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THE IMPACT OF THE SUFFOLK COUNTY, NEW YORK, PLASTICS BAN ON BEACH AND ROADSIDE LITTER

STELLA S. ROSS

R. L. SWANSON

State University of New York at Stony Brook

ABSTRACT

Suffolk County, Long Island, New York, beach and roadside litter surveys were conducted. Using a modified Center for Marine Conservation data card format, litter was categorized by composition: plastics, "banned" plastics, glass, rubber, paper, metal, wood, and cloth. "Banned" plastics are retail food packaging products banned under Suffolk County's Plastics Law (Local Law 10-1988), passed in 1988 (this law has since been replaced by Local Law 3-1994, which replaces the ban with language encouraging the recycling of these plastics). Percent composition by count and by weight were determined. Results are compared and contrasted with available published litter data. We conclude that the Suffolk County Plastics Law, which was intended to offer several environmental benefits, would not succeed in reducing the cumulative impact of beach and roadside litter.

INTRODUCTION

While much has been published about marine debris [1], most of it focuses on impacts while in the water. Little information is available about litter found on beaches and roadsides. The Center for Marine Conservation (CMC) organized the first large-scale beach litter clean-up in 1986—an effort to clean all Texas beaches. Almost three thousand volunteers participated. By 1992, the CMC

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volunteer base had grown to over 145,000, and the clean-up effort covered 4,347 miles of beaches and waterways in thirty-one U.S. states, two U.S. territories, and the District of Columbia. Volunteers collected about 2.9 million pounds of beach litter [2].

CMC provided all volunteers with beach clean-up data cards to complete as the litter was being collected, keeping track of the numbers of items. These cards allowed volunteers to choose among eight composition types: plastic, glass, styrofoam, rubber, paper, metal, wood, and cloth. Further, within each type, a range of products was listed so that an item's source might be better identified. For example, under the plastic category, bags were further subdivided into food, salt, trash, and other.

The detailed information provided on the data cards can be used to help formulate meaningful environmental policy. For example, plastics salt bags are an indicator of commercial fishing wastes (suggesting that the litter arrived onshore via current or wind action after being tossed overboard), whereas food bags may have never entered the water, having been left on the beach by beachgoers. This type of information can be used to target education efforts at specific generators of beach litter.

Data cards were collected and the information was entered into CMC's computers. For the first time in the United States, a database of beach litter was established, offering consistency in how and what was counted, so that meaningful comparisons could be made among shorelines.

We modified the CMC data card format in order to assess the Suffolk County Plastics Law's potential to ameliorate the impact of plastics on beach and roadside litter. Local Law 10-1988, the first plastics packaging ban in the United States, banned the use of all plastic grocery bags, and polystyrene (PS) and polyvinyl chloride (PVC) retail food packaging [3].[1] This controversial legislation is of particular interest because it stimulated similar legislative action across the United States [4, 5]. In passing the landmark legislation, the Suffolk County Legislature (and residents who spoke on its behalf at public hearings) believed that enactment would result in a reduction in the cumulative impact of litter, and, by association, the harm done to marine animals via plastics entanglement or ingestion. The legislature assumed that the banned products comprised a significant portion of the litter stream; however, the litter stream had never been characterized. We believe that if litter characterization information had been available to the legislature, litter reduction would not have been among the anticipated environmental benefits.

[1] The applicability date of Local Law (LL) 10-1988 was postponed by LL 22-1989, adopted 7/18/89; by LL 4-1990, adopted 1/30/90; and by LL 19-1991, adopted 6/13/91. Thus LL 10-1988 was not in force until 10/1/93. It was replaced in 1994 by LL 3-1994, which replaces the ban with language encouraging the recycling of these plastics.

