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Pt.2A

Comparing Apples and Oranges

Municipal Recycling Tonnages and Rates on Long Island in the 1990s
A. The Data Report

Part II of an Assessment of Recycling on Long Island



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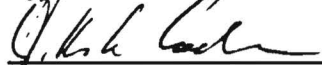
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Executive Summary

This is the second part of a six-part series concerning recycling on Long Island. This part, Comparing Apples and Oranges, is primarily a data report on the recycling programs in Nassau and Suffolk Counties. This volume of Comparing Apples and Oranges, "Part A," presents municipal recycling data from the past ten years or so. "Part B" contains analyses of the data.

Long Island, as considered in this report, is comprised of Nassau and Suffolk Counties. It contains a population of approximately 2.6 million. It is primarily suburban in character (although it has some urban areas in western Nassau County, and the eastern portions of Suffolk County contain agricultural and/or undeveloped land, and tourist resorts). Most of the suburbanization of Long Island occurred after World War II.

The first part of the series, Doing the Right Thing, discussed the growth and extent of municipal recycling programs. Long Island municipal recycling programs began in earnest after the Islip Garbage Barge in 1986. By 1994 (the last year completely discussed in the report), all 15 municipalities in Nassau and Suffolk Counties had mandatory source separation programs. Although programs differ, all recycle newspaper, and glass, metal and plastic containers. All but one of the mandatory programs also target corrugated cardboard; all but one of the municipalities also recycle yard wastes. All of the municipalities target additional materials, as well; the particulars vary. Differences in the techniques for amassing recyclables, processing them, and the participants of the recyclables programs also distinguish each municipality. These will be reviewed briefly in the reports contained in this paper.

The basic structure of each recycling program had been in place for over a year by the end of 1994, and, in all but one instance, had been set since 1990. Although changes in materials managed, processing means, and other elements were described for almost every municipality each year, it is also fair to say that municipal recycling on Long Island has progressed past the experimental stage, and is a mature part of each municipality's waste management policy.

This is reflected in the individual municipality data sets compiled here. The earliest waste management data for any municipality does not include a large tonnage managed by recycling. Beginning in the 1980s, some of each municipality's wastes began to be recycled; by the 1990s, substantial percentages of each municipality's waste stream were managed through recycling.

The intent of this report is to compile data essential for analyses to follow. As such, it does not lend itself to a short summary. Each report, however, includes three components: a table summarizing available waste management data, including a "recycling percent;" a table containing recyclables by tonnages (for the past five years or so), broken down by consistent materials categories; and a summary of the amount and per capita rate of either (1) curbside collection of paper and container recyclables or (2) drop-off collection of those materials, depending on the predominant means of municipal waste collection, for the years 1990 - 1994..

In general, these tables show the following: increasing recycling percentages over time; increasing recycling tonnages over time; and increasing per capita separation rates over time. Please note these three generalities do not hold for all the specific situations discussed for each municipality. The degree that particular municipalities make the generalities true can vary widely as well. Further analyses of these data will be contained in the following volume, Comparing Apples and Oranges, Part B.

Introduction

The Waste Reduction and Management Institute (WRMI) was established in 1985 by the New York State Legislature (as the Waste Management Institute). The mission of WRMI is to reduce the impact of waste generation on society through a program of research, assessment, education, and policy analysis. Locally, there is a need to compile accurate and credible information about Long Island's solid waste stream and infrastructure. This need was initially addressed by the publication of Where Does It All Go? in 1992 (Tonjes and Swanson).

Solid waste management on Long Island has evolved considerably since the data were collected for that report. This project began as an update to Where Does It All Go? In the course of data collection and analysis, it became obvious that certain aspects of Long Island's solid waste structure were deserving of study in and of themselves. The focus of the proposed report became recycling and its associated processes. As our assessment grew, it was suggested

to us that the report had grown to unwieldy size, and would be of little utility if issued as a single document. We therefore have attempted to break the initial report down into manageable pieces.

This paper, Comparing Apples and Oranges, is the second of a series of six related reports. All six of the reports discuss some aspect of recycling in Nassau and Suffolk Counties. Each report is intended to stand alone; however, the reader interested in all aspects of the recycling process on Long Island would reap the most benefit by reading the reports in order.

Comparing Apples and Oranges is a data report on the extent of municipal recycling on Long Island, and how this has changed over the past ten years or so. It also makes some comparisons between aspects of the municipal recycling programs that we found to be consonant with each other. The report has been broken into two pieces: Part A comprises the data sets, and Part B is our analysis of the data. The collected data are integral to the analyses; however, inclusion of the data with the analyses made the combined report too cumbersome.

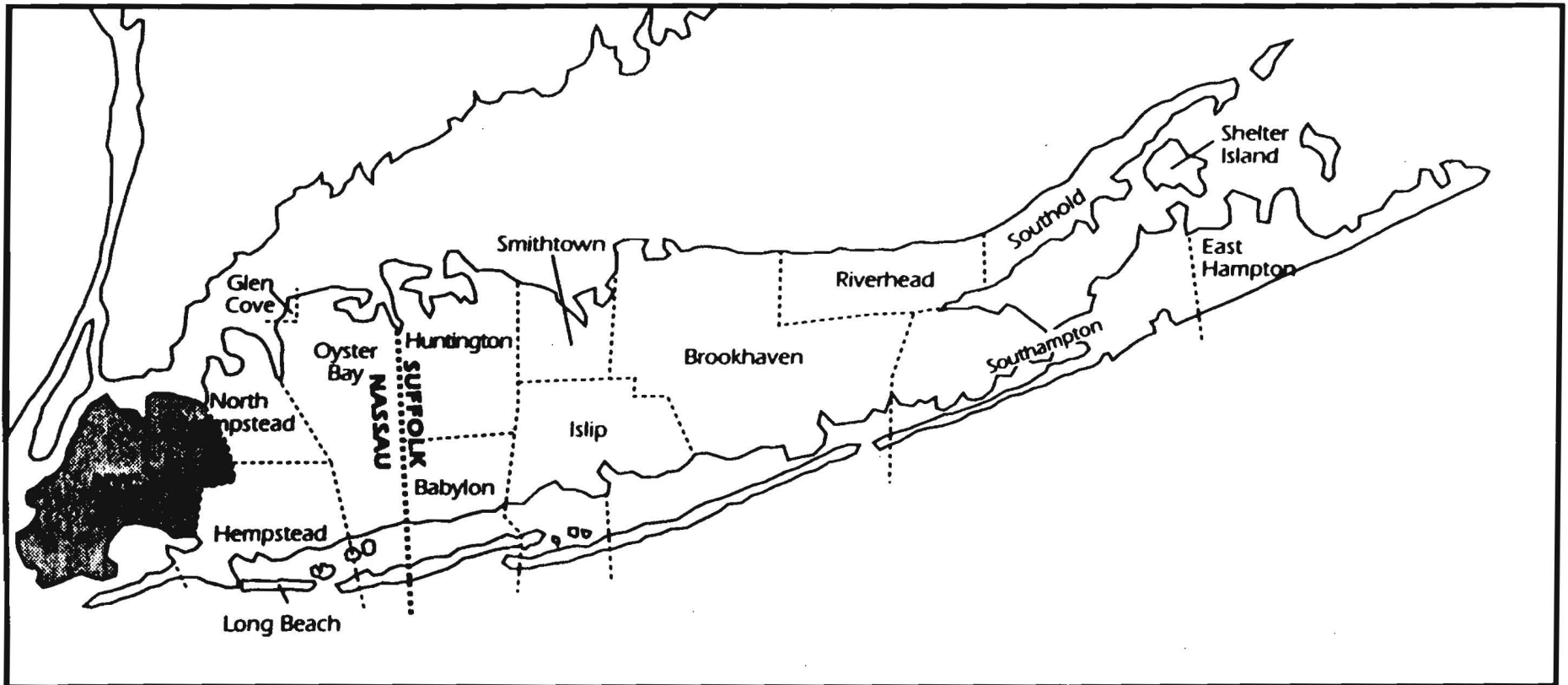
Doing the Right Thing (Tonjes and Swanson, 1996), the first report in the series, is a report on the growth and evolution of Long Island's municipal recycling programs. It is a qualitative, descriptive account; much of the data contained in this report might be better understood in the full context of the intent of each municipality's program. However, some descriptive aspects of the programs will be included prior to each data report in this document.

Part III of the series, Plumbing the Unknown, is our attempt to address private sector recycling practices. Information is less available for this portion of the recycling industry on Long Island. Nonetheless, the report will contain qualitative and quantitative descriptions, such as were available or could be inferred.

Comparing Apples and Oranges, The Data Report, as with its predecessor, is organized by county, and then by planning unit within each county. Long Island contains 15 solid waste management planning units -- ten Towns in Suffolk County (Babylon, Brookhaven, East Hampton, Huntington, Islip, Riverhead, Shelter Island, Smithtown, Southampton and Southold), and the three Towns (Hempstead, North Hempstead, and Oyster Bay) and two cities (Glen Cove and Long Beach) in Nassau County (Figure 1). Although Brooklyn (Kings County) and Queens County are geographically part of Long Island, history, political divisions, and common usage exclude them from public policy discussions of Long Island issues. They are not discussed in this report.

It must be realized that Long Island's municipal waste management infrastructure is organized differently from other areas of New York State. Elsewhere, waste management is the function of county government, or, in some instances, organizations comprised of groups of counties. On Long Island, the responsibility is assumed by Town or City government (the next lower level of government), and even, in some aspects, by Village government. This has led to a multiplicity of approaches in a relatively restricted geographical space.

Figure 1. Long Island Municipalities



Recycling (defined for the moment as the separation from the waste stream, or potential waste stream, of materials to allow for reuse or refabrication) has almost certainly always occurred on Long Island. Composting and the recovery for refabrication of certain valuable materials have occurred throughout recorded history. Government-sponsored programs have not been as continuous. They seem to be restricted to times of war, with a focus on materials that have use in supporting the war effort. Notable examples of such efforts in twentieth century America occurred during World War I and II (Melosi, 1981). These programs were discontinued with the end of the wars, and the perceived lack of need for such civic effort.

Modern recycling on Long Island appears to have begun in scattered municipalities through the co-opting of paper drives (which had often been organized by churches or scouting organizations). The Town of Huntington, for example, had some form of newspaper recycling beginning early in the 1970s. The initial goad to greater efforts appears to have been the notoriety of the famed Long Island Garbage Barge incident (1986), and the attention that Long Island waste management practices were therefore subjected to. To this was added the pressure of the Long Island Landfill Law, which mandated the closure of landfills on Long Island to unprocessed solid wastes by 1991, and the identification of a "solid waste hierarchy" by the State Legislature and its codification into state regulations. Pressures from residents to have municipal governments be environmentally responsible, coupled with the legal and regulatory strictures, made recycling part and parcel of every day waste management practices across Long Island (Tonjes and Swanson, 1996).

The remainder of this report will detail, municipality by municipality, exactly how much recycling is claimed by each municipality, or how much recycling was reported for these municipalities in some form. Information was collected through the end of 1994. The data for some municipalities are more complete than for others; each municipality was presented with the opportunity to add to or edit its report in draft form.

Long Island generates 9,000 - 10,000 tons per day of MSW, or, parsed differently, $3.0 - 3.5 \times 10^6$ tons per year (Tonjes and Swanson, 1992). We have found no good information to substantially change that estimation at this time. The uncertainties associated with waste generation rates spring from definitional differences in what constitutes MSW, imports and exports of MSW, and poorly documented flows of MSW in and through the private sector.

Similar difficulties plague accountings of overall recycling on Long Island, especially for private sector activities. Sources of uncertainty include: facilities that receive wastes counted in cubic yards, and transport products as cubic yards, tons, or both; facilities that receive C&D and MSW, and do not differentiate the source of the product recyclables; uncertainties concerning the veracity of tonnages reported to the New York State Department of Environmental Conservation (NYSDEC) or local municipalities; out-of-system activities (deliveries to scrap metal dealers, small-scale composting, supermarket and other direct-to-market recycling); imports of materials from off-Long Island to Long Island facilities; exports of materials to facilities off-Long Island; and definitional differences over what constitutes "recycling."

Municipal recycling statistics are better documented, but contain many uncertainties as well. Some of the more straight-forward problems include: inclusions of materials in recycling statistics which otherwise would not be considered solid waste (e.g., C&D, automobiles); counting collected tonnages versus tonnages sent to market; estimation errors associated with yard wastes; conversions of cubic yards and other non-weight measurements into tonnages; and incomplete and/or inconsistent inclusions of private sector activities under municipal statistics. The diversion of curbside recyclables from municipal systems into the private sector, or outright "paper piracy," during the period that the SSC vs. Smithtown (Platt, 1994) decision was under appeal, introduced a new source of statistical inaccuracy. Because of the value of paper recyclables, many contract carters delivered paper set out under residential programs to private recyclers rather than to municipal facilities. "Entrepreneurs" also patrolled streets on recycling days, trying to collect newspapers before the municipal or contract carters arrived. Many programs experienced up to a 50% decline in recyclables received during the first nine months of 1995, without any apparent decrease in resident enthusiasm or participation in the recycling programs (Smith, 1995; Swenson, 1995). The best means of addressing this problem in an environment requiring the reporting and comparison of municipal recycling rates is not clear.

More fundamental questions concerning the very definition of recycling can interfere with assessments of recycling programs (see National Recycling Coalition, 1989; Reaven, 1991; deKadt, 1992; Meade et al., 1992). For example, consider a yard waste composting program. Should the "recycled" tonnage be the incoming tonnage (the tonnage presumably avoiding disposal) or the outgoing tonnage of finished compost -- the tonnage netted from the process?

How should residues disposed from the process be counted -- does it depend whether they are produced at the back end of the process, or at the beginning? For instance, suppose a facility received 2,000 tons of leaves; at the end of the year, 800 tons of compost has been produced, 10 tons of material were disposed, and 100 tons were returned to the composting process for another year (either as a compost "seed," as a bulking agent, or because the material had not completely composted). What recycling credit should be given?

The same question arises in more complexity when considering the recycling process as an industrial process generating its own wastes -- at what point should the "net" tonnage be calculated, and what rationale should be used to determine the amount of recycling? For example, should a recycling program receive credit for the tonnage collected, the tonnage delivered to an intermediary after some processing, the tonnage delivered to an end-user, the tonnage actually incorporated by the end-user into a re-usable product, or the tonnage actually reused? When and how would some of the further "downstream" determinations be made?

The question of the end use of many materials must be considered. Suppose the compost is not used immediately and is stored -- should recycling credit be given? What if the compost is used as landfill cover material? Should material used as cleanfill at, say, a building lot (which, presumably, displaces other materials from this use), be counted as recycled materials? Should "alternative landfill cover" be counted as recycled materials (very often, ground up C&D material can be used in place of clean sand at active landfills as daily cover material)? Should treated incinerator ash, displacing clean sands in a landfill methane venting layer, count as recycled

material? If so, analogously with compost, should the tonnage entering the incineration process be counted as the recycled tonnage, or should the tonnage of ash used as the sand replacement be counted?

The complexity of these questions creates variability in the treatment of recycling statistics among different observers -- even members of the same organization. Thus, without the omniscience to distinguish between the criteria used by the different compilers, this report will note differences we are aware of, and not attempt to distinguish "true" figures. This section will report on recycling statistics compiled from the last several years, as data was made available.

In the tables included in the following sections, data is generally given in tons or tons per year, as appropriate. Different measures are spelled out. If a different measure was used, we have attempted to project that measure into the more familiar tons or tons per year measure. For several municipalities, we have had to generate data based on estimations. These data should be treated gingerly. References for data found in the tables are listed separately within the References.

The data are believed to be accurate representations of what was presented in the original document, report or interview. Certain data are more precisely presented than others, where all the figures shown are significant. Other data may be significantly less precise. The references for the tabular data will indicate whether the data are based on estimates or scale data, where this is known. Where data of different precision has been combined, often efforts have been made to

depict the loss of precision that results. However, the reader must use caution in assessing some of the numbers in this report, as the lack of precision in certain data may not be reflected entirely in the summary figures.

The overall accuracy of the data, as in any solid waste determination, is even less well known, as discussed above. Sometimes variance in reported tonnages can be simply ascribed to rounding by a particular reporter; sometimes the differences can be understood in terms of different methodologies being used to generate the data; and sometimes the differences are inexplicable.

Yet, given these difficulties, we believe that this presentation is the most complete yet offered. We have attempted to create a rational means of comparing some of the recycling outputs of the different programs, and we have attempted to explain some of the differences that exist between these aspects across Long Island, in Part B. To level the playing field, we considered only "classic" recyclables: paper and containers collected and/or processed by the municipality at the curbside (the "curbside set out rate"), or dropped off at the municipal recycling center (the "drop-off" rate), depending on the main type of recycling program employed. These rates will be presented in the individual municipality reports, and discussed in the analyses in Part B.

Each Long Island municipality was asked to provide information to us during 1994 and 1995. Personal interviews were held with most of the municipal waste managers; others

responded by telephone or letter. In addition, reports on Long Island waste management by governmental and environmental organizations were reviewed. Each municipality was given multiple opportunities to review and comment on drafts of our descriptions of its system, and to provide more complete or amended data sets. Some were more accomodating than others; although there is a lack of complete data in some of the accounts that follow, we believe that this is the most thorough and accurate account of overall Long Island recycling practices that has yet been made available.



