

**NORTH CAROLINA
RECYCLING BUSINESS
ASSISTANCE CENTER**

A cooperative effort
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Environment and Natural
Resources and the N.C.
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With this issue of Recycling Works, we will take a slight departure from our usual formula with articles on a variety of recycling business-oriented topics and examine the current status of plastic bottle recycling in the United States, and the role some state and regional plastic recyclers play.

Plastic Recyclers Face Shortage

By Scott Mouw, Chief, Community & Business Assistance Section

Today, we can recycle almost anything, even words. Take the word “Plastics” – given as career advice to Benjamin Braddock (played by a young Dustin Hoffman), in the classic movie “The Graduate.” Today, 37 years later, “plastics” remains a word filled with opportunity. It describes one of the hottest commodities in the recycling world.

But it took a while for the market to catch fire. The early years of recycling program development were fraught with scarce markets and low market prices, causing those collecting plastics for recycling to wonder what all the fuss was about.

What a difference a decade makes. Now, despite more plastic bottles being generated than ever before, collection programs cannot keep up with market demand. In recent articles about polyethylene terephthalate (PET) and high density polyethylene (HDPE), it is not uncommon to see “supply crisis” used to describe market conditions.

The year 2004 has seen dire predictions of disaster for domestic reclaimers of plastic bottles, who are competing for a flat supply of available material. Prices have remained consistently high as recyclers seek more bottles to feed a growing list of end uses for recycled resin.

So where are all the bottles? Another word provides a clue: China. The fast-growing

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Raleigh Recycle America employees perform a final manual sort after plastic bottles have exited the company's highly-automated series of color and resin sensors.

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Closing the Plastics Recycling Loop

By Matt Todd, Market Development Specialist

Step I: Recycle America – Raleigh

If you toss your plastic bottle into a recycling bin, it may end up at Recycle America in Raleigh. That's because the facility not only has a single stream recovery operation and container glass color-sorting capabilities, but it also has a thermoplastic resin sorting and processing operation.

Recycle America recycles 50,000 tons a year of commingled #1 through #7 plastic – drink bottles and such – known to the plastics folks as thermoplastic resins. This facility sources supply from haulers, local governments and material recovery facilities located all over North Carolina and other parts of the country.

In addition to sorting the plastic, the facility grinds polyethylene terephthalate (PET) and high density polyethylene (HDPE) grades (#1 and #2 plastic) to produce an unwashed flake. The flake and the other separated, baled resin-grades can then be used as a feed-stock for a wide variety of applications.

Even though a high level of automation is required by the resin sorting and processing operation, 150 employees are also needed to make it all work. All plastic processed at this facility is sold domestically.



Bales of mixed plastic bottles begin their journey through Recycle America's sorting and processing operation.

Recycle America will open another mixed plastic recovery facility in Chicago, Ill., in December 2004. The new plant will have the same 50,000 tons per year capacity as the Raleigh plant. As the competition for supply ratchets up, increased recovery will be needed to ease the stress.

Step II: United Resource Recovery Corporation – Spartanburg, S.C.

URRC is an intermediary processor of post-consumer PET bottles. The company purchases PET flake from various processors, many in North Carolina, including Recycle America in Raleigh. URRC employs 44 people and processes about 10 million pounds of plastic from PET bottles each year.

The flake is chemically washed and super-cleaned by a patented process called UnPET. UnPET creates food-grade PET flake purchased by container manufacturers, such as Southeastern Container in Enka, to make new soft drink bottles.

Step III: Southeastern Container – Enka

Southeastern Container, the official producer of plastic bottles for Coca Cola bottlers in the eastern United States, produces PET bottles of various sizes for Coca Cola water and soft drink products. The bottle-making plant in Enka, near Asheville, produces 750 million bottles a year. In addition to the Enka plant, there are seven other Southeastern Container facilities in the eastern United States producing millions more – only for Coke.

