

Best Practices in Reducing Waste

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Keeping unnecessary waste out of landfills extends their life.



NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES

Not in my backyard!” (NIMBY) is an oft-heard, shrill rallying call for citizens opposed to having public facilities such as roads, hazardous waste sites, and especially sanitary landfills located near them. Finding a site for waste disposal in North Carolina is increasingly difficult, especially in fast-urbanizing counties. In reviewing applications for landfill permits, the state must consider a local government’s process for site approval, including the socioeconomic impact of a new or expanded landfill within one mile of an existing landfill, as well as environmental justice policies of the U.S. Environmental Protection Agency (EPA).¹

Along with state approval, local governments must seek acceptance from their citizens. Such acceptance is

becoming increasingly problematic. For instance, between January and July 2000, citizens rejected the landfill proposals of Chatham, Duplin, and Halifax counties. Moreover, during the same period, permit decisions in Albemarle and in Anson, Greene, Mecklenburg, and Wake counties encountered legal challenges.

Reducing waste extends an existing landfill’s life. Some local governments in North Carolina are national leaders in “diverting” waste (that is, keeping it out of the waste stream, through recycling and other means); others, however, lag behind. This article discusses best practices for reducing the waste stream, highlighting the state’s top performers. The objective of the article is to help local governments follow best practices.

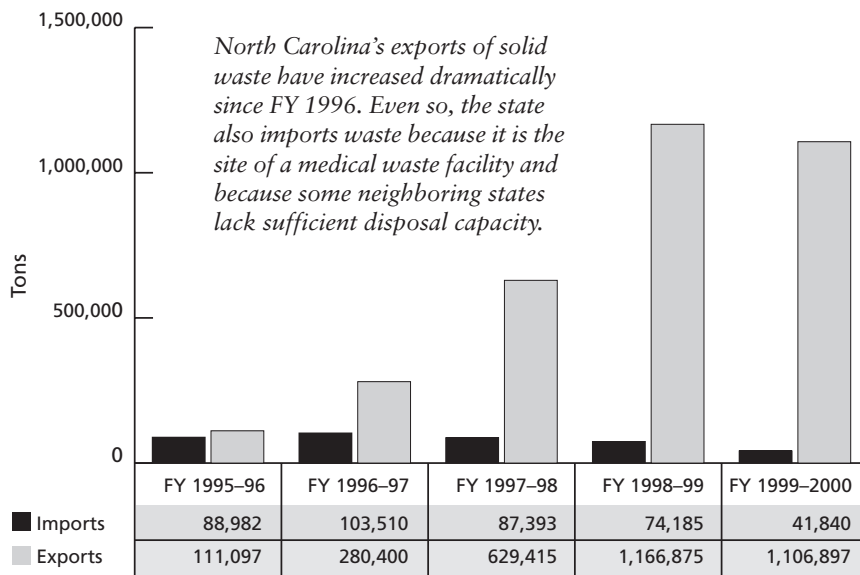
North Carolina in a National Context

Since data were first collected in 1988, the amount of municipal solid waste has outpaced population growth nationally and in North Carolina. From 1998 to 2000, national amounts increased by 10 percent, and from fiscal year (FY) 1997 to FY 2000, the amount of municipal

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Figure 1. Imports and Exports of Solid Waste, North Carolina



Source: NORTH CAROLINA DEP'T OF ENV'T AND NATURAL RESOURCES, SOLID WASTE MANAGEMENT ANNUAL REPORT (Raleigh: NCDENR, 2000).

solid waste and construction and demolition (C&D) debris in North Carolina increased by 23 percent.² In 1989, hoping to minimize the growth of waste with effective waste reduction and recycling, the General Assembly passed the Solid Waste Management Act, which called for a voluntary reduction of 40 percent in waste per person by 2001. Instead, the state will likely experience a 40 percent *increase* by 2001 because of population growth and inconsistent practices of waste reduction among local governments.³

As municipal solid waste has increased, the number of landfill sites has dramatically decreased—in the nation, from about 7,900 in 1989 to 2,314 in 2000; in North Carolina, from 112 in 1991 to 41 in 2000. (In North Carolina, landfills have become larger and more regionalized as a result.) The decreases are principally attributable to the EPA mandate that landfills be lined, because unlined landfills release contaminating chemicals in the form of “leachate.” In North Carolina all municipal solid waste had been placed in lined facilities by January 1998.

