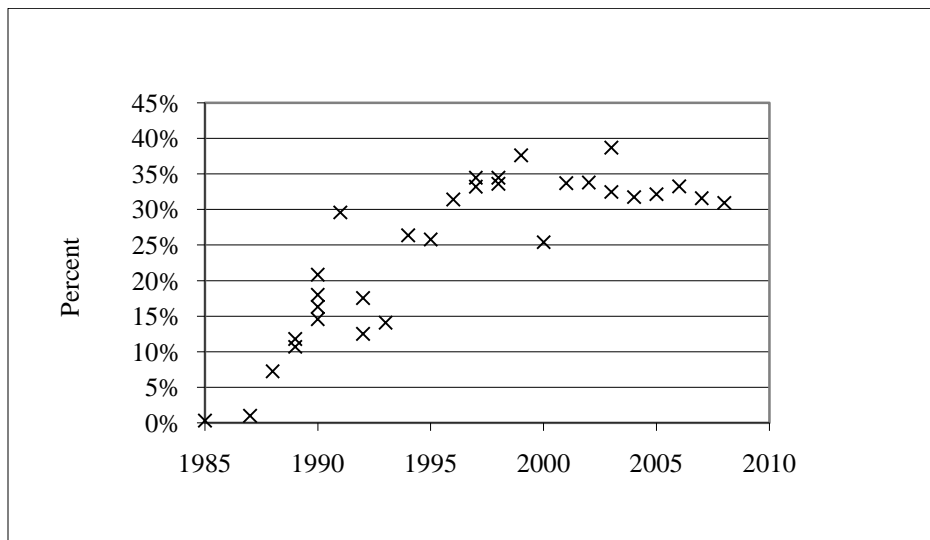


Figure 5. Huntington Recycling Rates (multiple data points result from accessing different sources of recycling information, or from differing sums of recyclables provided by the Town)

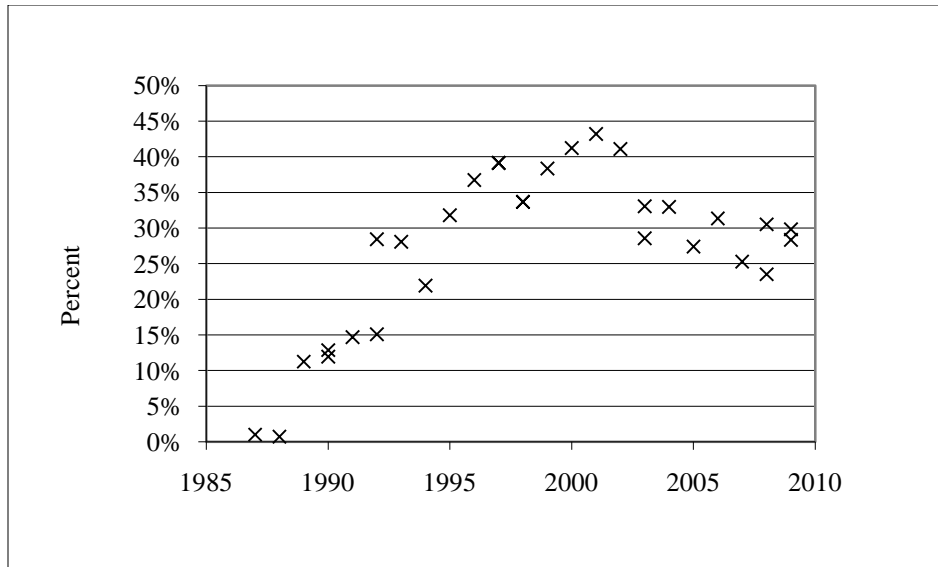


Figure 6. Brookhaven Recycling Rates (multiple data points result from accessing different sources of recycling information, or from differing sums of recyclables provided by the Town)

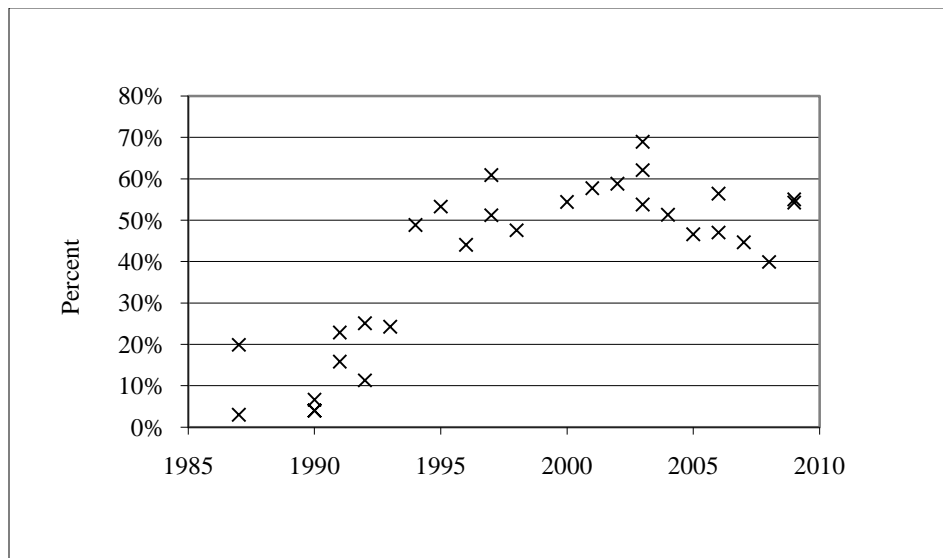


Figure 7. Southold Recycling Rates (multiple data points result from accessing different sources of recycling information, or from differing sums of recyclables provided by the Town)

