

3. Plastics Recycling Programs

Curbside recycling is growing at a tremendous rate. In 1989, it was estimated that 9 million U.S. households were part of curbside recycling programs and that 20% collected some type of plastic. In 1990, about 40 million people (roughly 14 million households) were participants in curbside recycling [Glenn, 1990]. By 1992, 20% of all U.S. households (16 million households) are expected to have curbside recycling and 180-330 million pounds of plastic will be recycled annually [COPPE].

3.1 *Curbside Collection of Plastics in Illinois*

As of August 1990, approximately 110 municipalities conducted curbside collection of recyclables in Illinois. It is estimated that 600,000 households will be served by curbside recycling by the end of 1990 [Fearncombe, 1990]. A review of these municipalities indicates 43 collect some type of post-consumer plastic affecting a total of 221,000 residences. This represents a dramatic increase since 1987, when only a few communities collected plastics. Curbside plastic recycling involvement in Illinois can be one of three types: programs which collect a form of mixed plastic (Table 3.1), those which collect only PET and natural HDPE beverage bottles (Table 3.2), and those which collect only natural HDPE bottles (Table 3.3). Approximately 22 municipalities (87,500 residences) collect a form of mixed plastics, 5 municipalities (27,600 residences) collect PET and natural HDPE beverage bottles and 16 municipalities (106,100 residences) collect natural HDPE bottles. The mixed plastics curbside collectors, for the most part, collect blow molded colored and natural HDPE and PET bottles, as shown in Table 3.1. The "Plastics Collected" column in Table 3.1 attempts to report as accurately as possible the plastics requested of residents. The Naperville Area Recycling Center (NARC) is the widest ranging mixed plastic recycling program, additionally collecting PS and LDPE 6-pack rings as part of test programs for Amoco and Illinois Tool Works, respectively.

3.2 *Film / Rigid Plastics Recycling*

A number of areas, especially on the east coast, are now collecting RPCs. Some are pilot programs in test areas and others are fully implemented. Large plastic processors such as Wellman (Allentown, PA), Waste Management (Oak Brook, IL), Day Products (Bridgeport, NJ) and Union Carbide (Pistacaway, NJ) are planning large scale RPC curbside collection and processing in the next few years. The most locally notable programs are the Chicago Park District Plastics-on-Parks drop-off program which accepts RPCs, and the curbside collection of rigid plastics in Akron, Ohio. A few recycling

Table 3.1 Illinois Recycling Programs Collecting Mixed Plastics

Municipality	Plastics Collected	Number of Curbside Pickup Households	Collector	Start of Plastics Collection	Number of Drop-off Centers
Alsip	All RPCs ^a	3,000	Groen Bros.	5/90	0
Arlington Heights	PRA mix ^b	10,032	Waste Management	9/88 (HDPE) 1/90 (PET)	2
Bloomington	#1 bottles #2 bottles	7,979	Own and Browning Ferris	1/89 (milk) 9/89 (soda) 7/90 (#1, #2 bottles)	
Buffalo Grove	PRA mix	8,400	Waste Management and Own (drop-off)	7/90	2
Darien	HDPE colored and clear bottles PET soda	~8,000	Rot's Disposal	7/90	0
DeKalb	HDPE colored and clear bottles PET soda	~9,000	DeKalb Disposal	12/88	1
Dixmoor	All RPCs	600	Groen Bros.	4/90	0
Elk Grove Village	PRA mix	~9,100	Waste Management	11/88 (milk) 7/90 (other)	0
Elmhurst	#1 bottles ^c #2 bottles	~1,500	Municipal Recycling and Browning Ferris (drop-off)	4/90	1
Freeport	#1 bottles #2 bottles	3,400	Moring Disposal	7/90	1
Fulton	#1 bottles #2 bottles	1,452	Moring Disposal	9/90	0
German Valley	#1 bottles #2 bottles	170	Moring Disposal	8/90	0
Lake in the Hills	#2 bottles	1,900	Valley Sanitation	7/90	0
Lansing	HDPE colored and clear bottles PET soda	~8,000	Own	1/90 7/90	
Morrison	#1 bottles #2 bottles	1,800	Moring Disposal	11/90	0
Naperville	HDPE bottles PET soda 6-pack rings PS	25,000	Naperville Area Recycling Center (NARC)	1/90 (6-pack rings) 10/90 (PS)	1
Oregon	HDPE and PET bottles	1,200	Moring Disposal	3/90	0
Palos Heights	All RPCs ^a	4,000	Groen Bros.	5/90	0

Table 3.1 Illinois Recycling Programs Collecting Mixed Plastics (Continued)