With the marked decline in landfills, transfer stations have become more prevalent. These are facilities that receive waste from homeowners, businesses, local governments, and private waste-hauling companies and consolidate it

into larger truckloads (typically a tractor-trailer with a 20-ton cargo load), which then are taken to landfills. Currently there are 76 authorized transfer stations in North Carolina.

Considerable variation exists among states in amount of municipal solid waste generated and disposal capacity of existing landfills. Jurisdictions generating high amounts and constrained in disposal capacity are increasingly exporting their waste to other states. In 1999, 38.9 million tons were exported nationwide, with Illinois leading the pack (16 million tons). North Carolina ranked fifth in the total exported and had the largest increase (537,460 tons) from FY 1998 to FY 1999.⁴ (For a depiction of the extent of importing and exporting in North Carolina from FY 1996 to FY 2000, see Figure 1.)⁵

There are three reasons for the dramatic increase in exports: decreasing landfill capacity, development of out-of-state landfills along North Carolina’s borders, and competitive pricing among landfills.

Estimating the remaining landfill capacity in North Carolina is difficult because landfills are authorized for five years. In 1998, state officials estimated that the municipal landfills collectively had a remaining capacity of about five years; however, this figure may be as high as ten years. Nonetheless, North

Carolina ranked among the lowest of the thirty-two states reporting landfill capacity in 1998.⁶

Waste Reduction: Best Practices

County waste reduction programs have greatly improved since the early 1990s. Most have been transformed from “green box” systems (unstaffed containers by the side of the road) to staffed convenience centers located in attractive, paved, fenced, and lighted areas. Likewise, many cities and towns have accepted the waste reduction challenge. Cities and counties use the following best practices:

- Education of citizens
- Reduction of waste at the source
- Adoption of a pay-as-you-throw system
- Enforcement of disposal diversion ordinances
- Effective recycling

WEB SITES ON WASTE REDUCTION

Environmental Education

www.epa.gov?epaoswer/oswl/kids.htm
Features a variety of activities and games for students in kindergarten through grade 6, including a poster and a storybook on fun ways to reuse old jelly jars.

Municipal Solid Waste

www.epa.gov/msw
Includes information on various methods of reducing and better managing municipal solid waste, such as source reduction and recycling.



North Carolina Recycle Guys Page

www.recycleguys.org
Provides facts on waste reduction and solid waste management in North Carolina, as well as resources for getting involved in reducing waste throughout the state.



Many cities and towns operate curbside recycling programs, picking up glass, aluminum cans, and other materials that residents place in special containers.

Education of Citizens

Of the 409 governments in North Carolina with recycling programs, 50 percent have one or more education programs to encourage waste reduction, as follows:

- Producing radio and television advertisements
- Writing newspaper articles and advertisements
- Doing mass mailings and informing citizens via their utility bills
- Making grants to innovative businesses
- Distributing promotional take-home items such as magnets and brochures
- Operating a telephone hotline to field questions
- Using a Web site to promote conservation
- Conducting informational workshops, forums, and conferences
- Making presentations at schools
- Promoting the Recycle Guys, cartoon characters who encourage waste reduction and recycling as part of an education campaign

Additionally, communities refer interested citizens and groups to helpful Web sites (see the sidebar, opposite).

Communities with education programs recover 22 percent more pounds per participating household and 47 percent more per household in the community, than communities that do not have such programs.⁷

Reduction of Waste at the Source

“Source reduction,” also known as waste prevention, is reduction of waste before recycling. It results in significant environmental benefits and cost savings. Waste reduction should be a cooperative effort between government, business, and the citizenry. Businesses can design, manufacture, purchase, and use materials and products with reduction in mind. Through education and other incentives described in this article, local governments can encourage citizens to do the following:

- “Grasscycle.” Leave grass clippings on lawns. Usually containing about 4 percent nitrogen, 2 percent potassium, .5 percent phosphorus, and essential minor elements, clippings increase the amount of organic matter in the soil.⁸