All of these examples show declines from peak levels in the late 1990s-early 2000s, although some are greater than others. Some of these declines stem from more precise accounting methods. Brookhaven, for instance, counted all materials delivered to its MRF as Brookhaven recyclables, although at least some of these materials had been collected outside of the Town, and may also have been claimed for recycling credits by other units. The Town of Hempstead was very aggressive in taking credit for yard waste recoveries. The Town also added to its recycling credits by counting C&D recoveries and innovative efforts such as clamshells (from chowder clam processors) used for decorative roadways in Town parks, and a now-defunct mattress recovery program. Even today, with most reporting following stricter counting rules, there are some anomalies such as collected glass being treated as recycled, although markets are non-existent and reuse is generally restricted to structural fills or cover at landfills. In 2009 Brookhaven counts abandoned automobiles in its recycling totals (which most recycling programs do not); this made sense when the abandoned cars were stored at the landfill and shipped from there for recycling (as it made it more waste management-linked). Municipalities with WTE incinerators count metal recovered post-combustion (although that metal has already been counted as waste). Residues are difficult to factor in; it is recognized that inappropriate materials set out in recycling bins should not be counted as recyclables, but few programs can determine what the residue rate is; it is not clear whether the input or the output from composting should be the “recycling” value; and, materials used as bulking agents in composting perhaps are residues, or perhaps are as-yet unrealized compost, and how to count them is not clear.

However, even the most robust Long Island programs do not achieve recycling rates measured in some other areas of the country. San Francisco, which has an extensive program that collects many materials not targeted on Long Island and includes significant amount of

public outreach, has achieved diversion rates of more than 70% (Greene, 2010). The City has taken numerous innovative approaches to recycling, such as food waste composting, public space recycling, and inclusion of all institutions and businesses in its recovery programs, without exceptions. The City has dedicated significant amounts of time, effort, and funding to continue to grow its recycling program, recognizing that it is spending considerably more on recycling than other municipalities do. These efforts result in a higher recycling rate.

It is hard not to think that similar efforts by Long Island municipalities would similarly result in improved recovery rates. Although New York State is touting program expansions to food wastes as a means of enhancing recycling rates (NYSDEC, 2010b), the State Solid Waste Management Plan also looks for consolidation of existing efforts, enhanced education and enforcement, and assurances that private sector waste management efforts are following the recycling ordinances that they are subject to. Because the latter set of efforts require little to no capital expenditures, they appear to be relatively simple to implement. However, policy implementations such as these are surprisingly difficult. For instance, we have heard increasing numbers of stories and have made our own observations that carters, municipal and private, are not delivering source separated recyclables as recyclables. Instead, to avoid the extra work that another collection effort imposes, source-separated recyclables are collected with regular trash (at least at times in certain places). This is disheartening for those who have taken the time and effort to try to recycle materials. Work-rule violation processes (for municipal workers) and contract or ordinance enforcement (for private carters) are often daunting prospects for administrators; it is easier to ignore the collection problems than to address them. Similarly, additional education is difficult to pursue when municipal work forces are being reduced, and enforcement efforts require political willingness to ticket potential voters for not complying with

recycling rules. In most instances, the local Towns lack a mechanism (such as a licensing process or code section) that would allow them to collect meaningful data from local private carters (who sometimes resist reporting requirements that may disclose business information).

Certainly there would appear to be a need for better outreach efforts. There seems to be only two recycling educators in all of Long Island (in the Towns of Islip and Oyster Bay). Perhaps a ‘shared’ educator resource (either through a consulting arrangement or an innovative hiring approach perhaps through the Counties) is a way of addressing this problem without necessarily hiring 14 new municipal employees. Such an arrangement might also make outreach programs more consistent.

Financial incentives, such as the Recycle Bank program in Philadelphia, are the inverse of compliance through enforcement. Several studies have found increased recycling and decreased disposal associated with such programs (Skumatz, 2008; Ferrara and Missios, 2005). However, it is critical that municipalities actively publicize these incentives, as, absent awareness, participation will not be great. Thus, the need for more active outreach programs would appear to be crucial. Even if enforcement is the tack selected to increase rates, there would clearly be a need to make the effort known, as it is impossible to ticket everyone who does not comply with the rules – assuming, of course that the intention is to increase recycling participation, not raise revenues through fines.

Long Island-wide trends illustrate a stagnation in recycling recoveries (Figure 8). We have identified a number of reasons why individual programs may show declining rates, and those reasons certainly apply to Long Island as a whole: more precise accounting of recycling

activities, decreases in education efforts, and lack of inclusion of all recycling efforts, such as composting and commercial recycling activities.