Nassau County



Glen Cove

The City of Glen Cove is located in the northeast corner of the Town of Oyster Bay, on Hempstead Harbor. It has the smallest population of all the planning units on Long Island (approximately 24,000). Outside of a core downtown area, most of the City is composed of densely developed suburbanized streets. The City was one of the earliest population centers on the North Shore of Long Island (Tonjes and Swanson, 1996).

Glen Cove's recycling program began in 1987. The City collects paper, containers, and yard wastes from its residents using municipal crews. Certain commercial establishments, which are believed to generate "residential-like" wastes, also receive municipal service (Tonjes and Swanson, 1996).

Data from Glen Cove is sparse. Table 1 shows estimates of the City's waste stream and waste management tonnages. Table 2 gives recyclables information compiled from 1990. The computed recycling rate for the City has been between 10% and 15% in the 1990s.

The lack of data required an estimation of the curbside set-out rate for Glen Cove in 1994. For the purposes of this report, we have assumed an improvement to 2000 tons of paper and 500 tons of containers for 1994 (from 1652 tons of paper and 444 tons of glass and plastics in 1990, somewhat proportional to the estimated overall recycling tonnage increase from 2680 tons in 1990 to 3000 tons in 1992, given the uncertainties and variability due to the use of rounded numbers). This tonnage would necessarily include some materials collected from businesses, as described earlier in the report, and so overestimates the tonnages from purely residential sources. With that understood, Table 3 gives the set-out rates for the City of Glen Cove for the years in which data were available.

Table 1. City of Glen Cove Waste Management Data (in Tons)

Year	Source	Recycling	Incineration	Municipal Transfer	Total	Percent Recycling
1986	CGC (low)		18000	4000	22000	0%
1986	CGC (high)		20000	5000	25000	
1986	PB				26000	
1987	RTB	5%			75 tpd.	
1987	projected				19500	
1990	NYPIRG	2080	17877		19577	11%
1990	CGC	2680	14699	5259	22638	12%
1990	Newsday	3000	16000	4000	23000	13%
1992	NYSDEC	3000		19000	22000	14%
1992	PBAsh	3000		19000	22000	14%

Hempstead

The Town of Hempstead lies along the Queens County boundary, from the center of Long Island to the South Shore. It has the largest population of any planning unit on Long Island, with a population of approximately 725,000. Hempstead contains some areas that can be characterized as "urbanized," such as the Village of Hempstead; however, it is predominantly suburban in character. Some of these suburbs were established prior to World War II (such as Garden City); others, with Levittown as the example par excellence, were developed after the war. In general, there is little developable open space remaining in the Town (Tonjes and Swanson, 1996).

The Town's fragmented waste management structure makes it difficult to generalize about the "Town" as a whole (19 separate organizations administer waste collection, for example). However, in general, the recycling program, which was begun in 1988, has been incrementally expanding ever since. The Town has one of the most comprehensive lists of "recyclables

managed" on Long Island, including such materials as clamshells and mattresses. The Town, as of 1996, collects newspapers, corrugated cardboard, junk mail, magazines, telephone books, glass, plastic and metal containers, yard wastes, appliances and other bulky metal goods, used clothing and the aforementioned mattresses from residents. It also provides a certain amount of recyclables collection to businesses (Tonjes and Swanson, 1996).

The Town (Table 4 and Table 5) has made great efforts to include all recycling activities into its reports. This includes collecting data from local private carters, and compiling figures from the multitude of waste managing organizations in the various levels of government throughout the Town. The Town does recycle more tons than any other municipality on Long Island, and its calculated rate is approximately at the State recycling-only goal of 40% (8 - 10% waste reduction completes the total State goal of 50% waste diversion). Tonnages claimed have approximately doubled since 1991. However, paper and container tonnages have essentially remained flat since 1991 (see just below). The largest growth in Town tonnages have resulted from more composted yard wastes, and higher tonnages of metals and wood reported by commercial carters. Town figures show an approximate 10% increase in its waste stream size since 1988, making a computation of waste reduction tonnages to add to the recycling tonnages for Hempstead problematic.

As mentioned above, Hempstead collects a portion of its recyclables from businesses as well as from its residents. This will tend to inflate its rates as compared to other municipalities that do not offer businesses any curbside recycling. However, it is not possible to separate the

portion of business-generated curbside recyclables from the residential portion. Table 6 lists the Town's curbside recycling set-out rates for 1990 - 1994, although this naturally includes some commercial sector-generated recyclables. The Table demonstrates that the Town has had a 3% or so annual increase in its curbside recycling rates (per person) over this period.

Table 4. Town of Hempstead Waste Management (in tons)

Year	Source	Recycled	Incinerated	Landfilled	Municipal Transfer	Total	Percent Recycled
1985	LCWR					2400 tpd	
1985	projected					625000	0%
1986	TOH (low)			700000	200000	900000	
1986	TOH (high) PB			800000	200000	10e+05 900000	
1987	LCWR					624000	
1987	RTB	22%		78%		2565 tpd	
1987	projected	150000		525000		675000	22%
1988	TOH	42247		*	*	770831	5%
1989	TOH	49033	762230			811263	6%
1990	TOH	110230	683505			793735	14%
1990	NYPIRG	110230	683505			793735	14%
1990	Newsday	110230	683505			793735	14%
1990	TOH	109720	686317			796037	14%
1991	TOH	187854	583905			771759	24%
1991	TOH					774042	
1992	TOH	275134	490272			765406	36%
1992	PBAsh	264169	499919			764088	35%
1992	NYSDEC	275000	490000			765000	36%
1993	TOH	309547	482171			791718	39%
1994	TOH	346418	493241			839659	41%
1995	TOH	353373	446341			799714	44%

* the Town was both landfilling and transferring MSW

Table 5. Town of Hempstead Recycling Data (in tons)

	1991	1992	1993	1994	1995
Recycling Total	187852	275134	309547	346418	353373
Paper	54242	48087	49784	49937	56340
Newspaper	40291	39056	40074	41067	41368
OCC	10453	6775	6392	7012	13200
office	3294	2256	3223	1832	1748
mixed					
other	204		95	26	24
Containers	14536	15553	17075	17257	18694
Metal					
Tin					
Alum.					
Glass					
Clear	4301	4347	3738	2964	3071
Brown					
Green					
Mixed					
Plastic	658	1644	2219	2312	2895
HDPE					
PET					
other					
White goods/mixed metal	62135	52197	22316	38078	46454
Yard Waste/compost	47548	149091	155237	149950	158370
Grass					
Leaves					
Brush					
Other Wood	1654	2340	47406	60987	46863
Waste Oil	170	218	291	495	503
Batteries	36	19	45	51	48
C&D	4060				
Other	3471	7629	27108	29591	26101

Table 6. Town of Hempstead Curbside Set-out Rates

Year	in tons			lbs/person			Paper:Cans
	Paper	Containers	Total	Paper	Containers	Total	
1990	39630	11038	50668	109	30	139	3.6
1991	39736	14329	54065	110	40	149	2.8
1992	39056	15553	54609	108	43	151	2.5
1993	40074	17075	57149	110	47	158	2.3
1994	41067	17257	58324	113	48	161	2.4

Long Beach

The City of Long Beach lies along the Atlantic Ocean in south-central Hempstead Town. It is characterized by a mix of shoreline high-rise apartments, and dense suburban development. The City has a population of approximately 33,000 (slightly greater than Glen Cove) (Tonjes and Swanson, 1996).

The City began collecting recyclables curbside in the mid-1980s. The highrises in the City may not have been adequately served by this program until 1994. The collected materials include newspaper, corrugated cardboard, mixed paper, commingled containers, and bulk metals. Yard wastes are not collected. Most commercial establishments also receive service (Tonjes and Swanson, 1996).

Long Beach (Table 7 and Table 8) has shown a steady increase in collected recyclables, doubling the tonnage of collected containers since 1990, and increasing collected paper tonnages by nearly 50%. However, because of a slight increase in disposed wastes, the low 1990 "base" recycling rate, and the lack of yard waste and "commercial" recycling figures, the City's recycling rate remains between 10% and 15%.

Table 9 lists the annual set-out rates for Long Beach's curbside program. These rates, in comparison to other municipalities, may have been boosted by the inclusion of apartment house and commercial recyclables collection. Although Hempstead and Glen Cove have some business recyclables collections, it appears that Long Beach has the most extensive business collection program. Most other municipalities do not collect recyclables from multi-family housing, as well; however, apartments house a very small portion of most Long Island municipalities' populations, which is certainly not true for Long Beach. In addition, recycling programs are difficult to establish in large apartment houses. Therefore, it is not clear that the Long Beach recycling program structure necessarily should produce a greater per capita recyclables collection rate.

The data in Table 9 suggest that not only is the City getting a better participation rate over time, but that perhaps the participants are recycling more materials. The ratio of paper to container recyclables has steadily dropped over time from 4.4:1 to 3:1, whereas an increase in participation alone might have resulted in a constant paper to container recyclables collection ratio.

Table 7. City of Long Beach Waste Management (in Tons)

Year	Source	Recycled	Incinerated	Municipal Transfer	Total	Percent Recycled
1986	CLB			31000	31000	0%
	PB				30000	
1987	RTB projected	"some"		"most"	62 tpd 16000	
1990	CLB	2744	22047		24791	11%
	NYPIRG	2744	22047		24791	11%
	Newsday				24791	
1991	CLB	2835	21742		24577	12%
1992	CLB	2842	23138		25980	11%
	PBAsh	2841	23137		25978	11%
	NYSDEC	2000	23000		25000	8%
1993	CLB	3623	23638		27261	13%
1994	CLB	3655	24471		28126	13%

Table 8. City of Long Beach Recycling Data (in tons)

	1990	1991	1992	1993	1994
Recycling Total	2744	2835	2842	3623	3655
Paper	1849	1908	1950	2507	2562
Newspaper	1849	1908	1830	1880	1816
OCC			120	617	734
office				10	2
mixed					
other					10
Containers	422	486	545	796	860
Metal					
Tin					
Alum.					
Glass					
Clear					
Brown					
Green					
Mixed					
Plastic					
HDPE					
PET					
other					
White goods/mixed metal	473	441	347	321	233
Yard Waste/compost					
Grass					
Leaves					
Brush					
Other Wood					
Waste Oil					
Batteries					
C&D					
Other					

Table 9. City of Long Beach Curbside Set-out Rates

Year	in tons			lbs/person			Paper:Cans
	Paper	Containers	Total	Paper	Containers	Total	
1990	1849	422	2271	110	25	135	4.4
1991	1908	486	2394	113	29	142	3.9
1992	1950	545	2495	116	32	148	3.6
1993	2497	796	3293	148	47	196	3.1
1994	2560	860	3420	152	51	203	3.0

North Hempstead

The Town of North Hempstead makes up the northwest corner of Nassau County. The villages along the North Shore were among the earliest inhabited parts of Long Island. North Hempstead's "suburban" character first developed as the site of summer or country estates for the wealthier residents of Manhattan (and it was the setting for F. Scott Fitzgerald's The Great Gatsby). These estates have mostly been broken up into developments. Port Washington and Great Neck are near-urban in character; however, much of the Town is suburban in character. There is little developable open space remaining. The Town's population is approximately 210,000 (Tonjes and Swanson, 1996).

The Town currently collects newspaper, junk mail, magazines, commingled containers and yard wastes from its residents. A variety of other materials are accepted for recycling at the Town transfer station. However, from 1992 into the first part of 1994, the Town was involved in

an innovative recycling program in addition to its source separation recycling. Commercial and residential wastes (in 1994, only commercial wastes) were processed after collection to remove additional recyclables. This program failed due to financial instabilities at one facility, and because of the U.S. Supreme Court decision banning flow control (Tonjes and Swanson, 1996).

The data (Table 10 and Table 11), however, illustrates the tremendous promise of post-collection recyclables recovery (in so far as recycling rates are concerned). A comparison of figures from curbside collection from 1989 to 1994 indicates relatively unchanged source separation tonnages for paper, and only a 6,000 ton increase due to the addition of container recyclables collection. However, because Star Recycling separated greater than 25% of the residential waste stream post-collection, and the Babylon Commercial and Residential Recycling Facility (CRRF) separated approximately 40% of the commercial waste stream post-collection, the Town recycling rate exceeded 45% in 1993. In 1994, because this arrangement collapsed in mid-year, the tonnages recycled decreased, and the recycling rate was 34%. The figures for 1992 and 1993 also show the complications of accurately counting in a complicated waste management environment (various Town publications disagreed slightly on tonnages in various categories). The Town also illustrates how recycling rates can be influenced by reducing the counted total waste stream. As the Town's total waste stream dipped below 2×10^5 tons, causing a huge decrease in the denominator of the recycling rate, increases in the numerator (the tonnage recycled) were amplified. These tonnage falls are not likely to be due to actual waste production decreases, but rather to diversion of MSW from the municipal system. North Hempstead also illustrates how the use of estimated private recycling efforts (one evaluation, in the Town's Solid

Waste Management Plan, credited private efforts with more than 60,000 tons of paper recovery in 1991) can be used to increase tonnages beyond measured levels (the 34,000 tons of materials claimed directly by the Town in 1991).

Many environmentalists are said to oppose post-collection separation of recyclables because such processes may provide disincentives for curbside program participation (why should a resident set aside something the post-collection program will capture). North Hempstead's curbside collection program did not decline in tonnages for the period 1992 - 1994 (Table 12), while the Town was operating its post-collection recovery program. Neither did the tonnages grow much. Table 12 shows the curbside program (as a whole) apparently has not grown more than 5% overall since 1990, as measured by per capita set-out rates. This may be a small validation of the "disincentive" opinion. However, the lack of growth is noticeable before North Hempstead began its post-collection recyclables recovery program (paper set-out rates fell by more than 15% from 1990 to 1991, for example). A more probable explanation for the flat "total" rate is the varied participation in the Town's waste management program by the many villages in the Town. The fluctuating percent of the Town's population enrolled in the Town program may disguise an actual increase or decrease in set-out rates.

Table 10. Town of North Hempstead Waste Management (in tons)

Year	Source	Recycled	Landfilled	Municipal Transfer	Total	Percent Recycled
1985	LCWR				750 tpd	
1985	projected				200000	
1986	TNH		333101		333101	
1986	WMI est.		300000		300000	
1986	PB				322000	
1987	LCWR		925 tpm		195000	
1987	projected	11000	185000		195000	6%
1987	RTB	7%			785 tpd	
1987	projected	14000	185000		200000	7%
1987	TNH	12000	263000		285000	4%
1988	TNH	17100	256900		274000	6%
1989	TNH	29151	241600		270800	11%
1989	TNH				363004	
1990	TNH	33849	219200		253000	13%
1990	NYPIRG	23456	219200		242656	10.0%
1990	Newsday	18900			283100	7%
1991	TNH	34000	10000	175000	219000	16%
1991	TNH	100000			285000	35%
1992	TNH				195784	
1992	PBAsh	88594		107191	195785	45%
1992	NYSDEC	88500		107500	196000	45%
1992	TNH				197600	
1992	TNH	88594		107451	196045	45%
1993	TNH	113020			242754	47%
1993	TNH	118046		133764	251810	47%
1994	TNH	76442		147085	223527	34%

Table 11. Town of North Hempstead Recycling Data (in tons)

	1987	1988	1989	1990	1991	1992	1993	1994
Recycling Total	12000	17100	29274	33849	34000	88594	114584	76442
Paper			14564	14200	11800	11905	12178	13310
Newspaper			14564	14200	11800	11903	12156	13274
OCC							9	27
office						2	13	9
mixed								
other								
Containers				4829	7200	6425	6677	6735
Metal								
Tin								
Alum.								
Glass								
Clear								
Brown								
Green								
Mixed								
Plastic								
HDPE								
PET								
other								
White goods/mixed metal			2364			1354	857	
Yard Waste/compost			8400	12600	12800	23376	24431	22853
Grass								
Leaves								
Brush								
Other Wood								
Waste Oil						27	16	~5000 gal.
Batteries								
C&D						5790	22090	11850
Other			4945		800	120	1	

Table 12. Town of North Hempstead Curbside Set-out Rates

Year	in tons			lbs/person			Paper:Cans
	Paper	Containers	Total	Paper	Containers	Total	
1990	14200	4829	19029	134	46	180	2.9
1991	11800	7200	19000	112	68	180	1.6
1992	11903	6425	18328	112	61	173	1.9
1993	12157	6677	18834	115	63	178	1.8
1994	13274	6735	20009	125	64	189	2.0

Oyster Bay

The Town of Oyster Bay runs from Long Island Sound to the Atlantic Ocean on the eastern end of Nassau County. The north end of the Town is similar in character to much of North Hempstead, being composed of large estates, and developments formed out of estates. The southern portion of the Town is more similar to Hempstead, and is predominantly tract housing developed after World War II. Some of the North Shore villages, such as Oyster Bay, pre-date the Revolutionary War. A small amount of developable land remains in the Town. The Town's population is approximately 290,000 (Tonjes and Swanson, 1996).