We all know PET soft drink bottles are recyclable. What you may not know is that Coke has already met a 2005 goal for producing PET bottles with 10 percent recycled content, and it happens right here in North Carolina. This is not an easy job due to FDA requirements and Coke's stringent standards for quality, not to mention the large quantity of PET required for production.

Southeastern Container is an end-user in the recycled PET supply chain and the Enka plant, employing about 200 people, has been using recycled PET for the past four or five years. Recycled PET is delivered by the truckload and stored in silos at the facility. Supplies of clean, recycled PET flake had never been a problem, until the second quarter of 2004. Now the plant's inability to stockpile a large amount of recycled PET limits its ability to react to the volatile nature of material supply.

Although the increased competition for supply has caused production costs to increase, Southeastern Container continues to meet the recycled content production standards set by Coke.

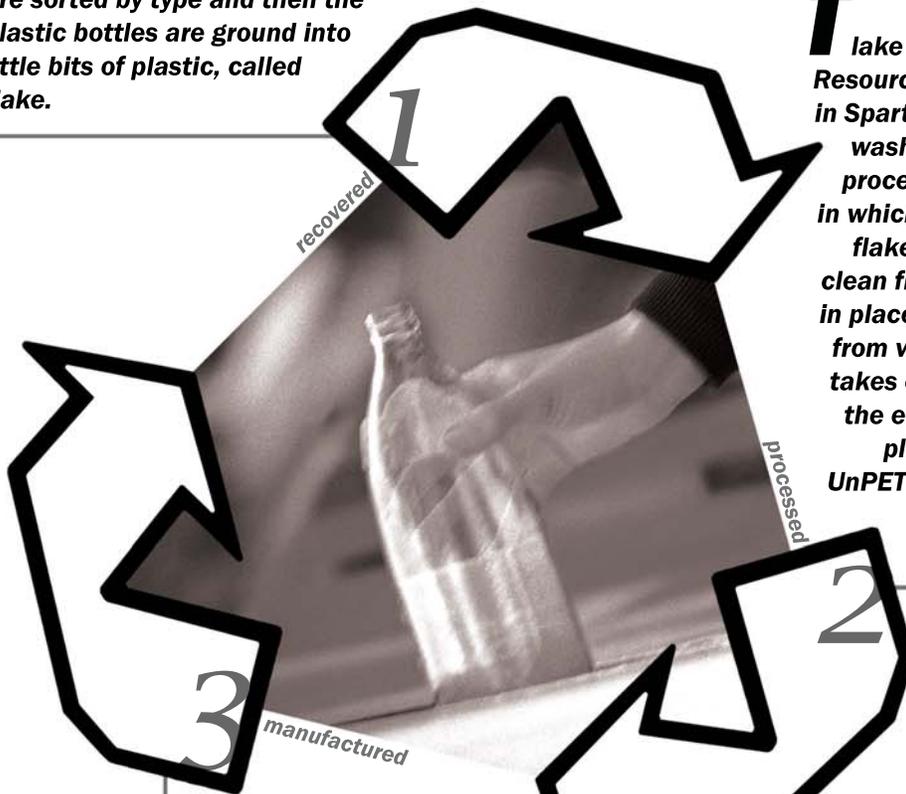
carolinas' recycling loop

a plastic bottle's experience through life, death and reincarnation

all within the carolinas

the recyclables from a bin are taken to a materials recovery facility, such as Recycle America in Raleigh. There the products are sorted by type and then the plastic bottles are ground into little bits of plastic, called flake.

flake is sent to United Resource Recovery Corp. in Spartanburg, S.C. It is washed by a patented process, called UnPET, in which the top layer of flake is removed. The clean flake is then used in place of pellets made from virgin materials. It takes only a fraction of the energy to produce plastic when using UnPET vs. virgin pellets.



Southeastern Container Inc. in Enka receives flake which is then molded back into bottles. Some of these bottles are sent to Coca-Cola Bottling Co. Consolidated in Charlotte. The filled Coca-Cola bottles are then distributed across the Carolinas, where they are put in stores to be bought and recycled again.