Municipality	Plastics Collected	Number of Curbside Pickup Households	Collector	Start of Plastics Collection	Number of Drop-off Centers
Palos Park	All RPCs ^a	2,000	Groen Bros.	5/90	0
Princeton	#1 bottles #2 bottles	2,300	Local center	9/88	1
Rolling Meadows	PRA mix	5,300	Waste Managment	7/90	1
Sycamore	HDPE colored and clear bottles PET soda	200	DeKalb Disposal	12/88	1
Sterling	Any #1 or #2 (inc. tubs)		Rock Valley Disposal	7/90	
Wheaton	HDPE colored and clear bottles	12,000	Waste Management and NARC (drop-off)	8/89	1
Wheeling	PRA mix	5,000	Waste Management	7/90	0
Woodridge	HDPE colored and clear bottles	none for plastic	NARC	4/88	1

- a. Any RPC which did not previously contain a chemical.
- b. Plastic Recycling Alliance (PRA) mix is defined as unpigmented HDPE milk, juice, water and windshield wiper fluid bottles, colored HDPE bleach, laundry detergent and fabric softener bottles, and clear and colored PET 1/2, 1, 2 and 3 liter soda/beverage bottles.
- c. No bleach or motor oil bottles.

Table 3.2 Illinois Curbside Recycling Programs Collecting Only Natural HDPE and PET Beverage Bottles

Municipality	Start of Plastics Collection	Number of Curbside Pickup Households	Collector	Number of Drop-off Centers
Barrington	10/90	3,500	Browning Ferris	1
Geneva	5/90 (HDPE)	4,214	Speedway Disposal	0
	10/90 (PET)			
Skokie	7/90	17,600	Haulaway	1
Mt. Carmel	10/88	1,300	K/C Disposal	0
Quincy	9/89 (HDPE)	4,500	Own	0
	2/90 (PET)			

Table 3.3 Illinois Curbside Recycling Programs Collecting Only Natural HDPE Bottles

Municipality	Start of Plastics Collection	Number of Curbside Pickup Households	Collector	Number of Drop-off Centers
Chicago	11/89	12,445	Own	
Collinsville	4/89	8,900	Laidlaw	0
Downer's Grove	5/90	12,550	Browning Ferris	1
Edwardsville	9/89	4,200	Laidlaw	0
Glenn Ellyn	1/88	~9,000	NARC ^a	1
Glen Carbon	9/89	2,600	Laidlaw	0
Golf	-	200	Laidlaw	0
Hanover Park	8/89	8,500	Laidlaw	0
Highland Park	10/89	8,500	North Shore Waste	0
Homewood	8/89	6,125	Homewood Disp.	0
Oakbrook	3/90	2,600	Oakbrook Disp. (84%) ^b	0
			Waste Management (8%)	
			Rot's Disposal (8%)	
			Waste Management	
St. Charles				
Schaumburg	7/89	11,500	Laidlaw	0
Streamwood	7/89	9,500	Laidlaw	0
West Chicago	7/89	9,500	Laidlaw	0

a. Naperville Area Recycling Center

b. Percentage relates to market share.

programs are collecting any rigid/film plastic. Most of these are located in close proximity to a plastic lumber manufacturer which accepts mixed plastic film or commingled bales. This includes communities around Toronto, Ontario, on Long Island, New York, in central Michigan and in northwestern Iowa.

Milwaukee, Wisconsin started collecting any type of plastic with an SPI 1-7 label in August, 1990 from a 5,147 residence pilot area and has expanded since. The city also collects HDPE milk bottles and other recyclables from 40,000 additional households as part of its established curbside recycling program. Waste plastic contribution from the pilot area has been strong. The flyer sheet distributed to residents is shown in Figure 3.1. The city uses semi-automated side loading trucks with partial commingled collection. Newspaper, cardboard and magazines are emptied into a bin separate from other recyclables. Material is sorted out on a conveyor belt at a MRF with manual picking stations. HDPE, PET and PVC are picked out and baled and the remaining plastics are baled commingled. Per capita generation and the cost of adding mixed plastic collection have not been estimated.

There have been pilot RPC/film collection programs with poor results due to extensive (uneconomical) sorting necessary at a materials recovery facility (MRF) to prepare material for market and due to food contamination. One such program, conducted in the Portland metropolitan area in 1990, had high amounts of food and residue contamination which resulted in the landfilling of large amounts of film and containers. There was also a large reject rate (30%) due to unacceptable materials, e.g. rubber hoses, household medical waste. Consumers reported difficulty in having to believe it was necessary to sort out all plastics at a MRF to obtain any market price. Resident education as a key element, including cleaning and proper preparation of recyclable plastic, was stressed multiple times as a solution to resolving the problem. Although residents were asked to change patterns in update mailings, participants from the beginning of the program did little to change their patterns. The sortation company participating in the pilot indicated that the types of plastic to be collected should have been more limited.