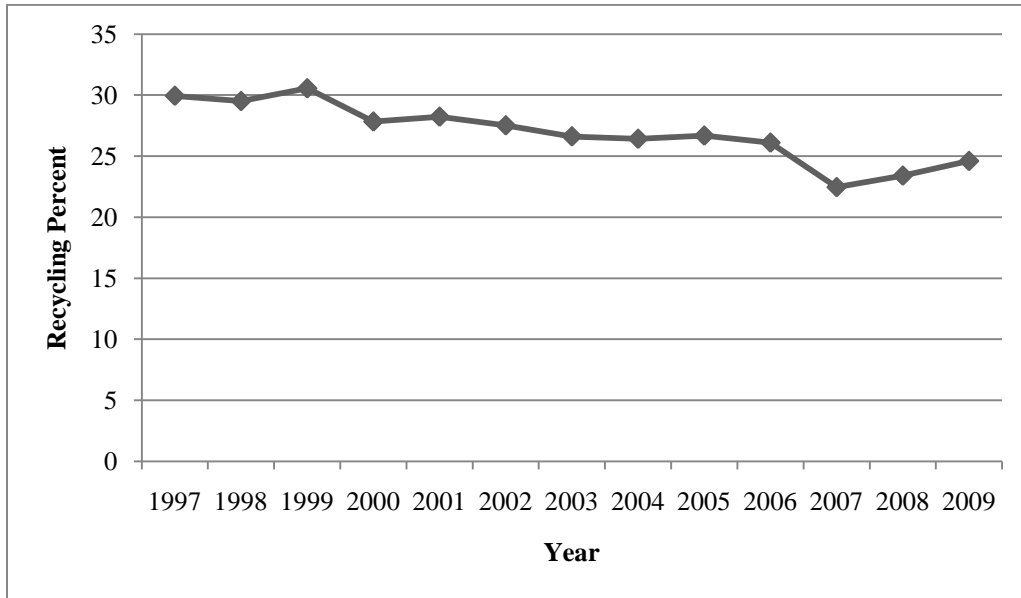


Figure 8. Trends in Long Island-wide Recycling Rates (based on collected information; not all municipalities provided information for each year)

The U.S. Environmental Protection Agency (USEPA) generates nationwide waste management data, primarily through an economic flows model that tracks the creation of products and determines their fate and management. Its calculations of U.S. recycling have been increasing, in contrast to the data we show here for Long Island. The aggregated Long Island recycling rate used to exceed USEPA national rates by approximately 20%, but now are a third less (Figure 9). USEPA attributes increasing national rates to the growth in curbside collection programs, increased organics composting, and robust recycling of commercially generated wastes (USEPA, 2009). Long Island has well-established curbside programs, and all municipalities (except Long Beach) have yard waste composting programs (although several municipalities do not document these programs well). We have identified a data gap for

commercial recycling, but the USEPA rates imply that Long Island municipal programs simply may not be as good at recycling as other programs across the country.

BioCycle, a composting trade journal, also collects nationwide waste management data. Its researchers contact each state and collect waste generation and management data from program officers (van Haaren et al., 2010). This is somewhat similar to the methodology we used to compile our Long Island data, at least in comparison to the USEPA modeling effort. *BioCycle* details very different waste management data than USEPA does. Its nationwide recycling trends, as also shown in Figure 9, have been trending lower over time. The total Long Island rate matches the *BioCycle* rate (comparing our more complete 2009 data set to the *BioCycle* 2008 data), as both have a 24% recycling rate. This is so although *BioCycle* believes its data for California, which claims to generate more than 30% of all U.S. recyclables, are somewhat uncertain and may be biased high. Therefore, it may be that Long Island actually recycles at a higher rate than the national average.

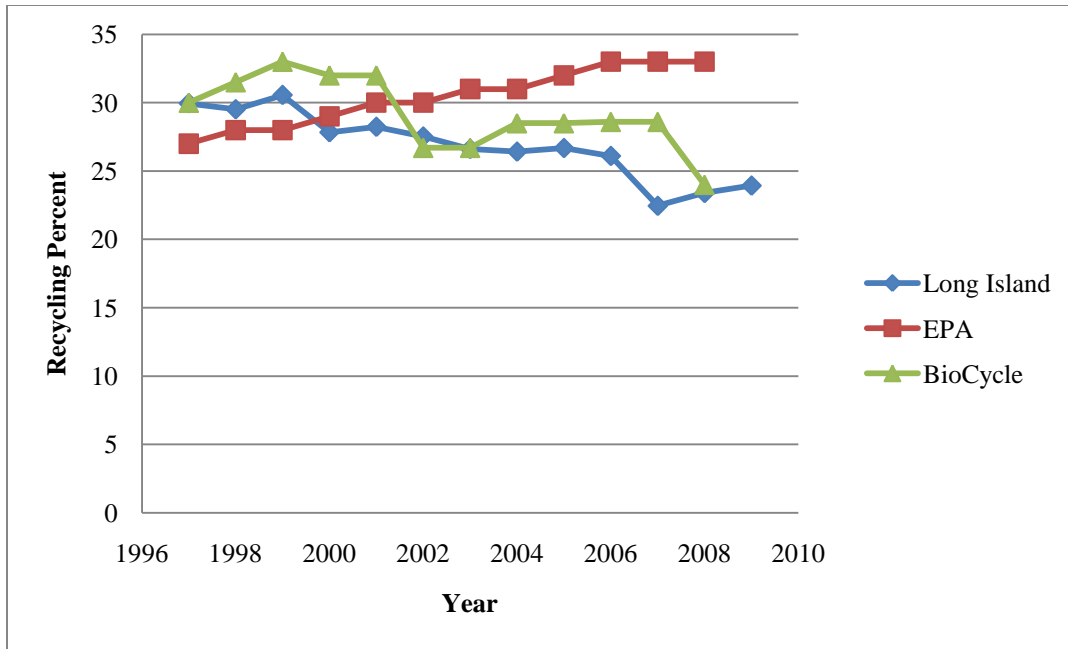


Figure 9. Trends in Recycling Rates for Aggregated Long Island Data and Two US Computations (USEPA and *BioCycle*).