- “Xeriscape.” Landscape with less water. Also, use native plants and grasses that tolerate the North Carolina climate, thereby reducing the need for watering and the generation of yard wastes.
- *Reduce junk mail.* Ask to have their names removed from many national mailing lists.⁹
- “Enviroshop.” Choose recyclable products and containers and recycle them. Also, purchase reusable products (for example, cloth napkins, rechargeable batteries, and refillable containers) and products with the least unnecessary packaging.
- *Reduce use of toxic substances.* For instance, select nontoxic inks; use less toxic cleaners, such as baking soda and vinegar; and purchase the least amount of chemicals to complete the job.
- *Compost yard and kitchen wastes in their backyards.* These wastes make up about 30 percent of the waste stream. “Composting” involves decomposing plant remains and once-living materials to make an earthy, dark, crumbly substance excellent

Table 1. Programs in North Carolina Local Governments to Reduce or Reuse Solid Waste

	FY 1994-95	FY 1995-96	FY 1996-97	FY 1997-98	FY 1998-99	FY 1999-2000
Source Reduction Programs						
Backyard composting	92	70	82	81	53	59
Grasscycling	49	40	41	43	41	36
Xeriscaping	12	12	11	13	12	11
Junk mail reduction	20	40	56	55	57	64
Enviroshopping	35	27	36	35	35	32
Promotion of nontoxics	38	34	39	35	30	31
Other	11	10	9	1	5	6
Reuse Programs						
Swap shops	NA	13	10	17	22	23
Paint exchange	17	22	28	25	27	23
Waste exchange	18	13	11	14	8	8
Pallet exchange	NA	NA	NA	NA	7	7
Other	NA	NA	4	6	15	10

NA = not available

Source: NORTH CAROLINA DEP'T OF ENV'T AND NATURAL RESOURCES, SOLID WASTE MANAGEMENT ANNUAL REPORT (Raleigh, N.C.: NCDENR, 2000).

County residents who live outside city and town limits often must take their recyclable waste to convenience centers, where they sort it by type.



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for adding to the soil of houseplants or for enriching garden soil. “Vermicomposting,” an adapted type of composting, can be done cleanly and unobtrusively indoors in apartment buildings and condominiums. Local governments can create a demonstration site to explain composting visually and might offer plastic bins to residents for free or at reduced cost.

Further, local governments can offer waste exchange and reuse programs:

- *Swap shop*: a reuse program that allows residents to drop off items they do not want that may be useful to others. Most swap shops are small shed-type buildings located at drop-off recycling centers or convenience sites.
- *Waste exchange*: a program similar to swap shops, providing an opportunity for individuals and businesses to exchange materials they do not need with others that have a use for the materials.
- *Paint exchange*: a program that allows residents to drop off unwanted paint or pick up needed paint.
- *Pallet exchange*: the same as waste exchange but involving an exchange



Waste haulers take recyclable products from communities to material recovery facilities, where they are sorted, baled or compressed, then transported to a manufacturing plant.