METHODS

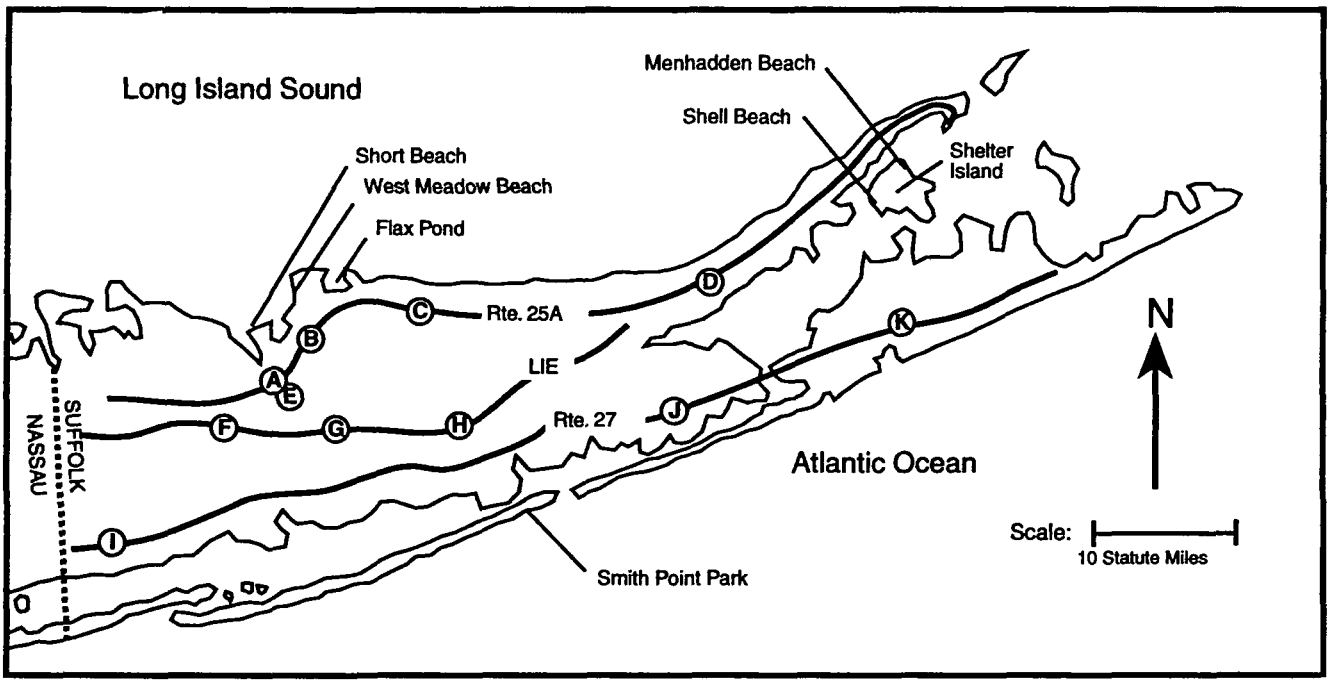
In order to determine the percentage of litter that was comprised of the banned plastics (Table 1), we sampled Suffolk County beaches and roadways in May and June of 1993. Our sampling scheme was designed to efficiently accumulate a large sample of litter using a small team of workers; therefore, we deliberately sought out littered areas rather than randomly selecting collection sites [4].

Beach litter was collected at six locations in Suffolk County: Flax Pond, Short Beach, and West Meadow Beach on the north shore; Smith Point Park on the south shore; and Menhadden Beach and Shell Beach on Shelter Island (Figure 1). Roadside sampling sites were arranged along three east-to-west transects that serve as major arteries in Suffolk County: along Route 25A, the Long Island Expressway (LIE), and Sunrise Highway (Figure 1). A section of roadside along each thoroughfare was sampled (mean area, 489.1 m^2; range, 71.1-1,964.8 m^2), from the edge of the road to an obvious line of demarcation, such as a change in vegetative type or a fence [4].

Table 1. Products and Materials Banned under the Suffolk County Plastics Law

	Materials					
	PS	PVC	PP	LDPE/ LLDPE	PET	HDPE
Products						
Grocery bags				*B		*B
Cups	*B				NC	
Plates	*B					
Cutlery	*B		NC			
Wraps		*BX	NC	NC		
Stirrers	*B					
Straws			NC			
Meat trays	*B					
Deli paper						NC
Hinged containers	*B					
Covers, lids	*B		NC			

Note: *B = banned; NC = not covered by the ban; *BX = banned, but exempt; blank space = no such product from that material. While PVC is banned by the law, the legislature made an exception for transparent wrap—the only food packaging product made from PVC. PP: *polypropylene*; LDPE: *low-density polyethylene*; LLDPE: *linear low-density* polyethylene; PET: polyethylene terephthalate; HDPE: high-density polyethylene.
Source: [4].