New York State data suggest that Long Island recycles better than the State does as a whole. In the *BioCycle* report, the data for New York (supplied by NYSDEC) for 2008 shows a State-wide rate of 21%, which means each Long Islander recycles 10% more than the State average. The recycling rate reported in the draft State Waste Management Plan was a little lower than the data provided to *BioCycle*, further suggesting that Long Island performs better at recycling than most areas of New York State.

Other issues make it difficult to compare Long Island recycling to programs in other states, or to national accountings. The State bottle bill program probably reduces the collection of certain containers through the recycling programs. The five cent incentives result in State-wide recovery rates of 70% or so for materials with deposits (NYSDEC, 2010a), which is

thought to exceed the recovery rates for curbside recyclables. The State recently expanded the reach of the deposit program; some downturn in collected materials can be expected.

It is also possible that the same expenditure of efforts to recycle may be resulting in lower results. The decades-long change in packaging materials may also be contributing to some declines in recycling amounts. Heavy glass containers are being replaced by plastics, for instance, and many varieties of packaging are thinner. The decline of newspapers under the onslaught of on-line information may also be reducing recycling rates. Paper (of all kinds) is the second largest recycling stream, after yard wastes, for most Long Island programs. We have no documentation of these suppositions, however.

The current recession should reduce waste generation rates, as the amount of waste is generally found to vary with retail rates (USEPA, 1999). It is not clear that overall recycling rates (as percents) would necessarily decline, however; proportionately, residents may continue recycling habits even though they are generating less waste overall. Our data suggest a longer trend in declining rates, in any case, that predate the 2007-2008 start of the current economic downturn.

V. Conclusion and Directions for Future Research

This study highlights the key components of all municipal recycling programs in Nassau and Suffolk Counties. The variety of program design options (ranging from municipal collection services for residential and commercial sectors, to PAYT residential drop-off facilities) which exist on Long Island are documented. In addition, differences in recycling rates from one municipality to the next are determined. It is clear that these programs can be enhanced, although the means to accomplish improvements is not easily determined. Certainly expanding public outreach is a necessary component. San Francisco, with approximately 25% of the population of Nassau and Suffolk Counties, employs over 30 people to enhance recycling rates there. Besides two recycling educators, there does not appear to be another municipal employee on Long Island whose job is solely directed at recycling program improvements.

Our study does have some limitations, many associated with differing ways the programs assess their efforts. However, these are not believed to have compromised the general accuracy of our findings. Our intent was to document and analyze aspects of recycling by municipalities on Long Island; we have created a context for evaluating the many different approaches taken toward recovery of materials here under different conditions, and beginning to find ways that improvements may be made to increase the success of these programs.

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References

a. Acknowledgements

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b. Websites

Information was also collected from the following websites:

Town of Hempstead Dept. of Sanitation. <http://townofhempstead.org/content/cs/collection.html>.

Town of North Hempstead Solid Waste Management Authority.
<http://townofhempstead.org/content/cs/sanitation.html/>

City of Long Beach Dept. of Sanitation and Recycling.
http://www.longbeachny.org/index.asp?Type=B_BASIC&SEC={59CAE0CD-2EC0-474C-A1D8-9513023DE987}.

City of Glen Cove Dept. of Public Works. http://www.glencove-li.com/index.asp?Type=B_BASIC&SEC={11FB179F-2632-4A35-9476-290BD4254CFE}.

Town of Oyster Bay Dept. of Public Works.
http://www.oysterbaytown.com/index.asp?Type=B_BASIC&SEC={8E10384D-990F-4315-969E-E4EC70D71567}&DE={72DE743B-1DDB-4C6E-93BF-B32835AC19D7}.

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<http://www.townofbabylon.com/departments/details.cfm?did=9>.

Town of Huntington Dept. of Environmental Waste Management.
http://town.huntington.ny.us/departments_details.cfm?ID=8.

Town of Islip Dept. of Environmental Control. <http://www.townofislip-ny.gov/departments/environmental-control>.

Town of Smithtown Dept. of Municipal Services. [http://www.smithtowninfo.com/Sanitation\(MunicipalServicesFacility\)/](http://www.smithtowninfo.com/Sanitation(MunicipalServicesFacility)/).

Town of Brookhaven Dept. of Waste Management. <http://www.brookhaven.org/Departments/WasteManagement.aspx>.

Town of Riverhead Dept. of Sanitation. <http://www.riverheadli.com/sanitation.html>.

Town of Southampton Dept. of Waste Management. <http://www.southamptontownny.gov/content/760/762/1122/1138/1128/default.aspx>.

Town of Southold Solid Waste District. http://southoldtown.northfork.net/collection_center.htm.

Town of East Hampton Dept. of Sanitation. <http://www.town.east-hampton.ny.us/sanitation.cfm>.