The Town began its recycling program in the late 1980s. The Town currently collects newspapers, junk mail, commingled containers, yard wastes, and white goods from its residents. The Town also has a voluntary "Don't Bag It" program, to encourage waste minimization through at-home management of yard wastes. The Town accepts recyclables at its transfer station, and collects them in large containers spread throughout the Town (Tonjes and Swanson, 1996).

Oyster Bay (Table 13 and Table 14) has made extensive efforts to increase the number of materials collected by the Town, and the means it uses to collect those materials. In addition, although the Town does not manage much commercially generated MSW, the Town has made extensive efforts to enumerate the tonnages recycled in the commercial sector. The Town therefore reaps the "numerator" benefits of this tonnage, without suffering the denominator increases of any disposed commercial MSW. However, because of the extremely low price bid by Star Recycling to manage the Town's MSW, the Town has decreased its tipping fee for 1996 (down to \$72 ton⁻¹) to attract more commercially-generated wastes (Lenz and Leupold, 1996) (the Town would generate revenue from this additional tonnage because Star's disposal charge to the Town is considerably less). Composting contributes relatively little to Oyster Bay's recycling rates: approximately 10% of the annual tonnages reported here, as compared to approximately 40% of Hempstead's annual tonnages. The Town's recycling rate, despite nearly tripling its paper recycling tonnages and increasing its container recovery tonnages by 20% since 1990, has actually decreased from 35% of its waste stream to approximately 30% (in 1994). This is attributable to a 60,000 ton reduction in cleanfill/C&D recycling claims. However, the Town expects 1995 statistics to show an increase in the recycling percentages, more towards the 35% rate (Lenz and Leupold, 1996).

Table 15 lists the set-out rates for Oyster Bay. In 1985, when the Town formed its solid waste district, many of the villages within the Town did not choose to participate (Tonjes and Swanson, 1996). It is not clear if these villages that opted out of the Town waste management system are recycling through the Town, or not; if not, the Town's rates, in comparison to other

Long Island municipalities, suffer from the exclusion of approximately 10% of the Town's population from the Town program. The set-out rates, in any case, have only increased slowly over the past five years (approximately 2% a year increase, with some degree of variability).

Table 13. Town of Oyster Bay Waste Management (in tons)

Year	Source	Recycling	Municipal Transfer	Total	Percent Recycled
1985	LCWR			850 tpd	
1985	projected			220000	0%
1986	PB			302400	
1987	LCWR	8%		221000	
1987	projected	17000		221000	8%
1987	RTB	<1%	>99%	907 tpd	
1987	projected			240000	
1988	TOH	2000			
1988	TOH	3000			
1990	TOB	99111	186163	285274	35%
1990	NYPIRG	47119	281281	328400	14%
1990	Newsday	99000	186163	384000	26%
1991	TOB	68259	174187	242446	28%
1992	TOB	78500	180745	259245	30%
1992	PBAsh	78500	180745	259245	30%
1992	NYSDEC	85000	175000	260000	33%
1993	TOB	93874	174861	268735	35%
1994	TOB	78278	178026	268735	29%

Table 14. Town of Oyster Bay Recycling Data (in tons)

	1990	1991	1992	1993	1994
Recycling Total	99111	68259	78500	93874	78278
Paper	17244	33352	41505	49218	50077
Newspaper	17232		26849	33778	32359
OCC		14150	14257	14571	15438
office	12	405			
mixed			399	840	2280
other				29	
Containers	6578	6594	7297	7587	8095
Metal		11			
Tin					
Alum.		3			
Glass					
Clear					
Brown					
Green					
Mixed					
Plastic		652			
HDPE					
PET					
other					
White goods/mixed metal		5433	6552	7775	9003
Yard Waste/compost	10999	11834	17091	14712	8459
Grass					
Leaves	10999	11834	11000	9788	8214
Brush					
Other Wood	55	69	67	67	30
Waste Oil			194	283	414
Batteries	16	17	828 pc.	1002 pc.	14
C&D	64837	10061	5603	12590	1047
Other	115	183	278	1642	1139

Table 15. Town of Oyster Bay Curbside Set-out Rates

Year	in tons			lbs/person			Paper:Cans
	Paper	Containers	Total	Paper	Containers	Total	
1990	17232	6578	23810	118	45	163	2.6
1991	18797	6580	25377	129	45	174	2.9
1992	15020	7227	22247	103	49	152	2.1
1993	17404	7559	24963	119	52	171	2.3
1994	18133	8080	26213	124	55	179	2.2



Suffolk County



Babylon

The Town of Babylon forms the southwest corner of Suffolk County. Although some of the villages in the Town were population centers prior to the turn of the century, most of the Town was settled in the vast suburban development of Long Island after World War II. Babylon has very little developable land remaining. The population of the Town is approximately 200,000 (Tonjes and Swanson, 1996).

Babylon's recycling program began in 1988. The course followed by the Town's residential program is similar to most other programs in Nassau County and western Suffolk County. The Town collects newspapers, cans, and bottles curbside, and recycles many more materials collected at its recycling center, or at containers placed around the Town (Tonjes and Swanson, 1996).

However, Babylon has been more active in commercial recycling than most other Towns, albeit mostly because of concerns over the waste stream required for the Town's Waste-to-Energy incinerator. For one, the Town helped finance a post-collection recyclables separation facility, the Commercial and Residential Recycling Facility (CRRF). The residues from this facility, which was designed to sort through commercially-generated wastes, were obligated to the incinerator. The operator of the facility was undone by poor economics, and, perhaps, animosity from the Town's private carters (who were required to use the facility under flow control law). With the demise of flow control, the Town has moved to assure the incinerator's waste stream by establishing a commercial collection district (where the wastes' destination can be specified contractually). This development means that the Town will also be the first municipality to have near-complete control over recyclables from all generators (although, by State law, the Town cannot interfere with private sector recyclables collection and processing arrangements). The district, which underwent a series of court challenges, was only implemented in January, 1996, and so it will not be included in the data presented here (Tonjes and Swanson, 1996).

The Town of has, despite the twists and turns in strategies, and despite only slow growth in curbside collection tonnages (newspaper and containers) since 1990, generally increased its recycling rate over time (Table 16 and Table 17). During the peak of the CRRF's operation, the Town had a greater than 40% rate. However, by reducing the considered tonnages to residential MSW only, and by substantially increasing yard waste composting efforts, the Town has managed to claim a recycling rate of approximately 30% post full CRRF operation. This is an increase as compared to the pre-CRRF operation time period -- although the Town included commercial

recycling efforts in its recycling total at that time (which it did not do in its 1994 report to New York State). It should be noted that, unlike other municipalities such as Oyster Bay which also count commercial efforts in the recycling total, in the time when Babylon counted commercial recycling tonnages, the Town also counted commercial MSW disposal in its waste stream. The varying figures for some years for Babylon illustrate that different interpretations can be made depending on definitional choices for "recyclables" (although it is not clear at all how the different reports from 1990 could compile such exceedingly different sums for the Town).

Table 18 lists the Town's curbside set-out rates. The Town is experiencing a 2% annual increase in these rates. The Town has said that it has used some of the collected newspapers as incinerator feedstock, when the relative economics between recycling and incineration have favored use of the incinerator.

Table 16. Town of Babylon Waste Management (in tons)

Year	Source	Curbside Recycled	Comm'l Recycled	CRRF Recycled	Yard Waste	Total Recycled	Incinerated	Landfilled	MSW Transfer	Percent Total Recycled
1980	Brown, et al.									750 tpd
1980	projected							275000		275000 0%
1985	LCWR									700 tpd
1985	projected									180000
1985	CDM 1985							231518		231518
1985	CDM 1987							257952		257952
1985	H2M							273200		273200
1986	TOB							18296 tpm		18296 tpm
1986	projected							220000		220000
1986	PB									225000
1987	LCWR					50000				182000 27%
1987	RTB					4%		96%		627 tpd
1987	projected					6500		160000		165000 4%
1988	CDM 1987									264980
1990	SWMP				1000	56040	223720			279760 20%
1990	CRRFBD	11632	49139			77552	218929	41758		338239 23%
1990	Ann. Rep.	12425	49275			61959				
1990	GBB									304458
1990	NYPIRG					61959	223720	27321		313000 20%
1990	Newsday					61959	223720	27231		313000 20%
1991	TOB					76459	213755			290214 26%
1992	TOB	11772	35647	4320		66827	222950			289777 23%
1992	PBAsh					66826	202170	68500	12100	281096 24%
1992	NYSDEC					62000	213000	68500		275000 23%
1993	TOB	12138	29398	51462	17781	112433				271423 41%
1993	WRMI est						189884	110000	6000	

Table 16. Town of Baylon Waste Management (in tons), continued

Year	Source	Curbside Recycled	Comm'l Recycled	CRRF Recycled	Yard Waste	Total Recycled	Incinerated	Landfilled	MSW Transfer	Total	Percent Recycled
1993	TOB (no comm'l)	12138			23306	42436	155575			198011	21%
1994	TOB	12816			25320	45658	105444			151102	30%
1994	WRMI est							160000			
1995	TOB (6 months)	6212			10640	21634	53254			74888	29%

Table 17. Town of Babylon Recycling Data (in tons)

	1990	1990	1990	1990	1991	1992	1993	1993	1994	1995 (6 mos)
Recycling Total	56040	77552	61959	77507	76459	66827	112433	42436	45658	21634
Paper	19397	24656	24656	22013	32466	26931	63655	8138	13076	4109
Newspaper	9142	8690	8690	8690	7982	8031	8094	8138	8715	4103
OCC	10000	10597	10597	10536	18660	12137	12776		1	6
office	35	2787	2787	2787	3900	4140	3841			
mixed	200									
other	20	2582	2582		1924	2623	38944			
Containers	8619	3675	3607	3629		3837	7860	4162	4360	2226
Metal				826			1607			
Tin	564			791			1556			
Alum.	63			35		65	51			
Glass	1880		22	2567	2903	2524	1151			
Clear										
Brown										
Green										
Mixed										
Plastic	6112	236	236	236	429	157	926			
HDPE										
PET	2									
other										
White goods/mixed metal	6966	17302	10278	17416	15601	12546	4556	808	4625	2151
Yard Waste/compost	1000				4498	11996	17781	23306	25371	10640
Grass	500									
Leaves	500									
Brush										
Other Wood			4520	4490			3625			1
Waste Oil		42	42	42	61	79			24	13
Batteries		14	14	14	13	17				
C&D	20000	31819	5846	5846	20239	11900	12740	5274	1792	1294
Other	88	22	12905	21475	249	609	2216	748	771	1206

Table 18. Town of Babylon Curbside Set-out Rates

Year	in tons			lbs/person			Paper:Cans
	Paper	Containers	Total	Paper	Containers	Total	
1990	8337	3295	11632	82	33	115	2.5
1991	7982	3332	11314	79	33	112	2.4
1992	8032	3742	11774	79	37	116	2.1
1993	8092	4046	12138	80	40	120	2
1994	8592	4233	12825	85	42	127	2

Brookhaven

The Town of Brookhaven has the largest land area of any planning unit on Long Island, and is second in population (at approximately 410,000) only to Hempstead. It comprises the center of Suffolk County, from the Sound to the Ocean. Most of the Town is tract housing, built in the 1960s or later (although certain villages, such as Port Jefferson, Patchogue, and Stony Brook, predate the suburban boom). The Town contains the largest stretches of undeveloped land left on Long Island, although much development is precluded under the Pine Barrens Protection Act (Tonjes and Swanson, 1996).

Brookhaven's recycling program began in 1988. The Town was the second Town on Long Island to build a specially designed facility, a Materials Recovery Facility (MRF), to process the collected recyclables. The feedstock list for this facility is one of the more extensive on Long Island -- newspaper, corrugated cardboard, junk mail, kraft paper, metal, glass, and HDPE and PET containers, aerosol cans, and aluminum foil. The Town also collects bulk metals, and

through its Highway Department, some leaves and other yard wastes. Additional materials can be dropped off at various locations in the Town. The Town has a mandatory version of a Don't Bag It program, where grass clippings are no longer collected by the Town as either recyclable material, or as acceptable solid waste (Tonjes and Swanson, 1996).

Brookhaven (Table 19 and Table 20) has not increased its curbside collection tonnages since 1990; in fact, tonnages have, in general, been declining. The Town attributes this to a decrease in commercial recyclable processing at its MRF (which is usually not distinguished from residential recyclables processing in most Town figures). Many of the Town's other recyclable categories have also decreased with time. This is attributed to better record-keeping. For example, it is not clear that the Highway Department actually composted 250,000 cubic yards of leaves in 1989; the Town is much more certain that leaf composting in 1994 was approximately 19,000 tons. The decline in Highway Department wood waste chipping in 1994 is also accounted for by more exact determinations of actual materials recovery. Despite these tonnage declines, because of a precipitous drop in the Town's overall waste stream, Brookhaven has been able to show a steadily increasing recycling rate. The Town rate of 26% claimed for 1994 is due to only counting residential MSW disposed, and excluding any commercial and institutional wastes disposed. The Town's rationale is, although some recycling must be occurring in the commercial sector, the Town has no quantification of the effort. Therefore, since these commercial wastes may have had recyclables removed (but the amount removed is unknown), the Town does not include the tonnages in a definition of recycling rates.

An important factor to consider when examining the Brookhaven tonnages is that Brookhaven mostly reports "net" tonnages -- that is, the tonnages actually delivered after some degree of processing and the removal of unrecyclable or contaminating materials. The exception to this is in yard waste and wood waste tonnages, where the tonnages reported are those entering the process (composting or chipping), rather than the tonnage of product leaving the process.

In computing the Town's curbside set-out rates (Table 21), tonnage inputs to the MRF were used (with the exception of 1990 data, which includes all non-composting recyclables tonnages). These tonnages include some commercial paper processed through the MRF, and containers processed for the Town of Southampton in some years. Therefore, the Town's set-out rate is slightly inflated.

Table 19. Town of Brookhaven Waste Management (in tons)

Year	Source	Curbside Recycled	Yard Waste	Highway Wood	Total Recycled	MSW Landfilled	other Landfilled	Town Transfer	Managed by Priv. Sector	Total	Percent Recycled
1980	Multi-Town					411877 yds				411877 yds	
1980	projected					275000				275000	0%
1980	projected					200000				200000	
1980	Brown et al.									1160 tpd	
1980	projected					425000				425000	
1981	Multi-Town					433648 yds				433648 yds	
1981	projected					290000				290000	
1981	projected					220000				220000	
1982	Multi-Town (May)					190511 yds				190511 yds	
1982	projected					460000 yds				460000 yds	
1982	projected					305000				305000	
1982	projected					230000				230000	
1983	TOB									6.5 lbs/p/d	
1983	projected									420000	
1985	TOB					1200 tpd				1200 tpd	
1985	projected					450000				450000	
1985	TOB					1400 tpd				1400 tpd	
1985	projected					500000				500000	
1985	LCWR									1200 tpd	
1985	projected									300000	
1986	PB									550000	
1987	LCWR				2-10%					312000	
1987	RTB				1%	99%				1440 tpd	
1987	projected				40000	330000				374000	11%
1987	TOB									6.8 lbs/p/d	
1987	projected									515000	
1988	TOB				3355	476543				479898	1%
1989	TOB	12019			16000	489505				505495	3%
1989	TOB Highway		250000 yds								
1989	projected	12019	80000		96000	489505				585495	16%
1990	TOB	37960	17000		54960	405693	442267			460653	12%
1990	NYPIRG				68401	463664				532065	13%
1990	Newsday				68401					500000	14%
1991	TOB	28614			72211	419963				492174	15%

Table 19. Town of Brookhaven Waste Management (in tons), continued

Year	Source	Curbside Recycled	Yard Waste	Highway Wood	Total Recycled	MSW Landfilled	other Landfilled	Town Transfer	Managed by Priv. Sector	Total	Percent Recycled
1992	TOB	36163	20000	54004	110167	76907	431464	200383		387457	28%
1992	PBAsh				80302	251653		200883		532338	15%
1992	NYSDEC				80000	70000	420000	200000		530000	15%
1993	TOB	35495	20000	46304	104062	65560	496466	202319	200000	571941	18%
1993	TOB				104062					371941	28%
1994	TOB	31945	19000	22288	75500	67214	509864	201670		344384	22%
1994	TOB	31945	19000	22288	75500						26%

Table 20. Town of Brookhaven Recycling Data (in tons)

	1991	1992	1993	1994
Recycling Total	72211	109301	104062	75500
Paper	19970	26754	29995	26267
Newspaper	19334	19626	22564	20662
OCC	444	5121	6500	4760
office	6	9		13
mixed	186	1874	570	430
other		124	361	405
Containers	5292	6134	5498	5690
Metal	1964	2221	2136	2003
Tin	1873	2113	2037	1908
Alum.	91	108	99	96
Glass	2833	3375	2721	2876
Clear	1884	1966	1595	1553
Brown	214	184	236	206
Green	551	741	659	587
Mixed	184	506	231	530
Plastic	495	539	641	766
HDPE		505	500	598
PET		33	141	167
other				256
White goods/mixed metal	2758	2218		2294
Yard Waste/compost	44000	74000	66000	41250
Grass				
Leaves	20000	20000	20000	19000
Brush		54004	46304	22288
Other Wood		36		
Waste Oil	159	147		165
Batteries	22	21		
C&D				
Other				

Table 21. Town of Brookhaven Curbside Set-out Rates

Year	in tons			lbs/person			Paper:Cans
	Paper	Containers	Total	Paper	Containers	Total	
1990			37960			185	
1991	19970	8644	28614	97	42	140	2.3
1992	26745	11050	37795	130	54	184	2.4
1993	29985	11825	41820	146	58	204	2.5
1994	26254	10871	37125	128	53	181	2.4

East Hampton

The Town of East Hampton, the eastern end of the South Fork of the Island, and one of the five "East End" Towns, was settled in the 1600s as a seafaring and farming community. It long retained a rural character; over the past thirty years, however, much development has occurred, transforming the Town into a summer resort destination. Its year-round population is approximately 16,000 (approximately equivalent to Southold), and much less than all of the Nassau County planning units. The East End is best characterized as lying beyond the practical commuting distance to New York; although the growth of on-Long Island commerce has made commutation from the East End somewhat practical in some situations, the distance from New York City has made the East End somewhat immune to suburbanization (Tonjes and Swanson, 1996).