Table 2. Waste Recycled by North Carolina Counties, FY 2000

County	Lbs./ Person	County	Lbs./ Person	County	Lbs./ Person	County	Lbs./ Person
Montgomery	491.40	Brunswick	145.31	Cabarrus	75.79	Gaston	53.48
Pitt	442.29	New Hanover	138.48	Polk	74.93	Hyde	53.12
Catawba	336.25	Alleghany	124.26	Rowan	74.90	Greene	52.17
Mecklenburg	304.10	Graham	123.34	Edgecombe	72.11	Davidson	48.51
Pamlico	299.27	Currituck	116.44	Chowan	71.84	Anson	47.96
Tyrrell	295.53	Ashe	116.36	Hertford	71.72	Randolph	47.53
Dare	283.67	Lenoir	115.55	McDowell	69.80	Camden	47.25
Macon	256.30	Wake	110.16	Avery	68.75	Caswell	39.54
Davie	244.77	Forsyth	105.90	Washington	68.75	Vance	38.71
Orange	217.82	Wilkes	105.71	Cleveland	67.42	Stanly	38.71
Swain	211.18	Lee	101.02	Alamance	67.17	Richmond	36.34
Jackson	208.69	Caldwell	100.80	Nash	66.22	Warren	35.36
Watauga	205.46	Carteret	100.12	Martin	65.62	Johnston	33.99
Craven	202.37	Burke	99.41	Wilson	65.18	Yancey	32.79
Duplin	195.74	Rutherford	93.52	Rockingham	64.99	Northampton	32.52
Buncombe	184.49	Wayne	90.91	Gates	64.14	Onslow	32.24
Durham	174.07	Pender	90.06	Franklin	63.87	Stokes	31.81
Transylvania	172.20	Lincoln	89.85	Jones	61.92	Cherokee	28.58
Haywood	170.87	Yadkin	88.95	Beaufort	61.67	Harnett	26.25
Mitchell	162.33	Henderson	86.32	Alexander	61.52	Bladen	20.01
Pasquotank	155.48	Granville	81.91	Iredell	61.29	Halifax	19.54
Union	155.44	Scotland	81.76	Surry	61.04	Cumberland	19.12
Guilford	149.60	Perquimans	77.96	Person	56.81	Bertie	17.95
Chatham	148.22	Columbus	77.43	Hoke	56.38	Clay	12.36
Madison	146.26	Moore	76.24	Sampson	54.49	Robeson	4.17

Source: Adapted from NORTH CAROLINA DEP'T OF ENV'T AND NATURAL RESOURCES, SOLID WASTE MANAGEMENT ANNUAL REPORT (Raleigh: NCDENR, 2000).

Table 3. Waste Recycled by North Carolina Municipalities of More than 10,000 People, FY 2000

Municipality	Lbs./ Person	Municipality	Lbs./ Person	Municipality	Lbs./ Person
Greensboro	200.63	Concord	102.33	Lexington	53.87
Boone	187.49	Asheboro	95.91	Washington	53.42
High Point	184.89	Garner	92.74	Thomasville	53.40
Hickory	178.13	Morganton	91.94	Greenville	52.58
Durham	159.90	Kinston	91.61	Elizabeth City	51.31
Salisbury	155.79	Southern Pines	91.00	Rocky Mount	47.41
Cary	153.87	Eden	88.86	Goldsboro	44.05
Matthews	152.22	Lenoir	86.42	Smithfield	43.56
Clemmons	138.55	Indian Trail	82.31	Statesville	42.72
Asheville	128.06	Reidsville	80.36	Tarboro	39.46
Laurinburg	114.02	Kernersville	80.02	Albemarle	37.26
Winston-Salem	111.92	Wilmington	77.47	Gastonia	33.66
Huntersville	109.66	Lincolnton	66.49	Henderson	33.43
Raleigh	106.60	Wilson	64.60	Graham	31.77
Newton	103.99	Wake Forest	61.46	Burlington	27.99
Apex	103.77	Sanford	61.41	Jacksonville	19.33
Charlotte	103.28	Monroe	57.61	Roanoke Rapids	10.71
Cornelius	102.69	Mint Hill	56.65	Lumberton	4.65

Note: Some municipalities of more than 10,000 people are not included because they have no recycling program or because tonnages recovered could not be determined.

Source: Adapted from NORTH CAROLINA DEP'T OF ENV'T AND NATURAL RESOURCES, SOLID WASTE MANAGEMENT ANNUAL REPORT (Raleigh: NCDENR, 2000).

of pallets among industries, construction companies, and commercial businesses.

Although the diversion programs discussed here cost little, relatively few governments in North Carolina offer them. The number of backyard composting, grasscycling, and enviro-shopping programs has declined since FY 1995 (see Table 1, page 22). Swap shop programs, on the other hand, have increased from 13 to 23, partially because the North Carolina Department of Environment and Natural Resources (DENR) funds them.

Adoption of Pay-as-You-Throw System

Governments can encourage citizens and businesses to reduce waste at the source by implementing a “pay-as-you-throw” (PAYT) system. Also known as variable-rate or unit-based pricing, such a system charges residents for collection on the basis of the amount of waste they discard. PAYT began in 1916 but did not become popular until the early 1990s.