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	Hemp.	N. Hemp	Long Beach	Glen Cove	Oyster Bay	Babylon	Hunt.	Islip	Smith	Brookhaven	Riverhead	S-hampton	Southold	E. Hampton	Shelter. Island
Olympic Fibers Corp.												√			
DeMatteo Salvage						√	√							√	
PK Metals							√						√		
Franza Universal Scrap Metal									√						
Gershow Recycling	√	√			√	√	√	√				√	√	√	
A&R Labasco												√			
Supreme Computer & Electronics Recycling								√	√						
E-Scrap Destruction	√	√							√			√	√		
Long Island Compost					√					√					
Islip Blydenburg Clean Fill								√	√						
Hillside Recycling Facility									√						

Hemp. = Hempstead; N Hemp. = North Hempstead; Hunt = Huntington; Smith = Smithtown; S-hampton = Southampton; E. Hampton = East Hampton

Appendix II

Table 5. Materials Recycled in Each Municipality

	Hemp.	N. Hemp	Long Beach	Glen Cove	Oyster Bay	Babylon	Hunt.	Islip	Smith	Brookhaven	Riverhead	S.-hampton	Southold	E. Hampton	Shelter. Island
Newspaper	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Corrugated Cardboard	√	√	√			√	√	√	√	√	√	√	√	√	√
Magazines	√	√	√		√	√	√	√	√	√	√	√	√	√	√
Junk Mail		√	√		√	√	√			√	√	√	√	√	√
Other Misc. Paper		√	√		√	√	√			√	√	√	√	√	√
Glass	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Metal Containers	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
#1 Plastics	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
#2 Plastics	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
#3 Plastics			√	√			√				√		√		√
#4 Plastics			√	√			√				√		√		√
#5 Plastics		√	√	√			√				√		√		√
#6 Plastics				√			√				√		√		√
#7 Plastics				√			√				√		√		√
E-Waste	√	√	√	√	√	√	√	√	√	√	√		√	√	√
Concrete				√		√			√	√			√		√
Bulk Metal	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
Yard Waste (brush and leaves)	√	√		√	√	√	√	√	√	√	√	√	√	√	√
Grass Clippings	√	√			√	√		√	√			√	√	√	√
Waste Oil	√		√		√	√	√	√	√	√	√	√	√	√	√

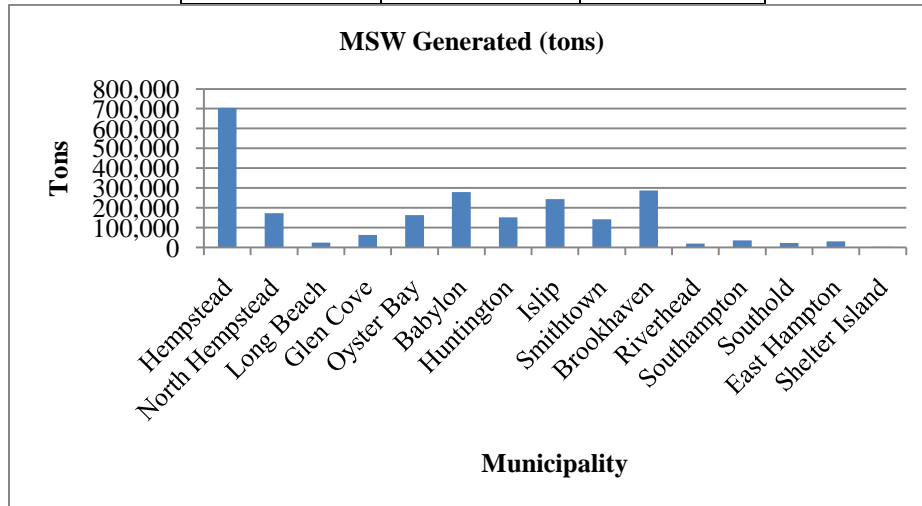
Hemp. = Hempstead; N Hemp. = North Hempstead; Hunt = Huntington; Smith = Smithtown; S-hampton = Southampton; E. Hampton = East Hampton

Appendix III

Municipal Rankings

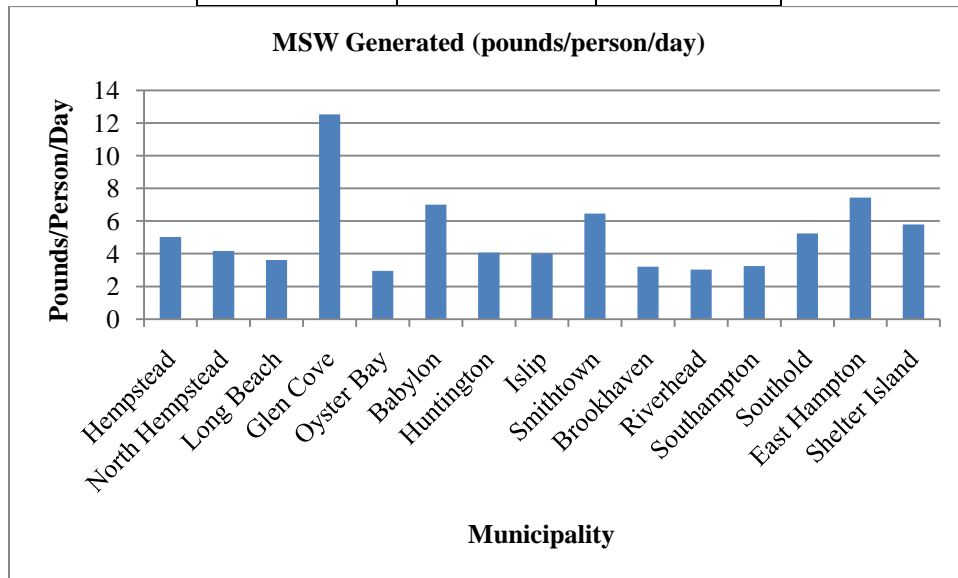
A. MSW Generated (tons)