East Hampton does not provide any collection services to its residents. Recyclables and waste materials must either be brought to one of three Town transfer stations, or be collected through private arrangements with an area carter. The Town requires that certain materials be source separated whether self-hauled or collected by carter, although those who self-haul are asked for greater sorting of materials to minimize processing costs. Materials required to be separated include newspaper, corrugated cardboard, mixed paper, and aluminum, steel, plastic and glass containers. The Town composts source separated yard wastes, and, in a Town-owned and operated enclosed composting facility, food wastes (a unique program for Long Island). White goods, automobiles, bulk wood, tires, waste oil and used clothing are also recycled. The drop-off program began in 1986, which makes the East Hampton program one of the earliest of the "modern" recyclables separation programs on Long Island (Tonjes and Swanson, 1996).

East Hampton (Table 22 and Table 23) has had a gradual increase in tonnages processed through its drop-off program. The Town has expectations that its food waste composting program (operating at one-third capacity in the first half of 1995) will raise its recycling rate towards the 40% mark (see the statistics reported for 1995). The improvement in residential separation rates is partly masked by the variations in the Town's woodchipping tonnages. Hurricane Bob in 1991, which coincidentally was the year used by the Town as a baseline for waste management planning purposes, distorted recycling rates by creating a bonanza of recyclable wood wastes. The Town has had a nearly 9,000 ton decrease in recycling credits from wood wastes since 1991. This hides the doubling of tonnages since 1990 through the drop-off program. Computations of the Town recycling rate have also improved due to redefinitions of the

waste stream (note the large drop in total wastes managed from 1990 to 1994). The data for 1995 reflect a new distinction between recyclables actually "dropped off," and those collected by contracted-for carters. However, as most other municipalities did not provide 1995 data for this report, the 1995 East Hampton data will not be discussed further.

The Towns on the East End that rely on drop-off recycling programs primarily (East Hampton, Riverhead up to 1993, Shelter Island, Southampton, and Southold) cannot be directly compared to the curbside collection programs used elsewhere on Long Island. The drop-off programs offer the opportunity for more careful policing of discards than curbside collection programs do. However, drop-off programs, as constituted on the East End, generally require more materials sorting efforts from participants than curbside programs require from their participants. With drop-off programs, there is no general distinction between residential and commercial points of origin -- although the Town of Southold differentiated between kinds of wastes for billing purposes. It is not clear which factor is more important, and whether recycling rates on the East End should be greater or less than those of curbside programs because of programmatic factors. It should be noted that a portion of each Town's wastes and recyclables are collected by contract carters in fashions similar to those used in the western Towns, which minimizes some of the differences.

Another source of difference is the large influx of summertime residents throughout most of this region, which skews population-based statistics. In assessing recycling statistics, it is not clear whether or not it is "fair" to include a factor for these additional residents. The part-time

residents and tourists are not subjected to municipal outreach programs as full-time residents may be. However, anecdotal evidence reported from part-time workers at the drop-off area in East Hampton suggests that summer-time residents may have more "free" time, and may perceive a drop-off waste management program as "exotic." Therefore, the visitors may be more enthusiastic participants in the recycling programs than full-time residents are. In Where Does It All Go?, we attempted to account for the summer population increases by creating a "full-time resident" equivalent (such as 40,000 summer residents = 10,000 year-round residents, based on a three month summer) (Tonjes and Swanson, 1992). Although there appears to be nothing inherently wrong with this population adjustment procedure, further reflection suggests that similar adjustments might then be used to account for the millions of visitors to parks such as Jones Beach, or for the large number of commuters living in Nassau County, but working in New York City -- which should affect waste generation and management statistics. We have therefore abandoned the population adjustment in this report. However, the inadequacy of year-round population statistics as a measure of actual residents should be understood for the East End Towns, in particular, when comparative statistics are discussed.

Therefore, the use of drop-off programs in the East End Towns should be understood to represent more than a methodological difference in waste management techniques. There is also an underlying difference in the means of assessing populations, which makes per capita comparisons relatively incommensurate.

Table 24 lists the drop-off participation rates for East Hampton. The amount of these materials collected per person has been rising consistently (and rather spectacularly) over time, increasing over five-fold in the five years shown. Figures such as these help to illustrate why program impacts may not be adequately expressed when "gross" recycling percentages are considered. The data from Table 22, for example, would suggest that the Town's recycling program effectiveness has not improved or changed over the period 1991 - 1994; Table 24, on the contrary, depicts a program that was experiencing tremendous growth.

Table 22. Town of East Hampton Waste Management Data (in tons)

Year	Source	Drop-off Recycled	Yard Waste	Total Recycled	Land Cl. Debris	C&D	MSW Landfilled	MSW Transfer	MSW Landfilled	Total	Percent Recycled
1985	LCWR									72 tpd	
1985	projected									19000	0%
1986	PB									21200	
1987	LCWR									18720	
1987	RTB			10%					90%	73 tpd	
1987	projected			2000					17000	19000	11%
1989	TEH	1896	5423	7319							
1990	TEH	1827	3979	5806							
1990	NYPIRG			1672					35513	37815	4%
1990	Newsday			1672					35513	37815	4%
1991	TEH	2168	11262	13430	9841	1717	14631		26189	40034	34%
1991	WMI est.			13430			14631			28476	47%
1992	TEH	2872	3050	5922							
1992	NYSDEC			13000					27000	40000	33%
1992	PBAsh			13000					27000	40000	33%
1993	TEH	3248	2978	6226							
1993	WRMI est.			6226			17000	3000		26000	24%
1994	TEH	3644	2534	6178				19844		26022	24%
1995	TEH	2890	5978	12277				17423		29770	41%

Table 23. Town of East Hampton Recycling Data (in tons)

	1989	1990	1991	1992	1993	1994
Recycling Total	7319	5806	13431	5922	6226	6178
Paper	343	373	817	1289	1641	1986
Newspaper	294	301	510	720	662	840
OCC	49	72	307	373	616	719
office				2	1	
mixed						
other				6	6	
Containers	45	175	509	916	913	973
Metal		18	104	122	116	122
Tin						
Alum.						
Glass	45	147	359	373	377	341
Clear						
Brown						
Green						
Mixed						
Plastic		10	46	247	224	260
HDPE						
PET						
other						
White goods/mixed metal	1339	977	586	298	354	471
Yard Waste/compost	5423	3979	11262	3050	2978	2534
Grass						
Leaves						
Brush	5423	3979	11262	3050	2978	2534
Other Wood						
Waste Oil	24	25	25	35	33	38
Batteries						
C&D						
Other	144	278	231	298	307	176

Table 24. Town of East Hampton Drop-off Recycling Participation

Year	in tons			lbs/person			Paper:Cans
	Paper	Containers	Total	Paper	Containers	Total	
1990	373	174	547	46	21	68	2.1
1991	818	509	1327	101	63	164	1.6
1992	1282	916	2198	158	113	271	1.4
1993	1634	914	2548	202	113	315	1.8
1994	1986	973	2959	245	120	365	2

Huntington

The Town of Huntington lies in the northwest corner of Suffolk County. It was predominantly developed after the war; however, some of the North Shore villages were ports of some note in the 1800s. The Town has little developable land remaining. Its population (approximately 190,000) is similar to its neighbor to the south, Babylon (Tonjes and Swanson, 1996).

Huntington began its municipal recycling program in 1972, although curbside collection did not begin until 1987 on a pilot basis, and was not Town-wide until 1989. Currently, the Town collects corrugated cardboard, newspaper, junk mail, and plastic, metal and glass containers, along with appliances. Other recycled materials must be dropped off at the Town recycling center. As in Brookhaven and Islip, the Huntington has a mandatory "Don't Bag It" program for

grass clippings, and encourages homeowner management of other yard wastes (Tonjes and Swanson, 1996).

Overall recycling tonnages in Huntington (Table 25 and Table 26) have fluctuated over the past five years, generally in harmony with the changes in its yard waste composting program. The long-term trend seems to be towards increasing tonnages, however. The tonnages of paper collected have increased by approximately 10% since 1990; container tonnages have been remarkably constant over the past four years. The Town managed to claim a recycling rate slightly greater than 25% for 1994 due to the re-institution of yard waste composting (the "Don't Bag It" program became mandatory for grass clippings in 1995). The Town had a slightly greater recycling rate (30%) in 1991 due to inclusion of commercial recycling efforts, the compost program operation, and a diminished waste stream size due to a relatively expensive tip fee. Lack of one or more of these factors contributed to other years' lower recycling rates.

Huntington's curbside set-out rates are given in Table 27. The Town's overall rate has increased by approximately 3% a year for the past five years, albeit not steadily.

Table 25. Town of Huntington Waste Management Data (in tons)

Year	Source	Recycled	Incinerated	Landfilled	Municipal Transfer	Total	Percent Recycled
1979	TOH	1177					
1980	TOH	1004					
1981	TOH	1075					
1982	TOH	1177	*	199321		200498	1%
1983	TOH	930	*	205535		206465	0%
1984	TOH	678	*	237916		238594	0%
1985	TOH	807	*	253570		254377	0%
1985	LCWR					900 tpd	
1985	projected					230000	
1986	TOH		100000	250000		350000	
1986	PB					302400	
1987	LCWR					234000	
1987	RTB	1%	20%	79%		772 tpd	
1987	projected	2000	40000	160000		200000	1%
1988	TOH	16652		213382		230033	7%
1989	TOH	31301				265222	12%
1989	TOH	27986			233972	261958	11%
1990	TOH	32723			191846	224569	15%
1990	TOH					460 tpd	
1990	TOH rec'd	32723			167900	200623	16%
1990	TOH total	44228			167900	234096	19%
1990	NYPIRG	44228			201373	245601	18%
1990	Newsday	44228				245601	18%
1991	TOH	53306	23720		103087	180113	30%
1992	TOH	35338	133400		32745	201483	18%
1992	PBAsh	25000	133824		41000	199834	13%
1992	NYSDEC	45000	138000		32000	215000	21%
1993	TOH	30680	143162		43829	217621	14%
1994	TOH	56001	151914		4325	212239	26%

* some MSW incinerated prior to landfilling

Table 26. Town of Huntington Recycling Data (in tons)

	1989	1990	1991	1991	1992	1993	1994
Recycling Total	31301	32732	39742	53306	35338	30680	56001
Paper	16195	16286	13524	16610	16045	17533	17660
Newspaper	14384	14116	11469	14208	13702	15058	15234
OCC	1728	2137	2016	2357	1543	1610	1566
office	83	33	39				
mixed				45	800	865	860
other							
Containers	1905	4228	4642	5497	5538	5489	5351
Metal	920	1290	1283	1575	1507	1496	1459
Tin							
Alum.							
Glass	920	2909	3120	3627	3751	3713	3616
Clear							
Brown							
Green							
Mixed							
Plastic	65	29	239	295	280	280	276
HDPE							
PET							
other							2
White goods/mixed metal	1850	2673	2330	2813	5952	6582	6392
Yard Waste/compost	9110	6773	15487	28085	5194	993	26511
Grass							
Leaves							
Brush							
Other Wood	2745	2709	3672		2498		
Waste Oil	28	51	52	62	45	31	63
Batteries	13	4	16	21	23	15	23
C&D							
Other	1346		19	19	36	43	
				includes comm'l			

Table 27. Town of Huntington Curbside Set-out Rates

Year	in tons			lbs/person			Paper:Cans
	Paper	Containers	Total	Paper	Containers	Total	
1990	16253	4228	20481	170	44	214	3.8
1991	16610	5497	22107	174	58	231	3
1992	16025	5538	21563	168	58	226	2.9
1993	17533	5489	23022	184	57	241	3.2
1994	17660	5349	23009	185	56	241	3.3

Islip

The Town of Islip lies between Babylon and Brookhaven on the South Shore of Suffolk County. The Town was intensely suburbanized following World War II, and little developable land remains. It has the second largest population in Suffolk County, and the third largest on Long Island (approximately 300,000) (Tonjes and Swanson, 1996).

Islip was the first municipality to establish and sustain a curbside collection program for recyclables. It had the first mandatory program, and, in addition, was the first to establish a "Don't Bag It" program for yard waste. The Town was also the first to ban the collection of grass clippings and the first to create a municipal MRF. The Town received much nationwide attention in the late 1980s for its recycling rates, although some of those rates may have suffered from some definitional flaws, and not truly reflected the state of the recycling program. The Town collects paper and container recyclables, bulk metals, and some leaves and other garden trimmings

(but not grass clippings) curbside for recycling. The Town also recycles waste oil. The Town also quantifies the amount of C&D and incinerator ash it has used in New York State "Beneficial Use Determination" (BUD) programs (where the materials are not quite defined as recyclables, but are also no longer considered "wastes" [New York State Department of Environmental Conservation, 1993]) (Tonjes and Swanson, 1996).

Islip (Table 28 and Table 29), as with other Towns with well-established curbside collection programs, has not seen spectacular growth in that aspect of its program over the past several years. In fact, because the Town now reports net tonnages at its MRF rather than collected tonnages, there has been a slight decline in reported curbside recycling tonnages from a 1991 peak. Composting tonnages have declined as well, due to the "Don't Bag It" waste diversion of grass clippings. Nonetheless, some computations of Islip's recycling rate still exceed 30%.

The Town prefers to calculate a "waste diversion" rate. This is based upon recycling plus "waste minimization" -- also called waste reduction. The Town bases this calculation on its residential waste stream. The numerator consists of curbside recycling, compost materials, and tonnage declines in compost received (presumably the product of the "Don't Bag It" campaign, which is estimated to be 0.2×10^5 tons year⁻¹ [Scully, 1996]) plus declines in residential wastes received at its incinerator for disposal. Those calculations show Islip approaches a 40% diversion rate. The Town has not attempted to use some of its secondary use - BUD products (incinerator

ash used at the landfill and C&D used to shape landfill slopes) in recycling rate calculations (although the compost is used as an input to its recycling calculations).

The Town's curbside program set-out rate was unavailable for 1994, as were individual rates for paper and containers for earlier years. For the purposes of Table 30, and later analyses, we assumed that the program resulted in a net recyclables production of approximately 24,000 tons (beginning in 1993, the Town did not include materials removed as unrecyclable at the MRF in its recycling reports). For 1992 and earlier, the "WRAP" program tonnage was the sum of collected materials, rather than the net tonnage. The curbside set-out rates are given in Table 30.

Table 29. Town of Islip Recycling Data (in tons)

	1991	1992	1993
Recycling Total	83482	70233	86303
Paper			
Newspaper			
OCC			23413
office		5	13
mixed			
other			
Containers			
Metal			
Tin			
Alum.			
Glass			
Clear			
Brown			
Green			
Mixed			
Plastic			
HDPE			
PET			
other			
White goods/mixed metal	7285	12248	7117
Yard Waste/compost	47055	29995	30063
Grass			
Leaves			
Brush			
Other Wood			
Waste Oil		124	202
Batteries			
C&D			
Other			

Table 30. Town of Islip Curbside Set-out Rates

Year	in tons			lbs/person			Paper:Cans
	Paper	Containers	Total	Paper	Containers	Total	
1990	no data						
1991			27460			183	
1992			26221			175	
1993			23971			160	
1994			~24000			~160	



Riverhead

The Town of Riverhead, in particular, the village of Riverhead, was long the seat of Suffolk County government, until the development in the west of the County led to a shift to Hauppauge in the 1960s. Riverhead straddles the Peconic River, at the head of the Peconic Bay, and was the center for the East End agricultural industry. Although some suburban growth has occurred, it still retains its mostly rural character. The Town is the second largest of the East End Towns in population (approximately 23,000), although, since it lacks much of the tourist attractions of the others, may have the smallest per capita tax base (Tonjes and Swanson, 1996).

Riverhead began its municipal recycling program as a drop-off program. In mid-1993, in anticipation of a change in overall waste management strategy (where East End Recycling, a private company, would process the Town's waste through a solid waste composting plant with associated preprocessing and recyclables processing equipment), the Town began collecting

residential solid wastes and recyclables. East End has been delayed in constructing the plant. Riverhead now collects newspaper, corrugated cardboard, chipboard, commingled ontainers, bulky metals, and yard wastes (Tonjes and Swanson, 1996).