In 2003, nearly 10,000 tons of PET plastic bottles were recycled in North Carolina. That's only a fraction of the 57,000 tons of PET plastic bottles that are generated in North Carolina. The discarded plastic bottles would fill a football field more than three stories high.

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Chinese economy is busy churning out consumer products, in large part for the United States. China now imports about one-third of all PET collected here. According to the 2002 National Post-Consumer Plastics Recycling Report, 275 million pounds of the 800 million pounds of PET bottles collected in this country were exported. And with Chinese buyers actively looking for more sources of material, their demand will continue to grow.

“There’s a lot at stake for North Carolina. Some of the nation’s largest and most important players in plastics recycling are right here in our backyard.”

Other major factors also account for the domestic supply shortage, some preceding the arrival of the insatiable Chinese market. The U.S. domestic processing and end-use infrastructure is near a historic apex. Buoyed by demand from large recycled resin users like Mohawk Car-

pets and Wellman, and the commitment of the major beverage companies to produce post-consumer content bottles, domestic markets for recycled plastics have never been better. However, as the imbalance of supply and demand has developed, it has brought a feedstock crisis to the domestic plastic reclamation industry.

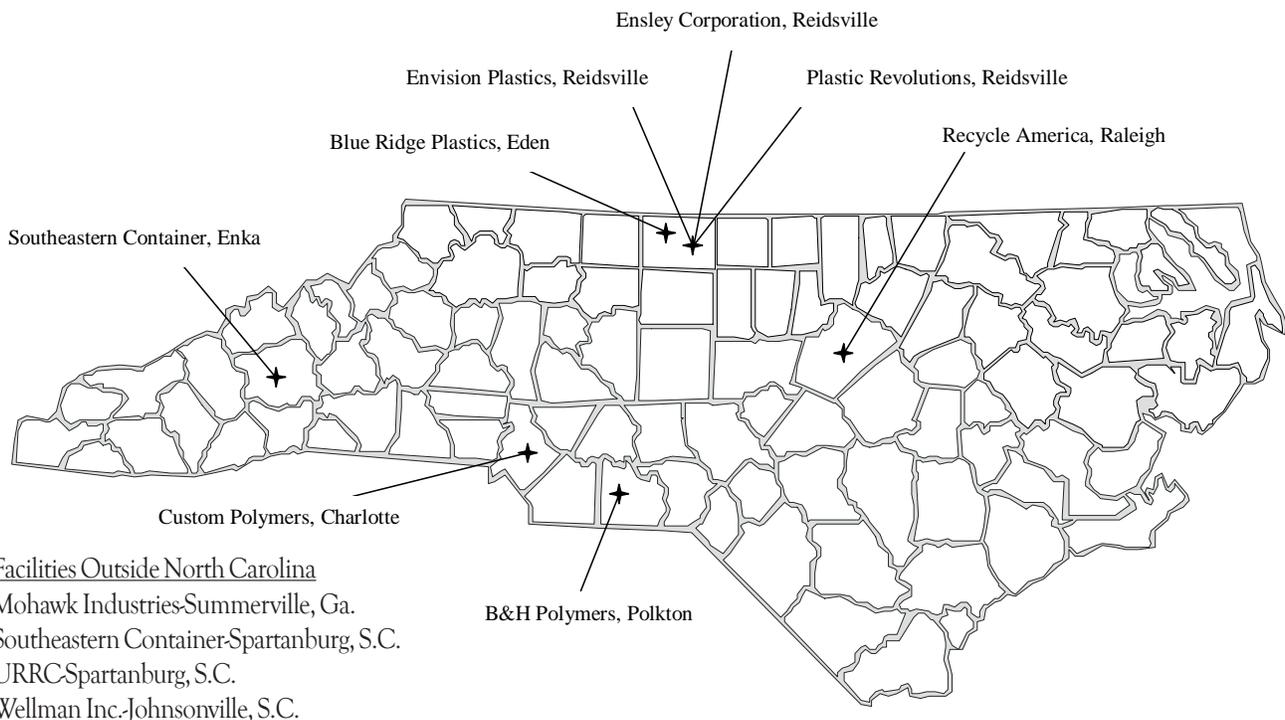
Rising demand and stagnant supply lead to price increases. Higher prices can be a good thing – to a point. Occasionally, it can force some market players out, driving down demand and eventually causing problems for suppliers. The issue now is how to bring supply and demand back into balance.