A six month pilot collection of mixed plastics was conducted on 4,500 households between November, 1989 and April, 1989, in Seattle, Washington. The program, which included collection of film and plastic wrappers in addition to more commonly collected plastics, allowed the following plastics to be disposed in curbside collection as described by the mailer to participant homeowners:

Containers:

- Pop and water bottles
- Milk and juice jugs
- Dishwashing soap bottles

Plastic Bags:

- Grocery bags (produce & checkout kind)
- Food bags (bread, popcorn, cereal, etc.)
- Trash can liners

RECYCLING UPDATE

Thanks to your support, Milwaukee's Recycling Program continues to be successful. The State of Wisconsin passed a major recycling law in April, 1990. Soon we will not be able to throw any glass, plastic, paper, steel or metal cans in landfills and we will have to recycle these items.



To give us an idea of how much of these materials we will be collecting, we are starting an expanded collection in your area. As of **December 3, 1990**, you can put the following in your bin for pickup each week.

- 1) **PLASTIC CONTAINERS**--You can put any plastic container in your recycling bin IF it has the recycling symbol on the bottom with a number of 1-7.



- 2) **FOAM POLYSTYRENE PRODUCTS** such as fast food clamshells and meat trays. **PLEASE RINSE!**
- 3) **CARDBOARD**--We will also pick up cardboard. **IT MUST BE CUT UP INTO PIECES NO LARGER THAN 2' X 2' AND STACKED NEATLY UNDER THE RECYCLING BIN FOR COLLECTION OR PUT IN A PAPER BAG.**
- 4) **MAGAZINES** can be included in the same bundle or bag with cardboard.

So, as of **December 3, 1990**, you can recycle the following items:

TYPE OF RECYCLABLE	HOW TO PREPARE
Glass containers	any colors, rinse out, no lids
Aluminum cans	rinse out
Tin cans	rinse out, throw lids in garbage, leave labels on
Plastic containers	rinse out, check bottom for 1-7, throw lids in regular garbage, step on containers to flatten
Foam polystyrene (clamshells)	rinse out
Newspaper	put in paper garbage bag or tie with twine
Cardboard	cut boxes into 2'x2' pieces, put under bin or in separate bag
Magazines	put with cardboard or in separate bag

printed on recycled paper

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Figure 3.1 Flyer Sheet Distributed to Mixed Plastic Collection Pilot Program Residents in Milwaukee, WI.

Containers (cont.):

- Laundry detergent bottles
- Shampoo and lotion bottles
- Food containers

Plastic Bags (cont.):

- Merchandise bags from stores
- Dry cleaner bags

Wrappings:

- Wrappings from around toys, razors, hair brushes, utensils, etc., without paper backing
- Wrappings from paper towels, toilet paper, cosmetics.

The Seattle program was the most aggressive mixed plastic collection program ever initiated. In addition to the curbside pickup, drop-off boxes were placed at two transfer stations and at two local stores. The drop-off boxes ended up being the most successful and accounted for 76% of the 161,000 lbs. collected over the six month program.

The curbside service, which was divided into two collection areas (north and south), had extremely different responses. The north end (1,000 customers) collected 25,300 lbs. plastic, while the south end (3,500 customers) collected 13,594 lbs. plastic. Possible explanations for this large difference was the collection frequency for the south end (monthly) compared to the north end (weekly) and the different socioeconomic structure between the two areas. Another difference is that a greater percentage of people in the south end surveyed (40%) thought that the plastic was "too messy," as compared to the north end (30%).

The subcontractor, which was to ship the material to Thailand for processing, could not provide a viable long term market for the mixed plastics collected, and therefore the film and wrapper portion of the project was not continued beyond the end of the pilot. Since it was determined that sufficient markets existed for plastic HDPE and PET bottles, this part of the pilot project was extended for three months. Seattle currently collects PET soft drink bottles city-wide.

The Seattle program conducted a survey of 78% of the participants to determine willingness to recycle various types of plastic. The return rate was 43%, which resulted in an estimated margin of error of $\pm 1.5\%$. Willingness to recycle plastic types was as follows: plastic bags (87%), food bottles (79%), milk jugs (54%) and soft drink bottles (43%) [City of Seattle, 1989]. Of the participants surveyed, 16% indicated the project made them cut down on plastic, while 11% bought more. Direct mail was an effective way to communicate with the pilot program audience with 86% of the respondents recalling the letter asking each respective residence to participate. Other promotional mail material had high recall rates as well. The survey also determined that preparation of the recyclables did not act as a barrier in plastics recycling.