Ranking	Municipality	MSW Generated
1	Hempstead	704,356
2	Brookhaven	287,550
3	Babylon	279,696
4	Islip	244,140
5	North Hempstead	171,733
6	Oyster Bay	162,616
7	Huntington	151,192
8	Smithtown	141,791
9	Glen Cove	63,183
10	Southampton	35,696
11	East Hampton	29,582
12	Long Beach	23,822
13	Southold	22,178
14	Riverhead	18,822
15	Shelter Island	2,688



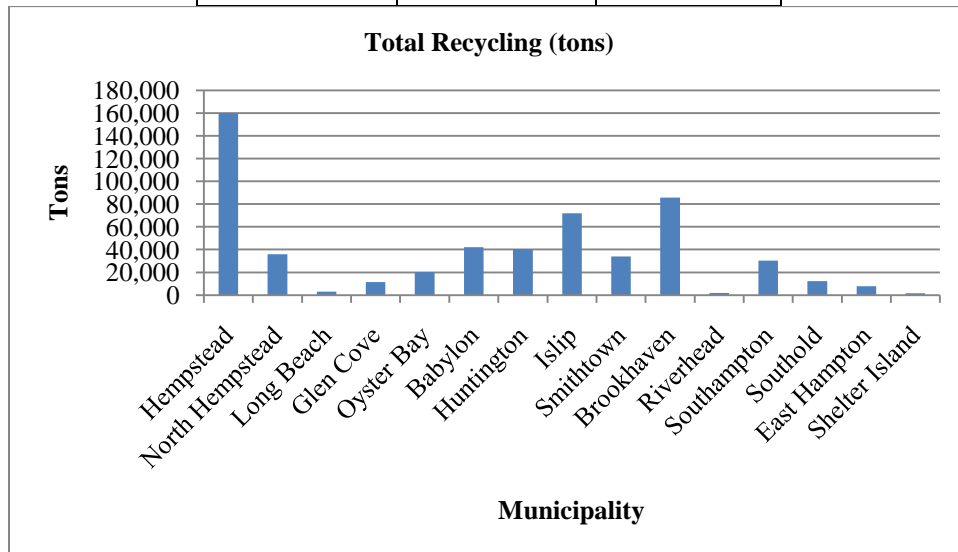
B. MSW Generated (pounds/person/day)

Ranking	Municipality	MSW Generated
1	Glen Cove	12.52
2	East Hampton	7.43
3	Babylon	7.01
4	Smithtown	6.45
5	Shelter Island	5.79
6	Southold	5.24
7	Hempstead	5.03
8	North Hempstead	4.16
9	Huntington	4.07
10	Islip	4.01
11	Long Beach	3.61
12	Southampton	3.25
13	Brookhaven	3.20
14	Riverhead	3.02
15	Oyster Bay	2.94



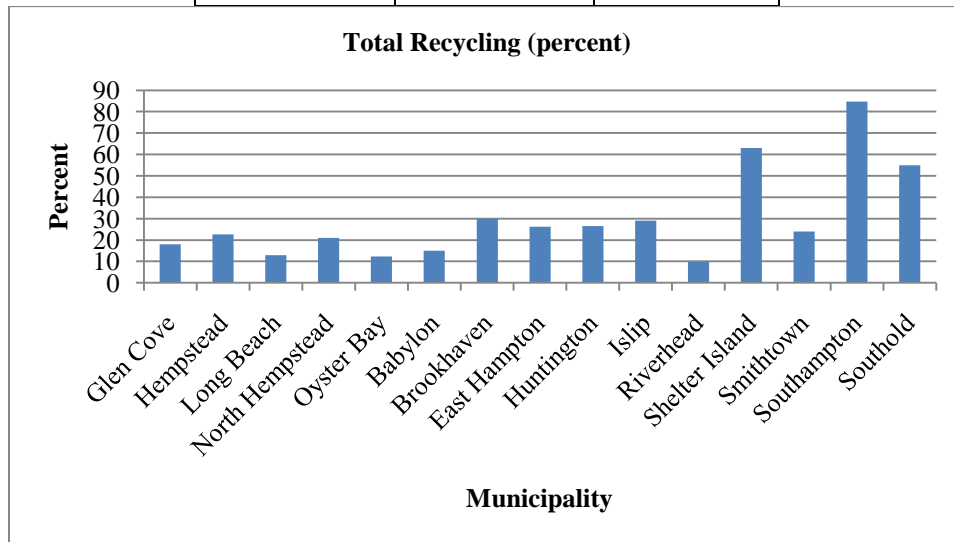
C. Total Recycling (tons)