Few data are available from the Town of Riverhead. The 1993 data used in Table 31 and Table 32 are from State reporting forms: it is not clear that the recycling data covers the entire year, or just for October to December. During that time the Town was transferrring MSW off Long Island; no recycling data was enclosed in the 1993 "Landfill" report, which apparently covered the interval of January through October 9 (the landfill closed October 10). Other non-municipal sources cited suggest the Town does recycle considerably more tons than were documented in the NYSDEC report submitted by the Town.

For that reason, we have estimated the Town's paper and container collection tonnage at 2000 tons for 1994. The NYSDEC report counted 407 tons of total recycling for a little less than a quarter of 1993, and the Town suggested that participation in its nascent curbside collection program, both for MSW and recyclables, improved considerably through 1994. That suggests that the Town could have been collecting approximately 175 pounds per person per year through the program. The first quarter-year (the last quarter of 1993) of the curbside program apparently produced 19 pounds of containers per person, or nearly 80 pounds per person on an annual basis. The only other data available for Riverhead are from 1990, when the Town's recycling program was still a drop-off program. That year the Town recycled a total of 120 pounds of paper and containers per person. These data are reported in Table 33 and Table 34.

Table 31. Town of Riverhead Waste Management Data (in tons)

Year	Source	Drop-off Recycled	Yard Waste	Total Recycled	MSW Landfilled	MSW Transfer	Landfilled	Total	Percent Recycled
1985	LCWR projected							100 tpd 26000	0%
1986	PB							29600	
1987	LCWR RTB projected						""almost all" 26000	26000 100 tpd 26000	
1989	LCWR			1411					
1990	NYPIRG Newsday			1381 1381			36219 36219	37600 37600	4% 4%
1991	WMI est.	1500	1000	2500			36000	38500	6%
1992	NYSDEC PBAsh			7000 7000			36000 36000	43000 43000	16% 16%
1993	NYSDEC	407	1861	2268	22612	3141	25038	28021	8%

Table 32. Town of Riverhead Recycling Data (in tons)

	1989	1993
Recycling Total	1411	2268
Paper	105	
Newspaper		
OCC		
office		
mixed		
other		
Containers	701	216
Metal	690	
Tin		
Alum.		
Glass	7	
Clear		
Brown		
Green		
Mixed		
Plastic	4	
HDPE		
PET		
other		
White goods/mixed metal		
Yard Waste/compost		1861
Grass		
Leaves		
Brush		
Other Wood		
Waste Oil		
Batteries		
C&D		
Other	525	

Table 33. Town of Riverhead Drop-off Recycling Participation

Year	in tons			lbs/person			Paper:Cans
	Paper	Containers	Total	Paper	Containers	Total	
1990			1381			120	
1991	no data						
1992	no data						
1993	no data						
1994	n.a.						

Table 34. Town of Riverhead Curbside Set-out Rates

Year	in tons			lbs/person			Paper:Cans
	Paper	Containers	Total	Paper	Containers	Total	
1990	n.a.						
1991	n.a.						
1992	n.a.						
1993		216			19		
1994			~2000			~175	

Shelter Island

The Town of Shelter Island, which is an island between the North and South Forks of Long Island, is the smallest in population of all the planning units on Long Island, by a wide margin (approximately 2,000, year-round). It is predominantly a tourist destination, and has little of either industry or farming. It can be reached from the "mainland" only by boat or ferry (Tonjes and Swanson, 1996).

Shelter Island waste stream statistics (Table 35 and Table 36) are difficult to analyze. The Town tends to mix cubic yards and tons together in its reports and documentations, and it is impossible to determine a proper conversion factor for cubic yards to tons without further information. This is partly because that is how the Town's contractors pay (or charge) the Town for the various components.

Nonetheless, the Town's recycling rate has obviously increased tremendously over the past several years. Improved recycling amounts are part of the increase; however, most of the improvement is due to the tremendous decrease in the denominator of the calculation. The Town's "Pay per Bag" system has decreased the Town's waste stream by over 50%. The tonnage disposed by the Town has decreased by nearly two-thirds by some calculations.

Absent data from 1994, we have assumed that the Shelter Island drop-off program had approximately the same efficiency in 1994 as in 1993 (see Table 37). Statistics for Shelter Island do not include metal containers, as they are included in the bulk metal statistics (and the bulk metals are reported in cubic yards, as well). This necessarily underreports the effect of the program. Please note the data shows that Shelter Island seems to be much more efficient in its collection rate of containers than any other municipality (especially so, with metal container tonnages not being included in the data). No reason for this efficiency is readily apparent.

Table 35. Town of Shelter Island Waste Management Data (in tons)

Year	Source	Drop-off Recycled	Yard Waste	Total Recycl.	C&D Landfilled	MSW Transfer	MSW Landfilled	Total	Percent Recycl.
1985	LCWR							10 tpd	
1985	projected							3650	0%
1986	PB							3100	
1987	LCWR							3650	
1987	RTB						"almost all"	14 tpd	
1987	projected						5000	5000	
1989	LCWR			760					
1990	TSI (low)			400					
1990	TSI			800					
1990	NYPIRG			208			4648	4856	4%
1990	Newsday			208				4856	4%
1991	TSI (low)			14%				3000	
1991	TSI (high)			15%				4000	
1991	projected			500		500	2500	3500	14%
1992	NYSDEC			800	700	2000		2800	29%
1992	PBAsh			700		3246	700	4196	17%
1993	TSI (11 mos.)	477		477		1038			
1993	projected	520		520		1132		1650	32%
1993	NYSDEC	373				1100		1473	
1993	add. mat.	65 yds		1681 yds					
1993	projected	400	500	900		1100		2000	45%

Table 36. Town of Shelter Island Recycling Data (in tons)

	1989	1990	1993
Recycling Total	760		900
Paper	350	192	206
Newspaper		191	
OCC			
office		1	
mixed			
other			
Containers	21		
Metal	12		35 yds.
Tin			
Alum.			
Glass		41	127
Clear		22	
Brown		5	
Green		14	
Mixed			
Plastic	9		40
HDPE			
PET			
other			
White goods/mixed metal			30 yds
Yard Waste/compost			
Grass			
Leaves			
Brush			
Other Wood			1616 yds
Waste Oil		2	
Batteries			
C&D			
Other	389		

Table 37. Town of Shelter Island Drop-off Recycling Participation

Year	in tons			lbs/person			Paper:Cans
	Paper	Containers	Total	Paper	Containers	Total	
1990	191	~120	~300	169	~100	~250	2
1991	no data						
1992	no data						
1993	206	167	373	182	148	330	1.2
1994	~200	~175	~375	~175	~150	~325	1

Smithtown

The Town of Smithtown lies on the North Shore, between Huntington and Brookhaven. Except for the core of the village of Smithtown (which is pre-Revolutionary War), the Town was largely developed after World War II. Some development of the Town is still occurring. The population of Smithtown is approximately 110,000 (Tonjes and Swanson, 1996).

Smithtown claims to be the first Long Island municipality with a large scale recycling program. It ran from the late-1970s until 1984, and involved collection of source separated newspapers and processing of other drop-off materials. The program was suspended following an explosion at the processing center in 1984. Recycling was re-instituted with curbside collection of source separated materials on a mandatory basis in 1987. Smithtown has been criticized by many observers for stopping the collection of some recyclables when markets were at a nadir, rather than continuing to market the materials at a substantial loss (as with newspapers and

corrugated cardboard early in 1990). As of 1994, however, the Town was collecting newspapers, corrugated cardboard, and commingled containers from curbsides. The materials are processed at the Municipal Services Building (MSB). The MSB began its service as a simple processing center, and has been expanded over time to become a full-service MRF. The Town has a voluntary "Don't Bag It" program as a partial management system for yard wastes; collected yard wastes are composted through the private sector (Tonjes and Swanson, 1996).

The data presented in Table 38 and Table 39 echo the changes in materials recycled by the Town for different years. The Town's recycling tonnages for paper, for example, appear to have fallen somewhat from 1989 (in 1990, the Town stopped collecting newspaper for some time while markets were especially bad), which is supportive of the view that deletion of materials causes less participation when the program is resumed.

The Town's overall recycling rate, as reported, has been stagnant at approximately 13%. However, the Town has included commercial wastes in the denominator of the calculation without attempting to include commercial recycling tonnages, and has taken no credits for any composting activities (admittedly, a somewhat fitful process over the past few years).

Additionally, the Town's difficulties with one of its largest contract carters, SSC, over deliveries of wastes and recyclables to Town facilities, make some of the waste stream and recyclables statistics for 1993 - 1994 less than complete (Trent, 1994). This dispute will be discussed in more detail in Plumbing the Depths, in the general context of private sector waste management and recycling efforts.

Smithtown's curbside collection set-out rates are listed in Table 40. The total collected appears to have declined by approximately 4% over the past five years; however, there is tremendous fluctuations in the data, and no clear trends are apparent. Some inconsistencies in the data sets appear for 1994, as well. This is due to changes in accounting and processing methodologies. Tonnages received (as presented in Table 40) are similar to those data collected for other years; however, because the Town began processing and marketing its containers directly, the net tonnages (shown in Tables 38 and 39) are not consistent with the tonnages received. This is due to discards of unsuitable materials, and to storage of materials prior to eventual marketing.

Table 38. Town of Smithtown Waste Management Data (in tons)

Year	Source	Recycled	Yard Waste Landfilled	C&D Landfilled	Landfilled	Municip Transfer	Incin. @Hunt.	Total	Percent Recycl.
1985	LCWR projected							300 tpd 78000	0%
1986	PB							173500	
1987	TOS				128805			128805	
	LCWR							350 tpd	
	LCWR							78000	
	RTB projected		""some"		""vast majority"			416 tpd 110000	
1988	TOS	15018			108240			123222	12%
1989	TOS	16402			112406			128448	13%
1990	TOS	7973			118686			126659	6%
	NYPIRG	7973			113956			121929	7%
	Newsday	7973						121929	7%
1991	TOS	13132			105325	11092	11092	129549	10%
1992	TOS	13815				96302	96302	110117	13%
	PBAsh	11755			43956	96918		152629	8%
	NYSDEC	13500		44000		90000		103500	13%
1993	TOS	14317	40768*	8918*		94782	94782	109099	13%
1994	TOS	13281				90741	90471	104022	13%

* includes some Town of Huntington material

Table 39. Town of Smithtown Recycling Data (in tons)

	1989	1990	1991	1992	1993	1994
Recycling Total	18786	7973	13132	13815	15189	13281
Paper	14614	4232	7902	10175	11020	10038
Newspaper						
OCC	1699	758	609	1778	1752	1819
office						
mixed						
other						
Containers	322		4798	3374	3297	1807
Metal						410
Tin						
Alum.	9	11				
Glass	266	337				1186
Clear						
Brown						
Green						
Mixed						
Plastic	47					211
HDPE						
PET						
other						
White goods/mixed metal	3821	3172	431	266	872	1358
Yard Waste/compost						
Grass						
Leaves						
Brush						
Other Wood						
Waste Oil		43				59
Batteries	29	72				19
C&D						
Other						

Table 40. Town of Smithtown Curbside Set-out Rates

Year	in tons			lbs/person			Paper:Cans
	Paper	Containers	Total	Paper	Containers	Total	
1990	11845	1807	13652	210	32	242	6.6
1991	7903	4798	12701	140	85	225	1.6
1992	10176	3374	13550	180	60	240	3
1993	11020	3297	14317	195	58	253	3.3
1994	9846	3197	13043	174	57	231	3.1

Southampton

The Town of Southampton is very similar to the Town of East Hampton, with which it shares the South Fork, except that Southampton is much larger (year-round population of approximately 45,000). It also was a farming and maritime community, which is now largely transformed into a resort destination. The "Hamptons" have become a greatly desired summer address for the affluent of New York City. Large areas within the Town are still agricultural in nature (Tonjes and Swanson, 1996).

As with East Hampton, Shelter Island, and Southold, Southampton does not provide collection services. As with Shelter Island and Southold, the Town recently (1995) instituted a "Pay-per-Bag" system to encourage waste reduction and recycling, and to make the cost allocation for wastes proportional to waste generation. In conjunction with this development, the Town has also restricted use of its waste management facilities to self-haulers (Tonjes and

Swanson, 1996). This development, not reflected in the data presented here, will undoubtedly greatly reduce the waste stream size reported by the Town.

The Town instituted recycling at its transfer stations and landfill in 1987. The program is now mandatory. Separations required of self-haulers are rigorous, into market-ready groupings of various paper and container materials (glass bottles separated into brown, green, and clear glass, for example). Other materials are also recycled at the transfer stations and/or the landfill on a non-mandatory basis (Tonjes and Swanson, 1996). The Town composts yard wastes at its landfill; however, the compost has not regularly found uses (see below) (Gilbride, 1994).

Southampton (Table 41 and Table 42) has consistently increased the tonnages of materials managed through its drop-off recycling programs (although tonnages generally levelled off from 1993 to 1994). This is not fully reflected in all the recycling rate calculations presented here. One reason for the swings in recycling rates seen in Table 41 is that the Town tends to not consistently take any recycling credit for its composting program. Some observers cited here have inserted the credit for the Town, and some Town reports also take the credits. Total waste stream calculations for the Town can vary by 40% or so. This also creates instability in recycling rate calculations.

Table 43 lists the drop-off program participation for the Town. The Town's recyclables collection rate approximately doubled from 1991 to 1993, and then has appeared to level off.

Table 41. Town of Southampton Waste Management Data (in tons)

Year	Source	Drop-off Recycled	Yard Waste	Total Recycled	C&D Landfilled	Wghed. Landfilled	est. Landfilled	MSW Landfilled	Total	Percent Recycled
1985	LCWR								210 tpd	
1985	projected								55000	
1986	PB								65500	
1987	TOS	1170	300	1470		61160	7330	68490	69960	2%
1987	LCWR								54600	
1987	RTB							"almost all"	175 tpd	
1987	projected							45000	45000	
1988	TOS	2300	500	2800	20000	59390	8620	68010	71000	4%
1989	TOS	4240	2000	6240	20000	62400	6000	68400	75000	8%
1989	LCWR			3247						
1990	TOS	4450	3500	7950	20000	50300	6000	64000		
1990	NYPIRG			4447				64553	69000	6%
1990	Newsday			4447					69000	6%
1991	TOS	5060	4500	9560	20000	61300	5000	66300	76000	13%
1991	TOS	5060	4500	24560	5000	61300	5000	66300	96070	26%
1991	TOS	4447						37500	42000	
1991	WMI est.	4447	12000	16500				37500	54000	31%
1992	TOS (1991 proj.)								76470	
1992	NYSDEC			13000				27000	40000	33%
1992	PBAsh			3752				52600	56352	7%
1993	TOS	9365	12000	21365				~35000	56500	38%
1993	TOS	9365		9365				~35000	44500	21%
1993	NYSDEC	7521		12500				49065	59284	21%
1994	TOS	9571		9571				45104	54675	18%
1995	TOS	7975		7975		44193		44193	52168	15%
1995	TOS (drop-off only)	5038		5038		7208		7208	12246	41%

Table 42. Town of Southampton Recycling Data (in tons)

	1989	1990	1991	1993	1993	1993	1994	1995	drop-off only 1995
Recycling Total	3247	7950	24560	7521	21365	9365	9571	7975	5088
Paper	1703		2625	5442	6213	6213	6000	4361	3135
Newspaper			1725		2948	2948	2730	1900	961
OCC			890	2478	2478	2478	2522	1818	901
office			10						
mixed					787	787	748	643	1273
other									
Containers	1353			1126	1906	1906	2147	2298	1794
Metal	1007		250	207			210	221	
Tin			205		207	207			
Alum.			45						
Glass	286		840	836	836	836	883	786	
Clear			460						
Brown			90						
Green			290						
Mixed									
Plastic	60		205	83	83	83	21		
HDPE			180						
PET			25						
other									
White goods/mixed metal			885	947	1000	1000	1174	1055	
Yard Waste/compost		3500	4500		12000				
Grass									
Leaves									
Brush									
Other Wood				6					
Waste Oil					113	113	111	109	109
Batteries					19	19	29	16	
C&D			15000						
Other	183		255		114	114	109	136	

Table 43. Town of Southampton Drop-off Recycling Participation

Year	in tons			lbs/person			Paper:Cans
	Paper	Containers	Total	Paper	Containers	Total	
1990			4450			196	
1991	2615	1295	3910	115	57	172	2
1992	no data						
1993	6213	1906	8119	274	84	358	3.3
1994	6000	2148	8148	264	95	359	2.8

Southold

The Town of Southold makes up the North Fork of Long Island. Until very recently, it was still a community centered around farming and fishing; lately, it is developing a cachet as a summer resort, although not to the extent seen on the South Fork. The Town's population is approximately 20,000 (Tonjes and Swanson, 1996).

As with three of the other four East End Towns, Southold does not provide collection services. The Town has a "Pay-per-Bag" system for assigning waste management costs, and to promote recycling and waste reduction efforts (Tonjes and Swanson, 1996).

The Town's drop-off recyclables program began in the mid-1980s. As of 1994, the Town's mandatory recyclables list included newspapers, corrugated cardboard, mixed paper, boxboard, and the usual list of consumer containers. The intimate size of the Town transfer

station allows for close supervision of self-haulers and a high degree of compliance with the Town regulations. Carters hauling wastes for residents are allowed to deliver "commingled" paper, and commingled containers (in separate loads). Southold also collects other materials on a voluntary basis. The Town composts its yard wastes at the Town landfill site (Tonjes and Swanson, 1996).