There’s a lot at stake for North Carolina. Some of the nation’s largest and most important players in plastics recycling are right here in our backyard. Few people realize the plastics loop is completely closed in the Carolinas, with empty bottles collected becoming new bottles manufactured here. The plastics recyclers in the state are sound companies, employing many local workers – they simply need more material.

North Carolina currently recovers less than one out of every five PET and HDPE bottles generated in the state. A number of factors explain a recycling rate of less than

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Plastic Recycling Facilities Highlighted in this Issue

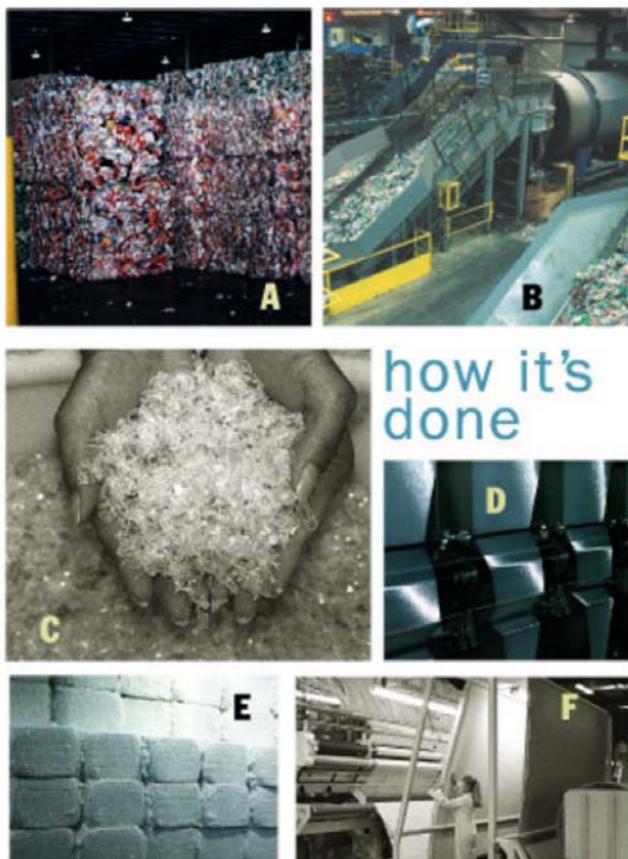


Recycled PET Made into Consumer Products by Industry Leaders Mohawk and Wellman

By Matt Ewadinger, RBAC Manager and Tom Rhodes, Waste Management Analyst

Mohawk Industries is using post-consumer recycled soft drink bottles to reduce the amount of virgin resources needed to manufacture new residential carpet. According to Mohawk's Web site, because plastic beverage bottles are made with top quality polyethylene terephthalate (PET) resins as required by the U.S. Food & Drug Administration, the recycled product is superior to lower grades of synthetic fibers used in making other brands of carpet yarns.

The Mohawk PET Story



- A – Used bottles arrive in compressed bales.**
B – Bottles are separated by color and type.
C – Bottles are ground into PET chips and washed.
D – Chips are melted and extruded into fiber.
E – Fiber bales are used to make yarn.
F – Yarn is manufactured into carpet for homes and businesses.