Ranking	Municipality	Total Recycling
1	Hempstead	159,816
2	Brookhaven	85,730
3	Islip	71,757
4	Babylon	42,109
5	Huntington	40,351
6	North Hempstead	35,964
7	Smithtown	34,064
8	Southampton	30,255
9	Oyster Bay	20,085
10	Southold	12,199
11	Glen Cove	11,408
12	East Hampton	7,760
13	Long Beach	3,064
14	Riverhead	1,835
15	Shelter Island	1,693



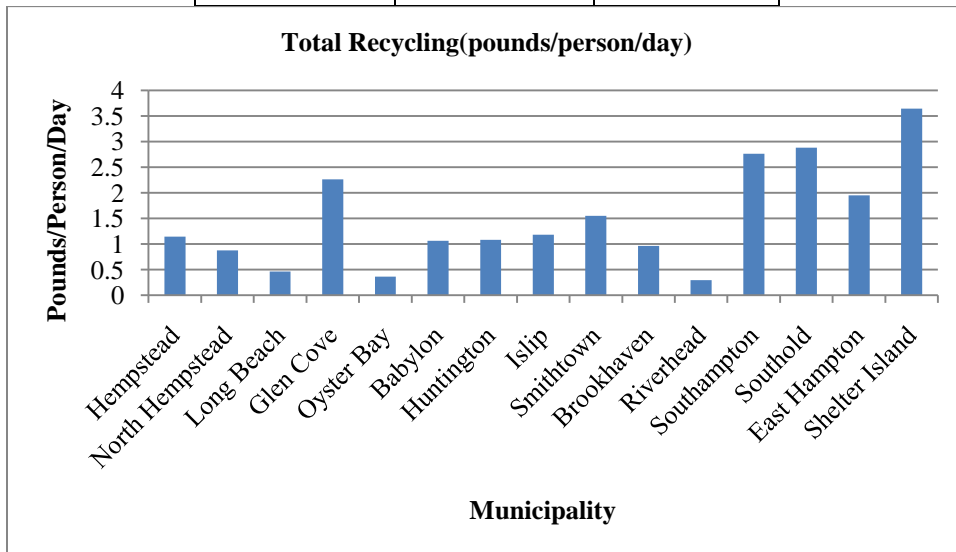
D. Total Recycling (percent)

Ranking	Municipality	Total Recycling
1	Southampton	85%
2	Shelter Island	63%
3	Southold	55%
4	Brookhaven	30%
5	Islip	29%
6	Huntington	27%
7	East Hampton	26%
8	Smithtown	24%
9	Hempstead	23%
10	North Hempstead	21%
11	Glen Cove	18%
12	Babylon	15%
13	Long Beach	13%
14	Oyster Bay	12%
15	Riverhead	10%



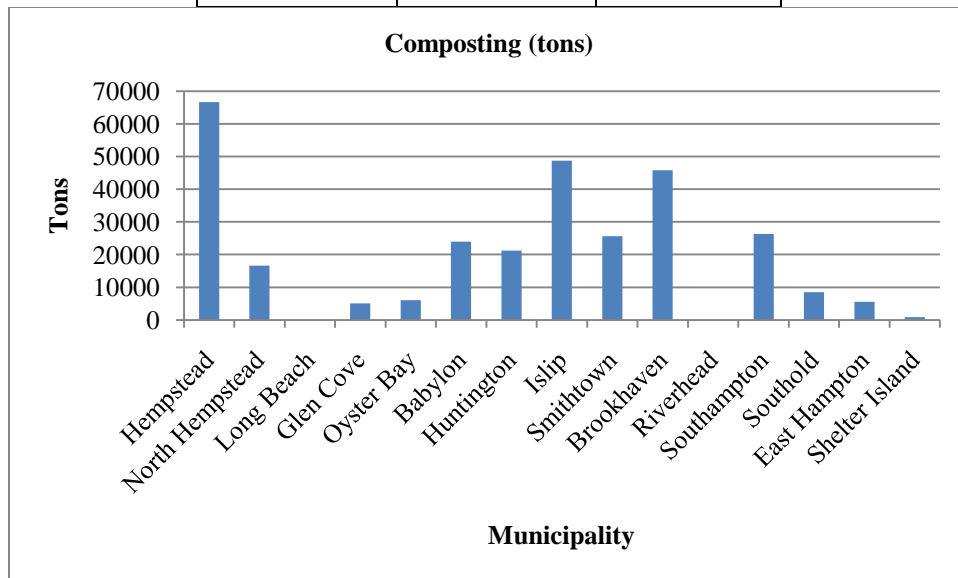
E. Total Recycling (pounds/person/day)

Ranking	Municipality	Total Recycling
1	Shelter Island	3.64
2	Southold	2.88
3	Southampton	2.76
4	Glen Cove	2.26
5	East Hampton	1.95
6	Smithtown	1.55
7	Islip	1.18
8	Hempstead	1.14
9	Huntington	1.08
10	Babylon	1.06
11	Brookhaven	0.96
12	North Hempstead	0.87
13	Long Beach	0.46
14	Oyster Bay	0.36
15	Riverhead	0.29