The data available for Southold (Table 44 and Table 45) show increases in the tonnages managed through its drop-off programs. This Town's recycling rate calculations also are extremely dependent on the size of the total waste stream. The increase in the drop-off program tonnages is also partly masked (in terms of overall recycling tonnages) by variations in yard waste and brush recovery tonnages. At least part of the variations is due to better determinations in exactly how much material is actually composted or chipped (similar to the re-evaluations of Brookhaven's tonnages). The imposition of the "Pay per Bag" system kept the recycling rate nearly constant despite a decrease in claimed recycling tonnages from 1992 to 1993. This was because the Town saw a sharp drop in the denominator term due to the decrease in disposed MSW.

The Town's drop-off recycling rate for 1994, as presented in Table 46, was estimated based on modest tonnage increases from 1993 levels. We estimate that the rate for paper separation was 200 pounds per person per year, the container separation rate 100 pounds per person, and the total rate was approximately 300 pounds per person. In 1993, data showed that the paper rate was 181 pounds per person, the container rate was 95 pounds per person, and the

total was 276 pounds per person. The data suggest that between 1992 and 1993 the Town made great strides in improving its recyclables collection.

Table 44. Town of Southold Waste Management Data (in tons)

Year	Source	Resid. Recycled	Other Recycled	Yard Waste	Total Recycled	MSW Landfilled	Total Landfilled	MSW Transport	Total	Percent Recycled
1985	LCWR									75 tpd.
1985	projected								20000	0%
1986	PB								31000	0%
1987	TOS				1124	36500			37500	3%
1987	LCWR				20%				100 tpd	
1987	LCWR								35200	
1987	projected				7000	28000			35200	20%
1987	RTB				"the rest"	"most"			75 tpd	
1987	projected					20000			20000	
1990	TOS				1919	46199			48108	4%
1990	TOS (WRMI interpret.)	979	948		1927	27131	45361		29058	7%
1990	NYPIRG				1919	46199			48108	4%
1990	Newsday				1919	46199			48108	4%
1991	TOS				6317	33604			39921	16%
1991	TOS (WRMI interpret.)	1690	956	3342	5988	20212	32072		26200	23%
1992	TOS (WRMI interpret.)	2100	881	4068	7049	21039	32085		28088	25%
1992	NYSDEC				4000	35000			39000	10%
1992	PBAsh				4438	34875			39313	11%
1993	TOS (WRMI interpret.)	2767	957	2064	5788	18088	29684	2772*	23876*	24%

* = includes agricultural wastes

Table 45. Town of Southold Recycling Data (in tons)

	1987	1991	1992	1993
Recycling Total	1124	6317	4438	5798
Paper	540	1016	1245	1797
Newspaper	540	871	776	1050
OCC		139	159	342
office				
mixed		6	310	405
other				
Containers			840	944
Metal		138	161	156
Tin				
Alum.				
Glass		567	566	650
Clear			352	405
Brown			50	48
Green			164	197
Mixed				
Plastic			113	138
HDPE				
PET				
other				
White goods/mixed metal	500	681	590	609
Yard Waste/compost		3256	1337	2064
Grass				
Leaves		1122	1109	815
Brush		2134	228	1249
Other Wood		215	120	62
Waste Oil			61	70
Batteries	31	19	16	22
C&D				
Other	53	318	280	226

Table 46. Town of Southold Drop-off Recycling Participation

Year	in tons			lbs/person			Paper:Cans
	Paper	Containers	Total	Paper	Containers	Total	
1990			1919			194	
1991	1016	705	1721	102	71	174	1.4
1992	1245	840	2085	126	85	210	1.5
1993	1797	944	2741	181	95	276	1.9
1994	~2000	~1000	~3000	~200	~100	~300	2

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Tables 1-46 References

Glen Cove, Table 1:

CGC = Lou D'Ambrosio, Superintendent, Department of Public Works, City of Glen Cove (1991).

PB = Long Island Regional Planning Board. 1987. Data summary and projections (Task 1.1: Long Island Ash Inventory). In: Long Island Ash Management Study. Long Island Regional Planning Board, Hauppauge, NY, and New York State Energy Research and Development Authority, Albany, NY.

RTB = Newsday. 1987. Across Long Island. In: The Rush to Burn. Newsday. Melville, NY (special reprint). Originally printed December 22. pp. 46-47.

NYPIRG = Romalewski, Steven A. 1991. A Legacy of Waste: Solid Waste Generation and Disposal on Long Island. Toxics Project, New York Public Interest Research Group, New York, NY.

Newsday = Bush, Frederick. 1991. Taking out the trash. Newsday. October 21, p. 25.

NYSDEC = Mitrey, Robert. 1993. Regional Solid Waste Engineer, Region I, NYSDEC. Presentation before Environmental Committee, Long Island Action, Melville, NY. May meeting.

PBAsh = Long Island Regional Planning Board. 1993. The Potential for Beneficial Use of Waste-to-Energy Facility Ash: Volume I: Long Island Ash Management Status. LE Koppleman, Project Director; E.G. Tannenbaum, Deputy Project Director. Long Island Regional Planning Board, Hauppauge, NY.

Glen Cove, Table 2:

1990 = Lou D'Ambrosio, Superintendent, Department of Public Works, City of Glen Cove (1991)

1992 = Mitrey, Robert. 1993. Regional Solid Waste Engineer, Region I, NYSDEC.

Presentation before Environmental Committee, Long Island Action, Melville, NY. May meeting; and Long Island Regional Planning Board. 1993. The Potential for Beneficial Use of Waste-to-Energy Facility Ash: Volume I: Long Island Ash Management Status. LE Koppleman, Project Director; E.G. Tannenbaum, Deputy Project Director. Long Island Regional Planning Board, Hauppauge, NY.

Glen Cove, Table 3:

1990 = Lou D'Ambrosio, Superintendent, Department of Public Works, City of Glen Cove (1991)

1994 = WRMI estimate, based on rounding past years' data upwards

Hempstead, Table 4:

LCWR (1985) = Trunzo, Caesar, and Thomas DiNapoli. 1986. Progress Report of the New York State Legislative Commission on Water Resource Needs of Long Island, 1985. New York Legislative Commission on the Water Resource Needs of Long Island, Hauppauge, NY.

TOH (1986, first 1990, first 1991) = McGrane, William. 1991, 1992. Commissioner, Department of Sanitation, Town of Hempstead, NY.

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LCWR (1987) = Trunzo, Caesar, and Thomas DiNapoli. 1988. Progress Report of the New York State Legislative Commission on Water Resource Needs of Long Island, 1987. New York Legislative Commission on the Water Resource Needs of Long Island, Hauppauge, NY.

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TOH (1988, 1989, second 1990, second 1991) = CSI Resource Systems, Inc. 1993. Town of Hempstead Comprehensive Recycling Analysis. CSI Resource Systems, Inc., Boston, MA.

NYPIRG = Romalewski, Steven A. 1991. A Legacy of Waste: Solid Waste Generation and Disposal on Long Island. Toxics Project, New York Public Interest Research Group, New York, NY.

Newsday = Bush, Frederick. 1991. Taking out the trash. Newsday. October 21, p. 25.

TOH (1992, 1993, 1994) = annual Town of Hempstead Department of Sanitation recycling summaries. Provided by: Ronan, Richard T. 1994, 1995. Commissioner, Department of Sanitation, Town of Hempstead, NY.

PBAsh = Long Island Regional Planning Board. 1993. The Potential for Beneficial Use of Waste-to-Energy Facility Ash: Volume I: Long Island Ash Management Status. LE Koppleman, Project Director; E.G. Tannenbaum, Deputy Project Director. Long Island Regional Planning Board, Hauppauge, NY.

NYSDEC = Mitrey, Robert. 1993. Regional Solid Waste Engineer, Region I, NYSDEC. Presentation before Environmental Committee, Long Island Action, Melville, NY. May meeting.

TOH (1995) = annual Town of Hempstead Department of Sanitation recycling summary. Provided by: Beedenbender, Lois M. 1996. Recycling Coordinator, Department of Sanitation, Town of Hempstead, NY.

Hempstead, Tables 5 & 6:

1991 = McGrane, William. 1991, 1992. Commissioner, Department of Sanitation, Town of Hempstead, NY.

1992 - 1994 = annual Town recycling summaries (see above).

Long Beach, Table 7:

CLB (1986, 1990) = Raab, Robert. 1991. Commissioner of Public Works, City of Long Beach, NY.

PB = Long Island Regional Planning Board. 1987. Data summary and projections (Task 1.1: Long Island Ash Inventory). In: Long Island Ash Management Study. Long Island Regional Planning Board, Hauppauge, NY, and New York State Energy Research and Development Authority, Albany, NY.

RTB = Newsday. 1987. Across Long Island. In: The Rush to Burn. Newsday. Melville, NY (special reprint). Originally printed December 22. pp. 46-47.

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PBAsh = Long Island Regional Planning Board. 1993. The Potential for Beneficial Use of Waste-to-Energy Facility Ash: Volume I: Long Island Ash Management Status. LE Koppleman, Project Director; E.G. Tannenbaum, Deputy Project Director. Long Island Regional Planning Board, Hauppauge, NY.

NYSDEC = Mitrey, Robert. 1993. Regional Solid Waste Engineer, Region I, NYSDEC. Presentation before Environmental Committee, Long Island Action, Melville, NY. May meeting.

Long Beach, Tables 8 & 9:

1990 = Raab, Robert. 1991. Commissioner of Public Works, City of Long Beach, NY.

1991 = Febrizio, Joseph. 1994. Environmental Planner, Department of Public Works, City of Long Beach, NY.

1992, 1993 = 1993 annual recycling memo, prepared by J. Febrizio, Environmental Planner, Department of Public Works, City of Long Beach, NY.

1994 = 1994 annual recycling memo, prepared by J. Febrizio, Environmental Planner, Department of Public Works, City of Long Beach, NY.

North Hempstead, Table 10:

LCWR (1985) = Trunzo, Caesar, and Thomas DiNapoli. 1986. Progress Report of the New York State Legislative Commission on Water Resource Needs of Long Island, 1985. New York Legislative Commission on the Water Resource Needs of Long Island, Hauppauge, NY.

TNH (1986, 1987, second 1989) = Malcolm Pirnie. unk. date. Town of North KHempstead Comprehensive Recycling Analysis. (as reported by McBride, Tim. 1991. Recycling Co-ordinator, Town of North Hempstead, NY.)

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LCWR (1987) = Trunzo, Caesar, and Thomas DiNapoli. 1988. Progress Report of the New York State Legislative Commission on Water Resource Needs of Long Island, 1987. New York Legislative Commission on the Water Resource Needs of Long Island, Hauppauge, NY.

RTB = Newsday. 1987. Across Long Island. In: The Rush to Burn. Newsday. Melville, NY (special reprint). Originally printed December 22. pp. 46-47.

TNH (1988, first 1989, 1990, second 1991, first 1992) = Town of North Hempstead. 1993. Town of Babylon/Town of North Hempstead Solid Waste Management Plan/Generic Environmental Impact Statement. Town of North Hempstead, Port Washington, NY. TNH

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TNH (1994) = Miner, Matthew. 1996. Deputy Executive Director, Town of North Hempstead Solid Waste Management Authority, Town of North Hempstead, NY.

North Hempstead, Table 11:

1987 = Malcolm Pirnie. unk. date. Town of North Hempstead Comprehensive Recycling Analysis. (as reported by McBride, Tim. 1991. Recycling Co-ordinator, Town of North Hempstead, NY.)

1988 - 1990 = Town of North Hempstead. 1993. Town of Babylon/Town of North Hempstead Solid Waste Management Plan/Generic Environmental Impact Statement. Town of North Hempstead, Port Washington, NY.

1991 = Roth, Paul. 1992. Executive Director, Town of North Hempstead Solid Waste Management Authority, Town of North Hempstead, NY.

1992, 1993 = Town of North Hempstead Solid Waste Management Authority annual reports to NYSDEC Region I.

1994 = Miner, Matthew. 1996. Deputy Executive Director, Town of North Hempstead Solid Waste Management Authority, Town of North Hempstead, NY.

North Hempstead, Table 12:

1990 = Town of North Hempstead. 1993. Town of Babylon/Town of North Hempstead Solid Waste Management Plan/Generic Environmental Impact Statement. Town of North Hempstead, Port Washington, NY.

1991 = Roth, Paul. 1992. Executive Director, Town of North Hempstead Solid Waste Management Authority, Town of North Hempstead, NY.

1992, 1993 = Town of North Hempstead Solid Waste Management Authority annual reports to NYSDEC Region I.

1994 = Miner, Matthew. 1996. Deputy Executive Director, Town of North Hempstead Solid Waste Management Authority, Town of North Hempstead, NY.

Oyster Bay, Table 13:

LCWR (1985) = Trunzo, Caesar, and Thomas DiNapoli. 1986. Progress Report of the New York State Legislative Commission on Water Resource Needs of Long Island, 1985. New York Legislative Commission on the Water Resource Needs of Long Island, Hauppauge, NY.

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RTB = Newsday. 1987. Across Long Island. In: The Rush to Burn. Newsday. Melville, NY (special reprint). Originally printed December 22. pp. 46-47.

TOH = Dvirka and Bartilucci. 1992. Town of Huntington Comprehensive Recycling Analysis. Dvirka and Bartilucci, Syosset, NY.

TOB (1990, 1991, 1992, 1993) = Town of Oyster Bay annual recycling reports. Provided by: Antonelli, Leonard. 1992. Recycling Coordinator, Town of Oyster Bay, NY; and Swenson, Eric. 1994. Superintendent of Environmental Control, Town of Oyster Bay, NY.

NYPIRG = Romalewski, Steven A. 1991. A Legacy of Waste: Solid Waste Generation and Disposal on Long Island. Toxics Project, New York Public Interest Research Group, New York, NY.

Newsday = Bush, Frederick. 1991. Taking out the trash. Newsday. October 21, p. 25.

PBAsh = Long Island Regional Planning Board. 1993. The Potential for Beneficial Use of Waste-to-Energy Facility Ash: Volume I: Long Island Ash Management Status. LE Koppleman, Project Director; E.G. Tannenbaum, Deputy Project Director. Long Island Regional Planning Board, Hauppauge, NY.

NYSDEC = Mitrey, Robert. 1993. Regional Solid Waste Engineer, Region I, NYSDEC. Presentation before Environmental Committee, Long Island Action, Melville, NY. May meeting.

TOB (1994) = Town of Oyster Bay. 1995. Town of Oyster Bay Solid Waste Management Plan Compliance Report. Town of Oyster Bay, Oyster Bay, NY.

Oyster Bay, Tables 14 & 15:

1990 - 1993 = Town of Oyster Bay annual recycling reports. Provided by: Antonelli, Leonard. 1992. Recycling Coordinator, Town of Oyster Bay, NY; and Swenson, Eric. 1994. Superintendent of Environmental Control, Town of Oyster Bay, NY.

1994 = Town of Oyster Bay. 1995. Town of Oyster Bay Solid Waste Management Plan Compliance Report. Town of Oyster Bay, Oyster Bay, NY.

Babylon, Table 16:

Brown et al. = Brown, Ruben S., Richard Napoli, Eduardo Lamanna, Herbert Sherman, Leonard F. O'Reilly, Kenneth Woodruff, and Robert Frederick. 1980. Toward Action on Waste Disposal/Resource Recovery on Long Island. The Center for Regional Technology of Polytechnic Institute of New York, Farmingdale, New York, for the Action Committee for Long Island.

LCWR (1985) = Trunzo, Caesar, and Thomas DiNapoli. 1986. Progress Report of the New York State Legislative Commission on Water Resource Needs of Long Island, 1985. New York Legislative Commission on the Water Resource Needs of Long Island, Hauppauge, NY.

CDM 1985 = engineering estimate of Camp, Dresser and McKee (1985) based on per capita waste stream estimates; reported by: Senatore, Peter. 1991. Program Director, Gershman, Brickner and Bratton, Inc. North Babylon, NY.

CDM 1987 = engineering estimate of Camp, Dresser and McKee (1987) based on per capita waste stream estimates; reported by: Senatore, Peter. 1991. Program Director, Gershman, Brickner and Bratton, Inc. North Babylon, NY.

H2M = Holzmacher, Mclendon and Murrell, PC. unk. date. Town of Babylon Solid Waste Management Plan. Reported by: Senatore, Peter. 1991. Program Director, Gershman, Brickner and Bratton, Inc. North Babylon, NY.

TOB (1986) = mean monthly landfill scale data from July, 1986 - September, 1987; reported by: Senatore, Peter. 1991. Program Director, Gershman, Brickner and Bratton, Inc. North Babylon, NY.

PB = Long Island Regional Planning Board. 1987. Data summary and projections (Task 1.1: Long Island Ash Inventory). In: Long Island Ash Management Study. Long Island Regional Planning Board, Hauppauge, NY, and New York State Energy Research and Development Authority, Albany, NY.

LCWR (1987) = Trunzo, Caesar, and Thomas DiNapoli. 1988. Progress Report of the New York State Legislative Commission on Water Resource Needs of Long Island, 1987. New York Legislative Commission on the Water Resource Needs of Long Island, Hauppauge, NY.