All of Mohawk's staple polyester yarn comes from its state-of-the-art plastic bottle recycling facility located in Summerville, Ga., about 95 miles northwest of Atlanta. PET bottles are sorted, ground into fine chips, and then cleaned. These chips are melted and extruded into Mohawk's Enviro-Tech PET residential carpet fiber.

Today, Mohawk recovers close to 20 percent of the 24 billion plastic bottles collected by recyclers each year. PET-fiber carpets will be installed in more than two million homes this year.

For more information about Mohawk Industries, contact Ken Prevette at (336) 643-7334 or visit the company's Web site at www.mohawkind.com.

Wellman Incorporated, located in Johnsonville, S.C., is one of the largest plastic recyclers in the world. Having originated a groundbreaking industry process converting discarded PET containers into usable flake and pellets, the company has developed a new generation of packaging resins and fibers made from recycled polyester feedstocks.

In 1993, the company introduced the first polyester textile fiber made from recycled post-consumer packaging. Its Fortrel® EcoSpun® fiber made from PET bottles is manufactured into many different products such as blankets, T-shirts, luggage, sportswear and much more. Additionally, the company manufactures recycled-content resins, sheet and thermoformed products marketed under the EcoClear® brand name that is used to manufacture bottles. Wellman's current capacity enables it to process three billion containers and bottles annually.

Wellman's facilities, worldwide, have the capacity to sort, clean and process more than 2.5 billion post-consumer PET bottles and containers annually into a variety of value-added products through its proprietary extrusion process. Wellman is an industry leader in the production of recycled polyester fiber and an important link in the polyester recycling chain.

For more information about Wellman, contact Phil Ammons at (843) 386-8110, or visit the company's Web site at www.wellmaninc.com.

Rockingham County Recyclers Process Plastics

By Sherry Yarkosky, Market Development Specialist

Ensley Corporation, located in Reidsville, is a processor of high-density polyethylene (HDPE) plastic, plastic drums and polypropylene. The company processes plastics, including detergent bottles and milk jugs, from industry as well as municipal recycling programs. Ensley employs 32 people and processes about 25 million pounds of plastics each year. North Carolina sources supply approximately 25 percent of the recycled plastics feedstock.

Baled plastics arrive by truck and are processed on-site. Plastic bales are conveyed to a grinding operation and the material is processed into flakes. The plastic flakes are washed, dried and pelletized. The recycled pelletized plastics are used in a variety of non-food extrusion and blow molding applications. Products made by Ensley's customers include black corrugated drainpipe, nursery plant containers, tool cases, wheels for carts and wagons, water tubing and other miscellaneous black plastic products. Half of Ensley's customers are located in North Carolina.

Like most plastics reclaimers, Ensley Corporation needs more recycled plastic feedstock. Ensley frequently finds itself short of plastic to process, causing facility downtime. Although robust markets exist for Ensley's pellet product, feedstock limitations have caused facility expansion plans to be put on hold.

For more information about Ensley Corporation, contact Dwight Ensley at (336) 349-6243 or Dwight@ensleycorp.com.



Envision Plastics color sorts its flakes through state-of-the-art technology.

Envision Plastics is the second-largest HDPE plastic recycler in North America with plants in Chino, Calif., and Reidsville. Envision employs 60 people and processes about four million pounds of post-consumer plastics a month at its North Carolina facility.

Although a number of North Carolina-based materials recovery facilities supply recycled HDPE to Envision, including Raleigh's Recycle America and FCR's facilities in Charlotte and Greensboro, the company receives a substantial amount of material from out-of-state recycling programs.



Flakes are pelletized according to clients' specifications -- like Downy® Blue, shown above.

Like other plastics processors, Envision receives baled plastics and grinds them into three-quarter inch flakes that are then washed and dried. State-of-the-art technology color-sorts the flakes into distinct groups based on clients' specifications, such as "Downy® Blue" or "Tide® Red." The flakes are then pelletized and sold to blow molders throughout the United States, including several in North Carolina, to manufacture all sizes of new colored plastic bottles. Although other recyclers must hand-sort HDPE flake, Envision employs the industry's only automated color-sort technology.