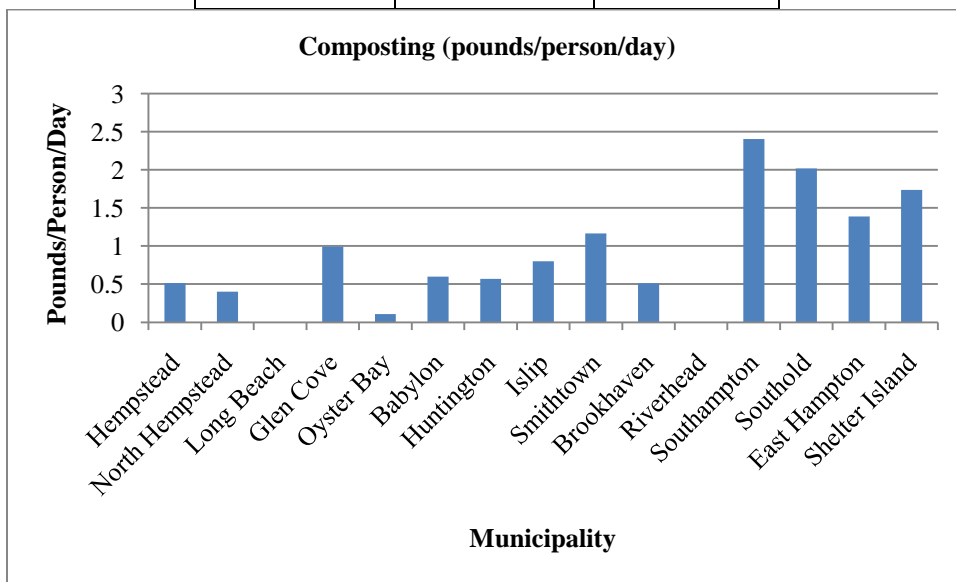
F. Composting (tons)

Ranking	Municipality	Composting
1	Hempstead	66,602
2	Islip	48,695
3	Brookhaven	45,748
4	Southampton	26,310
5	Smithtown	25,617
6	Babylon	23,956
7	Huntington	21,245
8	North Hempstead	16,576
9	Southold	8,527
10	Oyster Bay	6,018
11	East Hampton	5,523
12	Glen Cove	5,018
13	Shelter Island	807
14	Riverhead	0
15	Long Beach	0



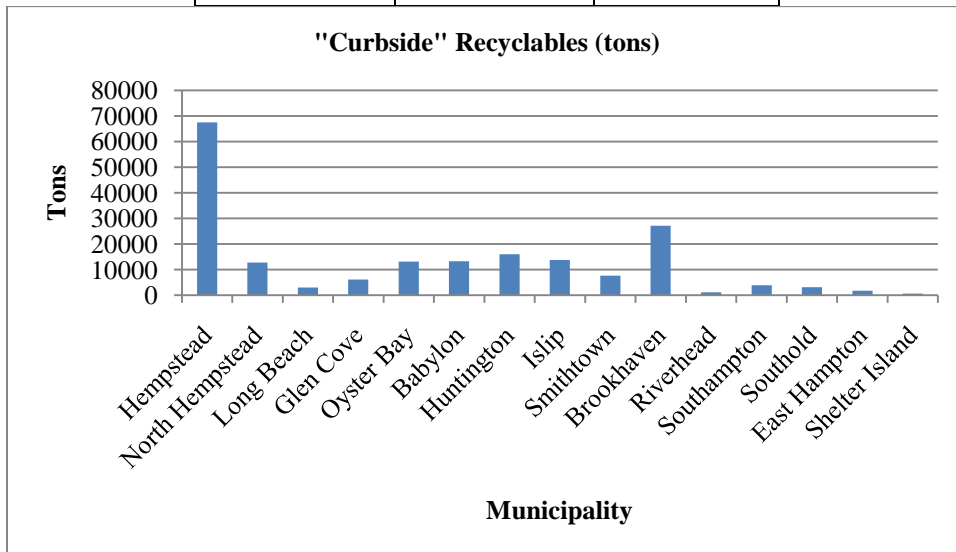
G. Composting (pounds/person/day)

Ranking	Municipality	Composting
1	Southampton	2.40
2	Southold	2.02
3	Shelter Island	1.74
4	East Hampton	1.39
5	Smithtown	1.17
6	Glen Cove	0.99
7	Islip	0.79
8	Babylon	0.60
9	Huntington	0.57
10	Hempstead	0.52
11	Brookhaven	0.51
12	North Hempstead	0.40
13	Oyster Bay	0.11
14	Riverhead	0
15	Long Beach	0



H. "Curbside" Recyclables (tons)

Ranking	Municipality	"Curbside" Recyclables
1	Hempstead	67,491
2	Brookhaven	27,047
3	Huntington	15,970
4	Islip	13,646
5	Babylon	13,203
6	Oyster Bay	13,026
7	North Hempstead	12,724
8	Smithtown	7,599
9	Glen Cove	6,055
10	Southampton	3,823
11	Southold	3,103
12	Long Beach	2,973
13	East Hampton	1,674
14	Riverhead	1,133
15	Shelter Island	642



I. "Curbside" Recyclables (pounds/person/day)

Ranking	Municipality	"Curbside" Recyclables
1	Shelter Island	1.38
2	Glen Cove	1.2
3	Southold	0.73
4	Huntington	0.51
5	Hempstead	0.48
6	Long Beach	0.45
7	East Hampton	0.42
8	Smithtown	0.38
9	Southampton	0.35
10	Babylon	0.33
11	North Hempstead	0.31
12	Brookhaven	0.30
13	Riverhead	0.29
14	Oyster Bay	0.24
15	Islip	0.22