RTB = Newsday. 1987. Across Long Island. In: The Rush to Burn. Newsday. Melville, NY (special reprint). Originally printed December 22. pp. 46-47.

SWMP = Town of Babylon Solid Waste Management Plan table, as provided by: Senatore, Peter. 1991. Program Director, Gershman, Brickner and Bratton, Inc. North Babylon, NY.

CRRFB = Gershman, Brickner and Bratton, Inc. 1991. Feasibility report of Gershman, Brickner and Bratton. In: Limited Offering Memorandum for the Town of Babylon Industrial Development Agency (New York), Recycling Facility Revenue Bonds (Babylon Recycling Center, Inc., Project) Series 1991. Donaldson, Lufkin & Jenrette, Securities Corporation, New York, NY.

Ann. Rep. = 1990 Town of Babylon Annual Recycling Report (press release).

GBB = Gershman, Brickner and Bratton. 1991. 1990 Town of Babylon Recycling Activities. Gershman, Brickner, and Bratton, North Babylon, NY.

NYPIRG = Romalewski, Steven A. 1991. A Legacy of Waste: Solid Waste Generation and Disposal on Long Island. Toxics Project, New York Public Interest Research Group, New York, NY.

Newsday = Bush, Frederick. 1991. Taking out the trash. Newsday. October 21, p. 25.

TOB (1991) = Gershman, Brickner and Bratton. 1992. 1992 Town of Babylon Recycling Activities. Gershman Brickner and Bratton, North Babylon, NY.

PBAsh = Long Island Regional Planning Board. 1993. The Potential for Beneficial Use of Waste-to-Energy Facility Ash: Volume I: Long Island Ash Management Status. LE Koppleman, Project Director; E.G. Tannenbaum, Deputy Project Director. Long Island Regional Planning Board, Hauppauge, NY.

NYSDEC = Mitrey, Robert. 1993. Regional Solid Waste Engineer, Region I, NYSDEC. Presentation before Environmental Committee, Long Island Action, Melville, NY. May meeting.

TOB (1992, first 1993) = Town of Babylon. 1994. 1993 Town of Babylon Recycling Activities. Town of Babylon, Babylon, NY.

TOB (second 1993, 1994) = Town of Babylon. 1995. 1994 Town of Babylon Recycling Activities. Town of Babylon, Babylon, NY.

WRMI est. (1993) = includes estimates of ash accepted, and Town of Huntington incinerator data (McNulty-Gallo, Audrey. 1994. Analyst, Huntington Resource Recovery Agency, Town of Huntington, NY.).

WRMI est. (1994) = includes estimates of ash accepted.

TOB (1995) = Kluesener, Ronald. 1995. Commissioner of Environmental Control and Administrator of Solid Waste, Town of Babylon, NY.

Babylon, Table 17:

first 1990 = Town of Babylon Solid Waste Management Plan table, as provided by: Senatore, Peter. 1991. Program Director, Gershman, Brickner and Bratton, Inc. North Babylon, NY.

second 1990 = Gershman, Brickner and Bratton, Inc. 1991. Feasibility report of Gershman, Brickner and Bratton. In: Limited Offering Memorandum for the Town of Babylon Industrial Development Agency (New York), Recycling Facility Revenue Bonds (Babylon Recycling Center, Inc., Project) Series 1991. Donaldson, Lufkin & Jenrette, Securities Corporation, New York, NY.

third 1990 = 1990 Town of Babylon Annual Recycling Report (press release).

fourth 1990 = Gershman, Brickner and Bratton. 1991. 1990 Town of Babylon Recycling Activities. Gershman, Brickner, and Bratton, North Babylon, NY.

1991 = Gershman, Brickner and Bratton. 1992. 1992 Town of Babylon Recycling Activities. Gershman Brickner and Bratton, North Babylon, NY.

1992, 1993 = Town of Babylon. 1993 Town of Babylon Recycling Activities. Town of Babylon, Babylon, NY.

1994 = Town of Babylon. 1995. 1994 Town of Babylon Recycling Activities. Town of Babylon, Babylon, NY.

1995 = Kluesener, Ronald. 1995. Commissioner of Environmental Control and Administrator of Solid Waste, Town of Babylon, NY.

Babylon, Table 18:

1990 = Gershman, Brickner and Bratton. 1991. 1990 Town of Babylon Recycling Activities. Gershman, Brickner, and Bratton, North Babylon, NY.
1991 = Gershman, Brickner and Bratton. 1992. 1992 Town of Babylon Recycling Activities. Gershman Brickner and Bratton, North Babylon, NY.
1992, 1993 = Town of Babylon. 1994. 1993 Town of Babylon Recycling Activities. Town of Babylon, NY.
1994 = Town of Babylon. 1995. 1994 Town of Babylon Recycling Activities. Town of Babylon, Babylon, NY.

Brookhaven, Table 19:

Multi-Town = Holzmacher, McLendon and Murrel, PC. 1982. Draft Environmental Impact Statement, Proposed Resource Recovery Facility, Multi-Town Solid Waste Management Authority. H2M/Holzmacher, McLendon and Murrell, PC, Melville, NY.

Brown et al. = Brown, Ruben S., Richard Napoli, Eduardo Lamanna, Herbert Sherman, Leonard F. O'Reilly, Kenneth Woodruff, and Robert Frederick. 1980. Toward Action on Waste Disposal/Resource Recovery on Long Island. The Center for Regional Technology of Polytechnic Institute of New York, Farmingdale, New York, for the Action Committee for Long Island.

TOB (1983, 1985, 1987) = Dvirka and Bartilucci. 1988. Town of Brookhaven Draft Generic Environmental Impact Statement/Solid Waste Management Plan. Dvirka and Bartilucci, Syosset, NY.

LCWR (1985) = Trunzo, Caesar, and Thomas DiNapoli. 1986. Progress Report of the New York State Legislative Commission on Water Resource Needs of Long Island, 1985. New York Legislative Commission on the Water Resource Needs of Long Island, Hauppauge, NY.

PB = Long Island Regional Planning Board. 1987. Data summary and projections (Task 1.1: Long Island Ash Inventory). In: Long Island Ash Management Study. Long Island Regional Planning Board, Hauppauge, NY, and New York State Energy Research and Development Authority, Albany, NY.

LCWR (1987) = Trunzo, Caesar, and Thomas DiNapoli. 1988. Progress Report of the New York State Legislative Commission on Water Resource Needs of Long Island, 1987. New York Legislative Commission on the Water Resource Needs of Long Island, Hauppauge, NY.

RTB = Newsday. 1987. Across Long Island. In: The Rush to Burn. Newsday. Melville, NY (special reprint). Originally printed December 22. pp. 46-47.

TOB (1988, both 1989, 1990) = Dvirka and Bartilucci. 1990. Town of Brookhaven Comprehensive Recycling Analysis. Dvirka and Bartilucci, Syosset, NY.

NYPIRG = Romalewski, Steven A. 1991. A Legacy of Waste: Solid Waste Generation and Disposal on Long Island. Toxics Project, New York Public Interest Research Group, New York, NY.

Newsday = Bush, Frederick. 1991. Taking out the trash. Newsday. October 21, p. 25.

TOB (1991) = Heil, James. 1992. Commissioner, Department of Waste Management, Town of Brookhaven, NY.

TOB (1992) = Tonjes, D.J. 1993. Town of Brookhaven Revised Solid Waste Management Plan. Town of Brookhaven, Medford, NY.

PBAsh = Long Island Regional Planning Board. 1993. The Potential for Beneficial Use of Waste-to-Energy Facility Ash: Volume I: Long Island Ash Management Status. LE Koppleman, Project Director; E.G. Tannenbaum, Deputy Project Director. Long Island Regional Planning Board, Hauppauge, NY.

NYSDEC = Mitrey, Robert. 1993. Regional Solid Waste Engineer, Region I, NYSDEC. Presentation before Environmental Committee, Long Island Action, Melville, NY. May meeting.

TOB (1993) = Heil, James. 1994. Commissioner, Department of Waste Management, Town of Brookhaven, NY.

TOB (1994) = Tonjes, D.J. 1995. Town of Brookhaven Solid Waste Management Plan Compliance Report. Town of Brookhaven, Medford, NY.

Brookhaven, Table 20:

1991 = Heil, James. 1992. Commissioner, Department of Waste Management, Town of Brookhaven, NY.

1992 = Tonjes, D.J. 1993. Town of Brookhaven Revised Solid Waste Management Plan. Town of Brookhaven, Medford, NY.

1993 = Heil, James. 1994. Commissioner, Department of Waste Management, Town of Brookhaven, NY.

1994 = Tonjes, D.J. 1995. Town of Brookhaven Solid Waste Management Plan Compliance Report. Town of Brookhaven, Medford, NY.

Brookhaven, Table 21:

1990 = Dvirka and Bartilucci. 1990. Town of Brookhaven Comprehensive Recycling Analysis. Dvirka and Bartilucci, Syosset, NY.

1991 - 1994 = annual MRF reports, 1991 - 1994. Provided by: Smith, Jennifer. 1995. Recycling Co-ordinator, Town of Brookhaven, NY.

East Hampton, Table 22:

LCWR (1985) = Trunzo, Caesar, and Thomas DiNapoli. 1986. Progress Report of the New York State Legislative Commission on Water Resource Needs of Long Island, 1985. New York Legislative Commission on the Water Resource Needs of Long Island, Hauppauge, NY.

PB = Long Island Regional Planning Board. 1987. Data summary and projections (Task 1.1: Long Island Ash Inventory). In: Long Island Ash Management Study. Long Island Regional Planning Board, Hauppauge, NY, and New York State Energy Research and Development Authority, Albany, NY.

LCWR (1987) = Trunzo, Caesar, and Thomas DiNapoli. 1988. Progress Report of the New York State Legislative Commission on Water Resource Needs of Long Island, 1987. New York Legislative Commission on the Water Resource Needs of Long Island, Hauppauge, NY.

RTB = Newsday. 1987. Across Long Island. In: The Rush to Burn. Newsday. Melville, NY (special reprint). Originally printed December 22. pp. 46-47.

TEH (1989, 1990, 1991, 1992) = Bullock, Tony. 1991, 1992, 1993. Supervisor, Town of East Hampton, NY.

NYPIRG = Romalewski, Steven A. 1991. A Legacy of Waste: Solid Waste Generation and Disposal on Long Island. Toxics Project, New York Public Interest Research Group, New York, NY.

Newsday = Bush, Frederick. 1991. Taking out the trash. Newsday. October 21, p. 25.

PBAsh = Long Island Regional Planning Board. 1993. The Potential for Beneficial Use of Waste-to-Energy Facility Ash: Volume I: Long Island Ash Management Status. LE Koppleman, Project Director; E.G. Tannenbaum, Deputy Project Director. Long Island Regional Planning Board, Hauppauge, NY.

NYSDEC = Mitrey, Robert. 1993. Regional Solid Waste Engineer, Region I, NYSDEC. Presentation before Environmental Committee, Long Island Action, Melville, NY. May meeting.

TEH (1993, 1994) = Garnham, Peter. 1994, 1995. Recycling Information Officer, Town of East Hampton, NY.

WRMI est. = estimate based on total 1993 waste stream size of 26000 tons (from 1994 data), with landfill closing in October.

TEH (1995) = Town of East Hampton. 1996. Town of East Hampton Solid Waste and Recycling Statistics, 1995. Town of East Hampton, East Hampton, NY.

East Hampton, Table 23:

1989 - 1992 = Bullock, Tony. 1991, 1992, 1993. Supervisor, Town of East Hampton, NY.
1993, 1994 = Garnham, Peter. 1994, 1995. Recycling Information Officer, Town of East Hampton, NY.

East Hampton, Table 24:

1990 - 1992 = Bullock, Tony. 1991, 1992, 1993. Supervisor, Town of East Hampton, NY.
1993, 1994 = Garnham, Peter. 1994, 1995. Recycling Information Officer, Town of East Hampton, NY.

Huntington, Table 25:

TOH (1979, 1980, 1981) = Dvirka and Bartilucci. 1984. Town of Huntington Solid Waste Quantification and Characterization. Dvirka and Bartilucci, Syosset, NY.

TOH (1982, 1983, 1984, 1985) = Dvirka and Bartilucci. 1986. Town of Huntington Resource Recovery Project Draft Environmental Impact Statement. Dvirka and Bartilucci, Syosset, NY.

LCWR (1985) = Trunzo, Caesar, and Thomas DiNapoli. 1986. Progress Report of the New York State Legislative Commission on Water Resource Needs of Long Island, 1985. New York Legislative Commission on the Water Resource Needs of Long Island, Hauppauge, NY.

TOH (1986, first 1990) = Del Col, Patricia. 1991. Director, Huntington Resource Recovery Agency, Town of Huntington, NY.

PB = Long Island Regional Planning Board. 1987. Data summary and projections (Task 1.1: Long Island Ash Inventory). In: Long Island Ash Management Study. Long Island Regional

Planning Board, Hauppauge, NY, and New York State Energy Research and Development Authority, Albany, NY.

LCWR (1987) = Trunzo, Caesar, and Thomas DiNapoli. 1988. Progress Report of the New York State Legislative Commission on Water Resource Needs of Long Island, 1987. New York Legislative Commission on the Water Resource Needs of Long Island, Hauppauge, NY.

RTB = Newsday. 1987. Across Long Island. In: The Rush to Burn. Newsday. Melville, NY (special reprint). Originally printed December 22. pp. 46-47.

TOH (1988, first 1989) = Hartnett, James. 1990. Director of Environmental Control, Town of Huntington, NY.

TOH (second 1989, second, third and fourth 1990) = Dvirka and Bartilucci. 1991. Town of Huntington Comprehensive Recycling Analysis. Dvirka and Bartilucci, Syosset, NY.

NYPIRG = Romalewski, Steven A. 1991. A Legacy of Waste: Solid Waste Generation and Disposal on Long Island. Toxics Project, New York Public Interest Research Group, New York, NY.

Newsday = Bush, Frederick. 1991. Taking out the trash. Newsday. October 21, p. 25.

TOH (1991, 1992, 1993, 1994) = McNulty-Gallo, Audrey. 1992, 1993, 1994, 1995. Analyst, Huntington Resource Recovery Agency, Town of Huntington, NY.

PBAsh = Long Island Regional Planning Board. 1993. The Potential for Beneficial Use of Waste-to-Energy Facility Ash: Volume I: Long Island Ash Management Status. LE Koppleman, Project Director; E.G. Tannenbaum, Deputy Project Director. Long Island Regional Planning Board, Hauppauge, NY.

NYSDEC = Mitrey, Robert. 1993. Regional Solid Waste Engineer, Region I, NYSDEC. Presentation before Environmental Committee, Long Island Action, Melville, NY. May meeting.

Huntington, Table 26:

1989 = Hartnett, James. 1990. Director of Environmental Control, Town of Huntington, NY.

1990 = Dvirka and Bartilucci. 1991. Town of Huntington Comprehensive Recycling Analysis. Dvirka and Bartilucci, Syosset, NY.

first 1991, 1992 - 1994 = McNulty-Gallo, Audrey. 1992, 1993, 1994, 1995. Analyst, Huntington Resource Recovery Agency, Town of Huntington, NY.

second 1991 = Dvirka and Bartilucci. 1993. Town of Huntington Draft Solid Waste Management Plan and Generic Environmental Impact Statement. Dvirka and Bartilucci, Syosset, NY.

Huntington, Table 27:

1990 = Dvirka and Bartilucci. 1991. Town of Huntington Comprehensive Recycling Analysis. Dvirka and Bartilucci, Syosset, NY.

1991 - 1994 = McNulty-Gallo, Audrey. 1992, 1993, 1994, 1995. Analyst, Huntington Resource Recovery Agency, Town of Huntington, NY.

Islip, Table 28:

LCWR (1985) = Trunzo, Caesar, and Thomas DiNapoli. 1986. Progress Report of the New York State Legislative Commission on Water Resource Needs of Long Island, 1985. New York Legislative Commission on the Water Resource Needs of Long Island, Hauppauge, NY.

PB = Long Island Regional Planning Board. 1987. Data summary and projections (Task 1.1: Long Island Ash Inventory). In: Long Island Ash Management Study. Long Island Regional Planning Board, Hauppauge, NY, and New York State Energy Research and Development Authority, Albany, NY.

LCWR (1987) = Trunzo, Caesar, and Thomas DiNapoli. 1988. Progress Report of the New York State Legislative Commission on Water Resource Needs of Long Island, 1987. New York Legislative Commission on the Water Resource Needs of Long Island, Hauppauge, NY.

RTB = Newsday. 1987. Across Long Island. In: The Rush to Burn. Newsday. Melville, NY (special reprint). Originally printed December 22. pp. 46-47.

NYPIRG = Romalewski, Steven A. 1991. A Legacy of Waste: Solid Waste Generation and Disposal on Long Island. Toxics Project, New York Public Interest Research Group, New York, NY.

Newsday = Bush, Frederick. 1991. Taking out the trash. Newsday. October 21, p. 25.

TOI = Scully, Peter. 1994. Commissioner, Department of Environmental Control, Town of Islip, and President, Islip Resource Recovery Agency, Town of Islip, NY.