KEY: A = Rte. 25A & Lake Ave.; B = Rte. 25A @ Stony Brook R.R. Station; C = Rte. 25A, Rocky Pt.; D = Rte. 25A, Mattituck; E = Rte, 347 @ Smith Haven Mall; F = LIE @ exit 56; G = LIE @ exit 62; H = LIE between exits 67 & 68; I. Rte. 110 @ Rte. 27; J = Rte. 27 @ exit 64; K = Bridgehampton Commons.

Figure 1. Suffolk County litter survey locations, roadside and beach, 1993.

After collection, the litter was placed in labelled, large plastic garbage bags and taken to a lab for sorting and weighing. The CMC data card format was followed with the following changes: 1) we did not include cigarette butts in our survey, as they were too numerous to count at every collection site; 2) instead of the styrofoam category, we separately kept track of those plastic bags and PS food packaging products that were targeted by the Plastics Law and labelled them "banned" plastics; and, 3) litter was quantified both as to number of items and total weight of items in each category. The litter was sorted according to the following eight categories: 1) non-banned plastics; 2) banned plastics; 3) glass; 4) rubber; 5) metals; 6) paper; 7) wood; and 8) cloth.

RESULTS

Beach Debris

Litter was most abundant at the north shore sites (Tables 2 and 3). There were pronounced similarities among sites. Non-banned plastics predominated at all but one site—Smith Point Park on the south shore, where paper was most prevalent. For the six beaches sampled, banned plastics comprised a small percentage of the litter stream, averaging 3.0 percent by count, and 0.25 percent by weight.

Roadside Litter

The composition of roadside litter was markedly different than the beach litter (Tables 4 and 5). By count, paper predominated at all but two sites (locations A and J on Figure 1), while non-banned plastics followed. At one south shore site (location J on Figure 1), banned plastics reached 22.5 percent by count; however, this represented only 2.2 percent of total weight. One explanation for this is that all PS foam pieces collected, regardless of size, were counted. Thus, if a foam PS hot drink cup had fragmented into ten or twenty pieces, each piece was counted. On average, however, banned plastics averaged 8.0 percent by count, and 1.7 percent by weight.

By weight, glass and paper were each prevalent at four sites. On the south shore, rubber predominated at two sites (locations I and J on Figure 1). Non-banned plastics were predominant at one site (location H on Figure 1), followed closely by the metals category.

DISCUSSION

While non-banned plastics were a major component of both the beach and roadside litter stream, banned plastics were very limited. Beach and roadside litter results will be discussed separately.

Table 2. Debris Collected at Selected Suffolk County Beaches by Count, Spring 1993

	North Shore			South Shore	Shelter Island	
	Flax Pond	Short Beach	W. Meadow Beach	Smith Point	Menhadden Beach	Shell Beach
Date	1 May	7 June	7 June	11 June	5 June	5 June
Site size (m^2)	3,414	93	93	16,722	12,263	5,886
Items per m^2	0.39	2.2	3.6	0.01	0.09	0.05
Number of pieces and (% by count):						
Non-banned plastic	1,261 (91.6)	96 (45.3)	208 (60.3)	78 (33.9)	669 (60.9)	181 (63.3)
Banned plastic	13 (0.9)	1 (0.5)	11 (3.2)	5 (2.2)	40 (3.6)	23 (8.0)
Glass	24 (1.7)	7 (3.3)	3 (0.9)	15 (6.5)	59 (5.4)	22 (7.0)
Rubber	53 (3.9)	1 (0.5)	14 (4.1)	1 (0.4)	55 (5.0)	13 (4.5)
Metal	9 (0.7)	50 (23.6)	90 (26.1)	35 (15.2)	88 (8.0)	14 (4.9)
Paper	8 (0.6)	46 (21.7)	18 (5.2)	87 (37.8)	162 (14.8)	19 (6.6)
Wood	2 (0.2)	11 (5.2)	1 (0.3)	3 (1.3)	2 (0.2)	11 (3.8)
Cloth	6 (0.4)	0 (0.0)	0 (0.0)	6 (2.6)	23 (2.1)	3 (1.0)
Total	1,376	212	345	230	1,098	286

Note: Percentages do not add to 100 percent due to rounding.
Source: [4].