By 1998 more than 4,000 communities nationally had adopted a PAYT system. To date, 17 counties and 7 cities in North Carolina have adopted such a system.¹⁰

Not surprisingly, some citizens initially resist switching to a PAYT system, disliking paying for what they perceive to have been a free service. If people do not realize that they are paying for waste collection through general tax revenues, they may hesitate to start paying directly for it through a fee. Hence policy makers, fearing political repercussions, may shy away from variable rates. Yet the efficiencies are great. One study found that increased recycling, source reduction, and yard waste diversion in PAYT communities resulted in a 16–17 percent decrease in disposal.¹¹

Perhaps partially offsetting the benefit of PAYT systems is that they may induce citizens to dispose of waste improperly. Ways to discourage undesirable diversion include locking commercial dumpsters, strictly enforcing littering

and anti-burning ordinances, educating the public, and providing free drop-off days for bulky items or garbage in general. To date, there is no evidence of illegal disposal in the North Carolina communities that have implemented a PAYT program.

Enforcement of Disposal Diversion Ordinances

As of FY 2000, sixty-eight local governments had passed disposal diversion ordinances (DDOs) that impose stricter requirements and penalties than the state’s laws banning aluminum cans, lead-acid batteries, old tires, “white goods” (appliances), used motor oil, antifreeze, and yard waste from disposal in municipal solid waste facilities. DDOs range from outright bans of selected products (for example, aluminum cans) to requirements that material be separated for recycling. The majority of DDOs divert corrugated cardboard, but some also divert clean wood, pallets, and traditional household recyclables. Durham has an extensive ordinance banning five materials: glass bottles and jars, aluminum cans, steel cans, newspapers, and corrugated boxes. Residential violators receive three warnings on brightly colored stickers. The fourth violation results in a warning letter. Thereafter, the city charges individual residents \$15 per violation and businesses \$50 per violation. Waste haulers caught with banned materials at a transfer station must pay double the “tipping fee” (the cost per ton disposed of) for the whole load. After just six months of having the ordinance in force, participation in the residential recycling program in Durham increased from 60 to 80 percent.¹² Columbus and Iredell counties passed DDOs banning corrugated cardboard, and both experienced significant increases in the recovery of this item. Whiteville, in Columbus County, increased cardboard recovery by 1,862 percent during FY 2000, although its ordinance was in place for only part of the year.

Before passing an ordinance, local governments should thoroughly understand their waste stream. Some materials are common to all waste streams, whereas others are specific to individual communities. For instance, Wake



Masses of corrugated cardboard await recycling.

County discovered that corrugated cardboard constituted 26 percent of its commercial waste stream, so it enacted a landfill disposal surcharge on that material. The next step is to determine whether recycling capabilities are adequate to handle targeted materials. For instance, to recycle cardboard, a community needs either private haulers or local governments to take the cardboard to paper stock dealers or material recovery facilities (see the later section entitled “Proximity of material recovery facilities”). Although local governments may collect and process materials, relying on the private sector is usually cheaper. If existing infrastructure is not available, local governments may be able to create it. For instance, Pasquotank County contracted with a major local hauler to build a processing facility for corrugated cardboard.

In designing a DDO, local officials must determine the community’s tolerance level (a complete or a partial ban may be appropriate), means of enforcing and inspecting for compliance, the point of compliance, the material to be targeted, the grace period before enforcement, and the penalties.¹³

Effective Recycling

On balance, the recycling story in North Carolina has not been promising in recent years. The amounts of traditional materials recycled—such as glass, plastics, and aluminum and steel cans—continue to decline. The recovery of organic materials, which can fluctuate greatly from year to year, has increased because of material generated by Hurricane Floyd.

Metals have the highest recovery rate of traditional recyclables, about 25 percent. Glass, paper, and plastic recovery rates average 14, 10, and 4 percent, respectively.¹⁴

The state records how much waste local governments dispose of in landfills and how much they recycle in pounds per person and per household. In FY 2000 the countywide average per person was 108.50 pounds, ranging from 491.40 in Montgomery County to 4.17 in Robeson County (see Table 2, page 23).