Customers save money using Envision's flake thereby reducing the amount of colorants needed during their manufacturing process. When making new detergent bottles, customers can reduce their dependence on the

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homopolymer found in unpigmented milk jugs by using the copolymer HDPE resin recovered from old detergent bottles. Copolymer resin has demonstrated better environmental stress crack resistance when customers perform "drop tests" on their finished product.

Demand for the end product is great and continues to grow. The obstacle in meeting demand is the need to increase supply of post-consumer bottles continuing to be disposed of in landfills.

For more information about Envision Plastics, contact Todd Payne at (336) 342-4749 or todd@envisionplastic.com.



Plastics Revolutions Safety Stop, a light-weight, cost-effective alternative to concrete.

Plastic Revolutions Inc., a plastic recycling company located in Reidsville, processes plastic scrap from industrial plants and post-consumer sources. The company employs 22 people, operates 24 hours a day, and processes 2.5 million pounds of plastics each month. Plastic Revolutions recycles a variety of plastic materials including bottles, pallets, bins, films, floor sweep regrind, pellets, parts, spurs and runners.

Plastics are processed into one-half inch flakes. The flakes are sent through a washing process to remove labels, glue, non-compatible plastics, dirt and metal. Cleaned flakes are dried and packaged for sale to manufacturers of plastic products such as drainage pipe, nursery containers and plastic sheeting.

Because of capital investments made to the company's wastewater treatment system, Plastics Revolutions' services as a toll processor continues to increase. Several local plastic recycling companies outsource the washing component of their plastics recycling operation to Plastics Revolutions instead of performing the function in-house.

Plastics Revolutions also manufactures "Safety Stop," a replacement for concrete parking stops. Safety Stops are made of recycled plastic and can be recycled at the end of their lifespan. Safety Stops are also cost-effective. Light-weight construction cuts shipping costs, and single-person installation reduces labor expenses.

For more information about Plastics Revolutions, contact Ed Handy at (336) 532-9274 or shandy1037@aol.com.

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A New Market for PET Bottles

B&H Recyclers LLC is a subsidiary of British-owned B&H Polymers, a major global supplier of polyethylene terephthalate (PET) resin for various food and non-food grade applications. The company's facility in Polkton processes and supplies post-consumer resin to the soft drink industry, helping leading manufacturers achieve their commitment to use at least 10 percent post-consumer content in their bottles. When B&H bought the Polkton plant in 2003 from Crown, Cork & Seal, it changed the focus from a mixed high density polyethylene (HDPE)/PET stream, to a PET-only process.

The plant handles materials in different forms, from bales to clean flake, to produce up to 55 million pounds a year of prime, clean, post-consumer pellets. Although it receives most of its current supply from the Northeast and from outside the United States, B&H hopes to source material from North Carolina in the near future. For the time being, the plant is another key facility in the U.S. bottle-to-bottle recycling infrastructure, located right here in North Carolina. Learn more about B&H by contacting Mark Royall at (704) 272-8011 or mark.royall@bypolymersgroup.com.

Custom Polymers Searches For Post-Consumer Bottles

Custom Polymers, another North Carolina-based company, has been in the plastics recycling business since 1996. Partners John Calhoun and Phil Howerton have built a multi-faceted business handling a remarkable array of recycled resins, including commodity and engineering grade materials. The company sells approximately nine million pounds of plastics a month in the form of scrap, regrind and pellets. Custom Polymers specializes in the regrinding and reprocessing of industrial plastics, but has recently begun to expand its business by focusing on post-consumer bottles. Sales are 80 percent post-industrial materials and 20 percent post-consumer.

As part of its growth, Custom Polymers recently formed a new partnership to acquire 50 percent of Blue Ridge Plastics in Eden. The plant is a washing and grinding facility processing approximately 1.6 million pounds a month of post-consumer bottle material into clean flake. The facility purchases HDPE natural and mixed color post-consumer bales, and commingled post-consumer bales. To fuel its growth, the company is interested in sourcing more post-consumer resin material.