Table 3. Debris Collected at Selected Suffolk County Beaches by Weight, Spring 1993

	North Shore			South Shore	Shelter Island	
	Flax Pond	Short Beach	W. Meadow Beach	Smith Point	Menhadden Beach	Shell Beach
Weight in pounds and (% weight):						
Non-banned plastic	33.67 (74.3)	1.61 (55.3)	1.89 (34.3)	3.68 (19.8)	27.17 (40.6)	7.08 (45.5)
Banned plastic	0.09 (0.2)	0.02 (0.7)	0.00 (0.0)	0.03 (0.0)	0.42 (0.6)	0.07 (0.0)
Glass	5.53 (12.2)	0.48 (16.4)	1.01 (18.4)	3.15 (17.0)	10.56 (15.8)	3.85 (24.8)
Rubber	1.43 (3.1)	neg. (0.0)	neg. (0.0)	0.58 (3.1)	4.90 (7.3)	neg. (0.0)
Metal	0.74 (1.6)	0.27 (9.3)	0.35 (6.5)	3.62 (19.5)	3.55 (5.3)	0.16 (1.0)
Paper	2.59 (5.7)	0.30 (10.2)	0.92 (16.8)	2.88 (15.5)	4.59 (6.9)	0.18 (1.1)
Wood	0.97 (2.2)	0.24 (8.1)	1.31 (23.9)	0.00 (0.0)	14.24 (21.3)	4.23 (27.2)
Cloth	0.33 (0.7)	0.00 (0.0)	neg. (0.0)	4.64 (25.0)	1.52 (2.3)	neg. (0.0)
Total	45.34	2.92	5.49	18.57	66.95	15.57

Note: Percentages do not add to 100 percent due to rounding.
Source: [4].

Table 4. Debris Collected at Selected Suffolk County Roadsides by Count, Spring 1993

	North Shore					Mid Island			South Shore		
	A[a]	B	C	D	E	F	G	H	I	J	K
Date	9 July	9 July	9 July	9 July	9 July	9 July	9 July	9 July	9 July	9 July	9 July
Site size (m^2)	96	480	288	480	72	120	120	575	432	2025	863
Items per m^2	1.73	0.8	1.33	0.89	4.70	4.68	2.0	0.61	1.31	0.32	0.72
Number of pieces and (% by count):											
Non-banned plastic	48 (28.9)	136 (35.3)	107 (28.0)	133 (31.3)	110 (32.5)	142 (25.3)	61 (25.5)	94 (26.6)	157 (27.7)	210 (32.2)	98 (15.7)
Banned plastic	45 (7.2)	4 (1.0)	14 (3.7)	12 (2.8)	21 (6.2)	54 (9.6)	21 (8.8)	32 (9.0)	76 (13.4)	147 (22.5)	20 (3.2)
Glass	45 (27.1)	34 (8.8)	37 (9.7)	64 (15.1)	1 (0.3)	9 (1.6)	12 (5.0)	2 (0.6)	9 (1.6)	38 (5.8)	33 (5.3)
Rubber	0 (0.0)	7 (1.8)	3 (0.8)	1 (0.2)	0 (0.0)	77 (13.7)	10 (4.2)	8 (2.3)	11 (1.9)	17 (2.6)	0 (0.0)
Metal	14 (8.4)	20 (5.2)	20 (5.2)	70 (16.5)	18 (5.3)	32 (5.7)	25 (10.5)	54 (15.3)	76 (13.4)	73 (11.2)	22 (3.5)
Paper	47 (28.3)	171 (44.4)	199 (52.1)	140 (32.9)	186 (55.0)	236 (42.1)	106 (44.4)	143 (40.4)	225 (39.7)	164 (25.1)	451(72.2)
Wood	0 (0.0)	9 (2.3)	0 (0.0)	1 (0.2)	0 (0.0)	9 (1.6)	1 (0.4)	0 (0.0)	1 (0.2)	0 (0.0)	0 (0.0)
Cloth	0 (0.0)	4 (1.0)	2 (0.5)	4 (0.9)	2 (0.6)	2 (0.4)	3 (1.3)	21 (5.9)	12 (2.1)	4 (0.6)	1 (0.2)
Total	166	385	382	425	338	561	239	354	567	653	625

[a]Refer to Figure 1 for site locations.
Note: Percentages do not add to 100 percent due to rounding.
Source: [4].