PBAsh = Long Island Regional Planning Board. 1993. The Potential for Beneficial Use of Waste-to-Energy Facility Ash: Volume I: Long Island Ash Management Status. LE Koppleman, Project Director; E.G. Tannenbaum, Deputy Project Director. Long Island Regional Planning Board, Hauppauge, NY.

NYSDEC = Mitrey, Robert. 1993. Regional Solid Waste Engineer, Region I, NYSDEC. Presentation before Environmental Committee, Long Island Action, Melville, NY. May meeting.

Islip, Table 29:

all data = Scully, Peter. 1994. Commissioner, Department of Environmental Control, Town of Islip, and President, Islip Resource Recovery Agency, Town of Islip, NY.

Islip, Table 30:

1991 - 1993 = Scully, Peter. 1994. Commissioner, Department of Environmental Control, Town of Islip, and President, Islip Resource Recovery Agency, Town of Islip, NY.

1994 = WRMI estimate from 1993 data

Riverhead, Table 31:

LCWR (1985) = Trunzo, Caesar, and Thomas DiNapoli. 1986. Progress Report of the New York State Legislative Commission on Water Resource Needs of Long Island, 1985. New York Legislative Commission on the Water Resource Needs of Long Island, Hauppauge, NY.

PB = Long Island Regional Planning Board. 1987. Data summary and projections (Task 1.1: Long Island Ash Inventory). In: Long Island Ash Management Study. Long Island Regional Planning Board, Hauppauge, NY, and New York State Energy Research and Development Authority, Albany, NY.

LCWR (1987) = Trunzo, Caesar, and Thomas DiNapoli. 1988. Progress Report of the New York State Legislative Commission on Water Resource Needs of Long Island, 1987. New York Legislative Commission on the Water Resource Needs of Long Island, Hauppauge, NY.

RTB = Newsday. 1987. Across Long Island. In: The Rush to Burn. Newsday. Melville, NY (special reprint). Originally printed December 22. pp. 46-47.

LCWR (1989) = Trunzo, Caesar, and Thomas DiNapoli. 1990. Progress Report of the New York State Legislative Commission on Water Resource Needs of Long Island, 1989. New York Legislative Commission on the Water Resource Needs of Long Island, Hauppauge, NY.

NYPIRG = Romalewski, Steven A. 1991. A Legacy of Waste: Solid Waste Generation and Disposal on Long Island. Toxics Project, New York Public Interest Research Group, New York, NY.

Newsday = Bush, Frederick. 1991. Taking out the trash. Newsday. October 21, p. 25.

WMI est. = addition of composting tonnage estimates to previous years' data. From: Tonjes, D.J. and R.L. Swanson. 1992. Where Does It All Go? The Size and Method of Disposal of Long Island's Solid Waste 1986 and 1991. Special Report #103, Marine Sciences Research Center, The University at Stony Brook, Stony Brook, NY.

NYSDEC (1992) = Mitrey, Robert. 1993. Regional Solid Waste Engineer, Region I, NYSDEC. Presentation before Environmental Committee, Long Island Action, Melville, NY. May meeting.

PBAsh = Long Island Regional Planning Board. 1993. The Potential for Beneficial Use of Waste-to-Energy Facility Ash: Volume I: Long Island Ash Management Status. LE Koppleman, Project Director; E.G. Tannenbaum, Deputy Project Director. Long Island Regional Planning Board, Hauppauge, NY.

NYSDEC (1993) = Town of Riverhead. 1994. Solid Waste Management Facility Annual Report, Riverhead Landfill, 1993. Files, Regional Engineer, NYSDEC Region I, Stony Brook, NY.

Riverhead, Table 31:

1989 = Trunzo, Caesar, and Thomas DiNapoli. 1990. Progress Report of the New York State Legislative Commission on Water Resource Needs of Long Island, 1989. New York Legislative Commission on the Water Resource Needs of Long Island, Hauppauge, NY.

1993 = Town of Riverhead. 1994. Solid Waste Management Facility Annual Report, Riverhead Landfill, 1993. Files, Regional Engineer, NYSDEC Region I, Stony Brook, NY.

Riverhead, Table 33:

1990 = Romalewski, Steven A. 1991. A Legacy of Waste: Solid Waste Generation and Disposal on Long Island. Toxics Project, New York Public Interest Research Group, New York, NY; and Newsday = Bush, Frederick. 1991. Taking out the trash. Newsday. October 21, p. 25.

Riverhead, Table 34:

1993 = Town of Riverhead. 1994. Solid Waste Management Facility Annual Report, Riverhead Landfill, 1993. Files, Regional Engineer, NYSDEC Region I, Stony Brook, NY.

1994 = WRMI estimate, projected from partial 1993 data

Shelter Island, Table 35:

LCWR (1985) = Trunzo, Caesar, and Thomas DiNapoli. 1986. Progress Report of the New York State Legislative Commission on Water Resource Needs of Long Island, 1985. New York Legislative Commission on the Water Resource Needs of Long Island, Hauppauge, NY.

PB = Long Island Regional Planning Board. 1987. Data summary and projections (Task 1.1: Long Island Ash Inventory). In: Long Island Ash Management Study. Long Island Regional Planning Board, Hauppauge, NY, and New York State Energy Research and Development Authority, Albany, NY.

LCWR (1987) = Trunzo, Caesar, and Thomas DiNapoli. 1988. Progress Report of the New York State Legislative Commission on Water Resource Needs of Long Island, 1987. New York Legislative Commission on the Water Resource Needs of Long Island, Hauppauge, NY.

RTB = Newsday. 1987. Across Long Island. In: The Rush to Burn. Newsday, Melville, NY (special reprint). Originally printed December 22. pp. 46-47.

LCWR (1989) = Trunzo, Caesar, and Thomas DiNapoli. 1990. Progress Report of the New York State Legislative Commission on Water Resource Needs of Long Island, 1989. New York Legislative Commission on the Water Resource Needs of Long Island, Hauppauge, NY.

TSI (1990) = Simes, Jeffrey. 1991. Supervisor, Town of Shelter Island.

NYPIRG = Romalewski, Steven A. 1991. A Legacy of Waste: Solid Waste Generation and Disposal on Long Island. Toxics Project, New York Public Interest Research Group, New York, NY.

Newsday = Bush, Frederick. 1991. Taking out the trash. Newsday. October 21, p. 25.

TSI (1991, 1993) = Sherman, Huson. 1992, 1994. Supervisor, Town of Shelter Island.

PBAsh = Long Island Regional Planning Board. 1993. The Potential for Beneficial Use of Waste-to-Energy Facility Ash: Volume I: Long Island Ash Management Status. LE Koppleman, Project Director; E.G. Tannenbaum, Deputy Project Director. Long Island Regional Planning Board, Hauppauge, NY.

NYSDEC (1992) = Mitrey, Robert. 1993. Regional Solid Waste Engineer, Region I, NYSDEC. Presentation before Environmental Committee, Long Island Action, Melville, NY. May meeting.

NYSDEC (1993) = Town of Shelter Island. 1994. Solid Waste Management Facility Annual Report, Shelter Island Landfill, 1993. Files, Regional Engineer, NYSDEC Region I, Stony Brook, NY.

Shelter Island, Table 36:

1989 = Trunzo, Caesar, and Thomas DiNapoli. 1990. Progress Report of the New York State Legislative Commission on Water Resource Needs of Long Island, 1989. New York Legislative Commission on the Water Resource Needs of Long Island, Hauppauge, NY.

1990 = Simes, Jeffrey. 1991. Supervisor, Town of Shelter Island.

1993 = Town of Shelter Island. 1994. Solid Waste Management Facility Annual Report, Shelter Island Landfill, 1993. Files, Regional Engineer, NYSDEC Region I, Stony Brook, NY.

Shelter Island, Table 37:

1990 = Simes, Jeffrey. 1991. Supervisor, Town of Shelter Island.

1993 = Town of Shelter Island. 1994. Solid Waste Management Facility Annual Report, Shelter Island Landfill, 1993. Files, Regional Engineer, NYSDEC Region I, Stony Brook, NY.
1994 = WRMI estimate, rounded from 1993 data.

Smithtown, Table 38:

LCWR (1985) = Trunzo, Caesar, and Thomas DiNapoli. 1986. Progress Report of the New York State Legislative Commission on Water Resource Needs of Long Island, 1985. New York Legislative Commission on the Water Resource Needs of Long Island, Hauppauge, NY.

PB = Long Island Regional Planning Board. 1987. Data summary and projections (Task 1.1: Long Island Ash Inventory). In: Long Island Ash Management Study. Long Island Regional Planning Board, Hauppauge, NY, and New York State Energy Research and Development Authority, Albany, NY.

TOS = Trent, John. 1991, 1992, 1994, 1995. Solid Waste Coordinator, Engineering Department, Town of Smithtown, NY.

LCWR (1987) = Trunzo, Caesar, and Thomas DiNapoli. 1988. Progress Report of the New York State Legislative Commission on Water Resource Needs of Long Island, 1987. New York Legislative Commission on the Water Resource Needs of Long Island, Hauppauge, NY.

RTB = Newsday. 1987. Across Long Island. In: The Rush to Burn. Newsday. Melville, NY (special reprint). Originally printed December 22. pp. 46-47.

NYPIRG = Romalewski, Steven A. 1991. A Legacy of Waste: Solid Waste Generation and Disposal on Long Island. Toxics Project, New York Public Interest Research Group, New York, NY.

Newsday = Bush, Frederick. 1991. Taking out the trash. Newsday. October 21, p. 25.

PBAsh = Long Island Regional Planning Board. 1993. The Potential for Beneficial Use of Waste-to-Energy Facility Ash: Volume I: Long Island Ash Management Status. LE Koppleman, Project Director; E.G. Tannenbaum, Deputy Project Director. Long Island Regional Planning Board, Hauppauge, NY.

NYSDEC = Mitrey, Robert. 1993. Regional Solid Waste Engineer, Region I, NYSDEC. Presentation before Environmental Committee, Long Island Action, Melville, NY. May meeting.

Smithtown, Tables 39 & 40:

all data = Trent, John. 1991, 1992, 1994, 1995. Solid Waste Coordinator, Engineering Department, Town of Smithtown, NY.

Southampton, Table 41:

LCWR (1985) = Trunzo, Caesar, and Thomas DiNapoli. 1986. Progress Report of the New York State Legislative Commission on Water Resource Needs of Long Island, 1985. New York Legislative Commission on the Water Resource Needs of Long Island, Hauppauge, NY.

PB = Long Island Regional Planning Board. 1987. Data summary and projections (Task 1.1: Long Island Ash Inventory). In: Long Island Ash Management Study. Long Island Regional Planning Board, Hauppauge, NY, and New York State Energy Research and Development Authority, Albany, NY.

TOS (1987, 1988, 1989, 1990, first two 1991, 1992) = Malcolm Pirnie. 1993. Design, Construct, Operate and Maintain a Solid Waste Recycling and Composting System. Draft Request for Proposals. Town of Southampton, Southampton, NY.

LCWR (1987) = Trunzo, Caesar, and Thomas DiNapoli. 1988. Progress Report of the New York State Legislative Commission on Water Resource Needs of Long Island, 1987. New York Legislative Commission on the Water Resource Needs of Long Island, Hauppauge, NY.

RTB = Newsday. 1987. Across Long Island. In: The Rush to Burn. Newsday. Melville, NY (special reprint). Originally printed December 22. pp. 46-47.

LCWR (1989) = Trunzo, Caesar, and Thomas DiNapoli. 1990. Progress Report of the New York State Legislative Commission on Water Resource Needs of Long Island, 1989. New York Legislative Commission on the Water Resource Needs of Long Island, Hauppauge, NY.

NYPIRG = Romalewski, Steven A. 1991. A Legacy of Waste: Solid Waste Generation and Disposal on Long Island. Toxics Project, New York Public Interest Research Group, New York, NY.

Newsday = Bush, Frederick. 1991. Taking out the trash. Newsday. October 21, p. 25.

TOS (third 1991, 1993) = Gilbride, Brian. 1992, 1994. Superintendent of Sanitation, Town of Southampton, NY.

NYSDEC (1992) = Mitrey, Robert. 1993. Regional Solid Waste Engineer, Region I, NYSDEC. Presentation before Environmental Committee, Long Island Action, Melville, NY. May meeting.

PBAsh = Long Island Regional Planning Board. 1993. The Potential for Beneficial Use of Waste-to-Energy Facility Ash: Volume I: Long Island Ash Management Status. LE Koppleman, Project Director; E.G. Tannenbaum, Deputy Project Director. Long Island Regional Planning Board, Hauppauge, NY.

NYSDEC (1993) = Town of Southampton. 1994. Solid Waste Management Facility Annual Report, North Sea Landfill, 1993. Files, Regional Engineer, NYSDEC Region I, Stony Brook, NY.

TOS (1994, 1995) = Baker, Judith. 1995, 1996. Recycling Coordinator, Recycling Office, Town of Southampton, NY.

Southampton, Table 42:

1989 = Trunzo, Caesar, and Thomas DiNapoli. 1990. Progress Report of the New York State Legislative Commission on Water Resource Needs of Long Island, 1989. New York Legislative Commission on the Water Resource Needs of Long Island, Hauppauge, NY.

1990 = Gilbride, Brian. 1992. Superintendent of Sanitation, Town of Southampton, NY.

1991 = Malcolm Pirnie. 1993. Design, Construct, Operate and Maintain a Solid Waste Recycling and Composting System. Draft Request for Proposals. Town of Southampton, Southampton, NY.

first 1993 = Town of Southampton. 1994. Solid Waste Management Facility Annual Report, North Sea Landfill, 1993. Files, Regional Engineer, NYSDEC Region I, Stony Brook, NY.

second and third 1993 = Gilbride, Brian. 1994. Superintendent of Sanitation, Town of Southampton, NY.

1994, 1995 = Baker, Judith. 1995, 1996. Recycling Coordinator, Recycling Office, Town of Southampton, NY.

Southampton, Table 43:

1990 = Gilbride, Brian. 1992. Superintendent of Sanitation, Town of Southampton, NY.
1991 = Malcolm Pirnie. 1993. Design, Construct, Operate and Maintain a Solid Waste Recycling and Composting System. Draft Request for Proposals. Town of Southampton, Southampton, NY.
1993 = Gilbride, Brian. 1994. Superintendent of Sanitation, Town of Southampton, NY.
1994 = Baker, Judith. 1995. Recycling Coordinator, Recycling Office, Town of Southampton, NY.

Southold, Table 44:

LCWR (1985) = Trunzo, Caesar, and Thomas DiNapoli. 1986. Progress Report of the New York State Legislative Commission on Water Resource Needs of Long Island, 1985. New York Legislative Commission on the Water Resource Needs of Long Island, Hauppauge, NY.

PB = Long Island Regional Planning Board. 1987. Data summary and projections (Task 1.1: Long Island Ash Inventory). In: Long Island Ash Management Study. Long Island Regional Planning Board, Hauppauge, NY, and New York State Energy Research and Development Authority, Albany, NY.

TOS (1987, first 1990, first 1991) = Bunchuck, Jim. 1992. Supervisor, Department of Public Works. Town of Southold, NY.

LCWR (1987) = Trunzo, Caesar, and Thomas DiNapoli. 1988. Progress Report of the New York State Legislative Commission on Water Resource Needs of Long Island, 1987. New York Legislative Commission on the Water Resource Needs of Long Island, Hauppauge, NY.

RTB = Newsday. 1987. Across Long Island. In: The Rush to Burn. Newsday. Melville, NY (special reprint). Originally printed December 22. pp. 46-47.

TOS (second 1990, second 1991, 1992, 1993) = annual Town of Southold waste management reports. Provided by: Bunchuck, Jim. 1994. Supervisor, Department of Public Works. Town of Southold, NY. Data interpreted by WRMI.

NYPIRG = Romalewski, Steven A. 1991. A Legacy of Waste: Solid Waste Generation and Disposal on Long Island. Toxics Project, New York Public Interest Research Group, New York, NY.

Newsday = Bush, Frederick. 1991. Taking out the trash. Newsday. October 21, p. 25.

NYSDEC = Mitrey, Robert. 1993. Regional Solid Waste Engineer, Region I, NYSDEC. Presentation before Environmental Committee, Long Island Action, Melville, NY. May meeting.

PBAsh = Long Island Regional Planning Board. 1993. The Potential for Beneficial Use of Waste-to-Energy Facility Ash: Volume I: Long Island Ash Management Status. LE Koppleman, Project Director; E.G. Tannenbaum, Deputy Project Director. Long Island Regional Planning Board, Hauppauge, NY.



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Southold, Table 45:

1987, 1991 = Bunchuck, Jim. 1992. Supervisor, Department of Public Works. Town of Southold, NY.

1992, 1993 = annual Town of Southold waste management reports. Provided by: Bunchuck, Jim. 1994. Supervisor, Department of Public Works. Town of Southold, NY.

Southold, Table 46:

1990 = Bunchuck, Jim. 1992. Supervisor, Department of Public Works. Town of Southold, NY.

1991 - 1993 = annual Town of Southold waste management reports. Provided by: Bunchuck, Jim. 1994. Supervisor, Department of Public Works. Town of Southold, NY.

1994 = WRMI estimate, based on rounding up from 1993 data.

DATE