Custom Polymers' corporate office is in Charlotte. It also has a production facility in Houston, Texas, and sales offices in Durham, Chicago, Ill., and Toronto. The company is active in international markets, with two sister companies located in Toluca, Mexico.

For more information about Custom Polymers, contact John Calhoun at (704) 332-6070 or john@custompolymers.com. You can also learn more about the company at its Web site: <http://www.custompolymers.com>.

Recycling Works is published by the N.C. Recycling Business Assistance Center (RBAC), a program of the Division of Pollution Prevention and Environmental Assistance of the N.C. Department of Environment and Natural Resources (DENR). For more information call (919) 715-6500 or (800) 763-0136, or write to DPPEA, 1639 Mail Service Center, Raleigh, NC 27699-1639.

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20 percent for these resins. Stagnant public participation has limited collection of material. More and more bottles are being generated away from home – at sporting events, soccer fields, offices and convenience stores – places underserved by recycling programs. Many curbside and drop-off programs are also stuck on collecting soft drink bottles and milk jugs, even though plastic is used in an increasingly wider array of applications. Markets today can take all plastic bottle types.

“In the short term, it seems clear that all players with a stake in plastics recycling must dedicate themselves to increasing public recycling participation.”

No magic bullet can solve the current supply problem, but many parties are exploring possible solutions. Beverage companies formed a group to find ways to recover more plastic soft drink bottles. A group of states, including North and South Carolina, is endorsing a product stewardship approach to increase container recycling. Local collection programs are beginning to investigate

how and where plastics are being recovered. Communities are addressing the issues of participation, away-from-home generation, and limited bottle collection. New collection methods, like “single-stream,” and more commingling of recyclables may offer additional chances to collect greater volumes of plastics.

In the short term, it seems clear that all players with a stake in plastics recycling must dedicate themselves to increasing public recycling participation. DPPEA is continuing to invest in education and promotion programs to help increase public commitment to recycling, and is seeking partnerships with communities and private companies to enhance these efforts. The bottles are out there, the markets are ready – it’s time to move to the next level.

For more information on plastics recycling, visit these Web sites:

- American Plastics Council — www.americanplasticscouncil.com
- Association of Postconsumer Plastics Recyclers — www.plasticsrecycling.org
- National Association for PET Container Resources — www.napcor.com



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Call (919) 715-6500 or (800) 763-0136 for free technical assistance and information about preventing, reducing and recycling waste.



North Carolina market prices for recyclables

Prices current as of Nov. 8, 2004

Item	Western Region	Central Region	Eastern Region
METALS			
Aluminum Cans, lb. loose	\$0.62	\$0.45	\$0.645
Steel cans, gross ton baled	\$175	\$160	\$103
PLASTICS			
Central Region markets plastics together			
PETE, lb. baled	\$0.16	\$0.085	\$0.14
HDPE, lb. baled	Natural	\$0.22	\$0.24
	Colored	\$.12	\$0.17
PAPER			
Newsprint, ton baled	\$85	\$90	\$85
Corrugated, ton baled	\$95	\$100	\$92.50
Office, ton baled	\$125	\$135	\$190
Magazines, ton baled	*	\$85	**
Mixed, ton baled	\$55	\$50	\$55
GLASS			
Eastern Region sells glass F.O.B. origin			
Clear, ton crushed delivered	\$30	\$26	\$17
Brown, ton crushed delivered	\$20	\$16	\$21
Green, ton crushed delivered	\$10	\$0	(\$9)

*Markets with mixed paper.
**Markets with newsprint.

Note: Prices listed above are compiled by RBAC and are for reference only. These prices are not firm quotes. RBAC obtained pricing information from processors for each category and developed a pricing range.

Visit RBAC online at <http://www.p2pays.org/rbac>

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