Table 5. Debris Collected at Selected Suffolk County Roadsides by Weight, Summer 1993

	North Shore					Mid-Island			South Shore		
	A[a]	B	C	D	E	F	G	H	I	J	K
Number of pounds and (% weight):											
Non-banned plastic	1.99 (10.2)	1.08 (9.1)	0.70 (17.4)	1.03 (28.3)	1.66 (39.3)	2.50 (21.4)	1.1 (7.4)	6.74 (43.5)	1.99 (16.7)	2.44 (16.0)	0.82 (10.4)
Banned plastic	neg. (0.0)	neg. (0.0)	neg. (0.0)	0.18 (4.8)	neg (0.0)	0.18 (1.6)	0.1 (0.6)	0.11 (0.7)	0.04 (0.4)	0.33 (2.2)	0.14 (1.8)
Glass	12.42 (63.9)	2.96 (24.7)	0.89 (22.3)	1.19 (32.5)	neg. (0.0)	3.44 (29.5)	5.43 (35.4)	0.64 (4.2)	2.59 (21.7)	3.17 (20.8)	2.31 (29.1)
Rubber	0.00 (0.0)	0.95 (8.0)	neg. (0.0)	neg. (0.0)	0.00 (0.0)	2.80 (24.0)	0.99 (6.4)	0.33 (2.1)	4.64 (39.0)	3.75 (24.6)	0.00 (0.0)
Metal	2.47 (12.7)	0.42 (3.5)	0.72 (18.0)	0.36 (9.8)	0.30 (7.1)	0.82 (7.0)	0.58 (3.8)	5.1 (33.0)	1.14 (9.6)	3.32 (21.8)	0.18 (2.3)
Paper	2.56 (13.2)	4.48 (37.5)	1.70 (42.3)	0.90 (24.6)	1.78 (42.2)	1.61 (13.8)	4.63 (30.2)	1.19 (7.7)	0.82 (6.9)	2.44 (16.0)	4.48 (56.5)
Wood	0.00 (0.0)	0.11 (1.0)	0.00 (0.0)	neg. (0.0)	0.00 (0.0)	neg. (0.0)	1.93 (12.6)	0.00 (0.0)	neg. (0.0)	0.00 (0.0)	0.00 (0.0)
Cloth	0.00 (0.0)	1.95 (16.3)	neg. (0.0)	neg. (0.0)	0.48 (11.4)	0.32 (2.7)	0.55 (3.6)	1.37 (8.9)	0.07 (0.6)	neg. (0.0)	0.00 (0.0)
Total	19.43	11.96	4.01	3.65	4.22	11.67	15.34	15.49	11.9	15.23	7.92

[a]*Refer to Figure 1 for site locations.*
Note: Percentages do not add to 100 percent due to rounding.
Source: [4].

Beach Debris

According to the Center for Marine Conservation, "plastics are the number one debris problem in the marine environment" [2]. In order to compare our data with those from the CMC beach clean-ups, we excluded cigarette butts from the latter. After this modification, 59.0 percent of all debris items collected nationally during the 1991 Annual Beach Clean-up were plastic (plastics plus foamed PS). Foamed PS pieces, cups, caps, lids, food bags, and wrappers were among the twelve most commonly found items [2].

The New York state annual beach clean-up plastics data were higher than the national average: 64.3 percent of the marine debris collected on beaches, by count, was plastics (including foamed PS) in 1991. Among the plastics targeted by the ban, plastic food bags (5.9%), caps and lids (5.1%), and foamed PS cups (2.9%) were among the top twelve items found [2]. The composition of beach debris collected during the 1991 Annual Beach Clean-up at selected locations in Suffolk County parallels the state data: 69.4 percent of the debris was plastic, with plastic food bags and wrappers being the most prevalent (exact breakdown unknown [6]). Weight information was not available.

Our survey data show a slight increase in plastics representation over the 1991 New York State data and Suffolk County data. Seventy-three percent (by count) of all beach debris we collected was plastic, including foamed PS. The difference between this and the 69.4 percent found on Suffolk beaches in 1991 is slight, but may be attributable to the following: the 1991 Annual Beach Clean-up occurred in the fall, perhaps reflecting end-of-season beach usage (and following a period when beaches had been cleaned regularly), while our litter surveys occurred in May and June—possibly reflective of the accumulation of debris over the winter. Additionally, any difference may be due to the diversity of beach environments sampled, from open beaches to closed embayments. Third, it is possible that the plastic component of beach litter is increasing; however, we don't have enough information to know whether this is the case. On a national basis, however, the trend is toward a slight decrease in the percentage of debris composed of plastic [2].

Of total plastics that constitute marine debris, we determined that the Suffolk County Plastics Law would impact less than 1 percent, by weight. Since each fragment collected counted as one piece, we would expect the contribution of foamed plastics to increase the percentage of plastics the ban would impact by count; however, banned plastics represented only about 2 percent of all litter by count.

Finally, a significant source of floatable debris to Suffolk area beaches is New York City and surrounding communities that are served by combined storm sewers [7]. Even if we had found significant quantities of banned plastics on Suffolk County beaches, the Plastics Law would likely have little impact on their presence. In the case of New York City, even moderate rainfall flowing through combined storm sewers can result in an overwhelming volume of water which

cannot be properly processed at wastewater treatment plants. This combined storm sewer overflow (CSO), along with any street litter it contains, is released unscreened and untreated directly into the New York Harbor and western Long Island Sound.

In New York City, according to a city-wide floatables study, floatables in CSOs were composed predominantly of plastics (68.2% by count, including PS) [8]. During CSO events, Long Island's prevalent meteorological and oceanographic conditions tend to carry the debris into the Atlantic Ocean. The south shore of Long Island is more susceptible to large-scale debris wash-ups than the north shore, particularly during the summer.

The Plastics Law would succeed in changing the character of marine debris somewhat, in that alternative products would be used for the banned plastics—most likely plastic-coated paper products. Regardless, the law would likely have no impact on the quantity of litter on Suffolk County beaches.

Roadside Litter

Keep America Beautiful (KAB), a national non-profit educational organization, conducted a three-year research project and identified seven sources that contribute to litter on land. These are: 1) commercial refuse, 2) household trash handling, 3) construction/demolition sites, 4) uncovered vehicles, 5) loading docks, 6) motorists, and 7) pedestrians. Nationally, the latter two categories constitute approximately 20 to 50 percent of all litter, according to KAB [9], and it is these two categories which the Plastics Law sought, in part, to address.

A few characterizations can be made based on visual observations at the roadside sample sites. Generally, the amount and type of litter reflected the type of retail business closest to the sample site. For example, litter collected near malls (Smith Haven Mall, Bridgehampton Commons, and Caldor Plaza—locations E, K, and C on Figure 1, respectively) consisted almost exclusively of stores' packaging products: mostly paper and plastic bags (non-banned, unless they came from a retail food store), food wrappers of various types, cans, and such items as grocery store flyers, coupons, and advertisements.

When the sampling occurred near fast-food establishments, the litter consisted primarily of food-related packaging from those businesses. Roadside litter also included automobile parts that were left behind after accidents or breakdowns. In more isolated areas, less litter was visible, but it was of a more diverse nature. The less-populated east end of the County seemed less littered than areas to the west along the roadsides sampled. All roadways sampled serve as major east-west arteries.

No published information assessing the amount and types of roadside litter was available for direct comparison. The New York State Department of Transportation Highway Maintenance Office, responsible for the parks and highways of

Table 6. Litter Composition at Various Michigan Sites, by Percent Count, 1986

Location	Litter Type				
	Cans	Glass	Plastic	Paper	Misc.
Highway	4.3	2.8	21.1	51.4	20.4
County Roads	6.5	2.6	13.4	73.1	4.4
City	5.7	6.6	14.9	66.6	6.2
State Parks	8.7	9.9	23.0	53.5	4.9
Roadside Parks	2.6	3.6	15.6	78.2	0.0
Rest Areas	1.4	0.4	15.3	81.5	1.4

Source: [10].

Suffolk County (among others), does not characterize the litter it collects; nor do any of the Suffolk County towns' Highway or Environmental Control Offices.

The Michigan Department of Transportation (DOT) conducted litter surveys in 1986 at highways, county roads, cities, state parks, roadside parks, and rest areas. Their results (Table 6) indicate a range of 13.4 to 23.0 percent, by count, for all plastics [10]. Of these, 38 percent were identified as fast-food containers (food and drink), indicating that a range of 5.1 to 8.7 percent of the plastics identified in the Michigan surveys would fall under the category of banned materials in Suffolk County.

Additionally, a survey of litter of New York City streets and sidewalks during the mid-1980s indicated that 60 percent of all litter collected, by count, was food-related (Table 7) [8, 11, 12]. As we found in surveying Suffolk County roadside litter, Wiener's results indicated that the quantity of food-related litter was greatest nearest the businesses where these products originated. Straws, napkins, candy wrappers, and food wrappings were the most abundant items among this litter.

The only type of litter listed in the New York City survey that would be banned under the Plastics Law is plastic bags, which ranged from 0.7 to 2.4 percent by count (not all of these would constitute the banned retail food packaging bags, however). Cups, regardless of material, represented 3.8 to 8.3 percent of all litter, by count. At most, then, 10.7 percent may represent that portion of New York City's litter stream comprised of materials that would be banned under the Suffolk County Plastics Law. Both sets of survey data are in accord with the Suffolk County roadside data, wherein banned plastics accounted for 8 percent of total litter, by count.

By weight, banned plastics in Suffolk County represent about 2 percent of the litter stream (information for comparison with the Michigan and New York City

Table 7. Litter Composition of New York City Streets and Sidewalks, by percent count

Litter Type	Streets[a]	Streets[b]	Sidewalks[b]
Candy wrappers	8.8	14.9	18.4
Napkins/tissues	11.1	10.5	6.1
Food wrappers	7.2	4.3	5.1
Food	1.0	0.9	0.7
Cups	3.8	8.3	5.6
Straws/wrapers	12.0	5.2	2.6
Cup lids	2.7	3.8	2.3
Soda/beer containers	1.9	8.9	8.8
Paper bags	2.4	8.2	7.9
Plastic bags	0.7	2.4	1.1
Paper	24.8	10.2	18.0
Matches/cigarette pack	5.6	8.0	7.2
Cartons/delivery	3.0	3.1	3.3
Newspaper	2.1	1.7	2.9
Broken glass	0.9	1.6	1.2
Miscellaneous	12.0	8.0	8.8
Total	100.0	100.0	100.0

Sources: Table adapted from [8].
[a]Data from 1986 [11].
[b]Data from 1984 [12].

data was unavailable). Again, the Plastics Law would change the general character of litter; however, it would probably have no impact on the quantity of litter, as substitute products would replace the banned products in the litter stream.

Whether at beach or roadside, the composition of litter will be a function of the composition of the material discarded, and the degradation rate of that material. To assess the impact of the law on litter reduction efforts, any differences among degradation rates of banned plastics and the items that would replace them would have to be considered. The substitute products would likely not degrade much faster than the banned products when exposed to the elements, because the substitutes will contain a plastic film coating.

LITTER REDUCTION RECOMMENDATIONS

While it would change the composition of litter, the Suffolk County Plastics Law would likely have no impact on the volume of litter on our beaches and roadways. Keep America Beautiful's research indicates that people litter when

they feel no sense of ownership for the property; when they believe someone else will clean up after them; and where litter has already accumulated—suggesting that litter is a matter of mindset, not material. One who litters is not likely to care if the material being improperly disposed of is paper or plastic. Thus litter reduction in Suffolk County could probably be more effectively achieved by means other than banning materials that constitute a small fraction of the total litter stream.

Examples of efforts that may help meet litter reduction goals include the following:

- Encouraging malls to adopt a "Don't Bag It" program, whereby a sticker (as an indicator of a transaction) would replace the traditional shopping bag when possible. Other types of markers such as handles and straps might also be appropriate. Stickers are already used by many stores for large purchases, such as charcoal briquets or large bags of pet food.
- Encouraging malls and other significant centers of retail activity to take more responsibility for policing their own properties and surrounding areas. Much of the litter in these areas is comprised of flyers and other advertising materials that are immediately discarded by customers.
- Encouraging grocery stores to reduce or eliminate the use of paper coupon flyers. This could be done by adoption of an automated coupon card system, whereby weekly specials are scanned right at the checkout counter.
- Developing better County- and Town-sponsored litter collection and street cleaning programs.
- Encouraging citizen participation in litter reduction programs such as the Keep America Beautiful or "Adopt a Highway" programs.

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Direct reprint requests to:

R. L. Swanson
Waste Management Institute
State University of New York at Stony Brook
Stony Brook, NY 11794-5000