Among the leaders in county waste reduction are Craven and Orange counties, which offer a wide range of programs—backyard composting, source reduction, reuse, recycling (of glass, cans, etc., plus oil, oil filters, antifreeze, and batteries), education,

local bans on disposal, pay-as-you-throw, household hazardous waste collection, mulching/composting, and C&D reuse/recycling. However, a major recycler of construction debris in Craven County was closed in 1999 because of operational difficulties, resulting in a lower per person recovery than in prior years.

In fifty-four cities of more than 10,000 in population, the amount recycled in FY 2000 ranged from 200.63 pounds per person in Greensboro to 4.65 pounds per person in Lumberton, with an average recovery of 85.28 pounds per person (see Table 3).

Among the top ten municipal programs, some practices are prevalent:

- All use curbside collection.
- Nine provide collection once a week.
- Eight educate citizens about waste reduction.
- Seven augment curbside collection with drop-off recycling services.
- Six have access to a material recovery facility that accepts mixed waste.
- Four provide recycling services to commercial customers as well as residential ones.

- Four ban particular materials from disposal or require separation of materials.

In the following sections, we discuss five factors that influence productivity in recycling.

Method of collection. Jurisdictions provide three types of recycling services: at the curb, at a drop-off facility, or both. Because they are less dense than cities, counties usually offer drop-off facilities. Municipalities typically offer curbside service, which varies in frequency of pickup and type of collection—that is, materials separated by homeowners or commingled at the curb. Common in the early 1990s, programs calling for separation of materials by homeowners have sharply declined because the extra effort required of citizens discouraged them from recycling. Hence, almost all programs in North Carolina now involve commingling of materials. Collectors either sort materials at the curb or take them to a center for sorting.

County and municipal recycling operations also differ in who runs them. Most counties (57 percent) operate programs themselves. In contrast, most municipalities (78 percent) use private service providers because they cannot afford the capital investment needed to operate curbside recycling programs. Kannapolis and Fayetteville are the only cities of more than 30,000 in population that provide no recycling services of any kind. Robeson County is the only county with no program.

Although privatization of recycling is prevalent among municipalities, it is not necessarily effective. Publicly operated systems recover approximately 324 pounds per household served, compared with 241 pounds per household recovered in privately run programs. Further, cities that contract for recycling services still need to operate education programs about waste diversion.

Materials collected. Before the EPA required lined landfills, C&D waste was usually disposed of in the same landfill as municipal solid waste. Although C&D waste may still be disposed of in lined landfills, it goes mostly to separate C&D facilities, where tipping fees are lower because of lower landfill construc-

tion and operating costs. In FY 2000, C&D waste made up 29 percent of the waste stream. C&D facilities received 22 percent, lined facilities 7 percent. The volume of C&D waste is increasing, yet only 13 local governments recycle C&D waste, only 13 salvage C&D waste, and only 3 do both.

Considerable variation exists in the collection of special wastes, such as car products and household hazardous waste. The number of gallons of used oil collected increased by 18 percent from FY 1999 to FY 2000, but the increase was not uniform across the state. For instance, 12 rural counties have no public collection sites, and 26 others have just one. Only 38 of the state's 529 cities collect oil. Of all the county and municipal governments, only 14 collect oil filters, 49 antifreeze, and 24 hazardous waste.

Proximity of material recovery facilities (MRFs). Moving recycled material from a home or a business involves three steps: collection, processing (for example, baling or crushing) for transport, and delivery to a manufacturing plant. MRFs consolidate items for efficient transportation, linking collected materials to end-use markets. MRFs accept mixed materials, separate them by specific commodities, and often bale or compress them. Local governments either operate their own MRFs or contract with privately operated MRFs. Four MRFs are operated by vocational centers with minimal financial support from local governments. The MRFs provide jobs and skill training. Two counties (Davidson and Davie) keep operational costs low by using inmate labor.

Because markets for recycled waste are usually outside a community, processing and transportation are crucial to successful marketing. The presence of an MRF makes a difference in the kind and the amount of materials collected per person.

For their size, Greensboro and High Point, with programs supported by MRFs, have considerably higher per person rates of curbside recycling than Raleigh and Wilmington. The contrast between Greensboro and Raleigh also is notable regarding the kinds of materials collected. Although other factors con-

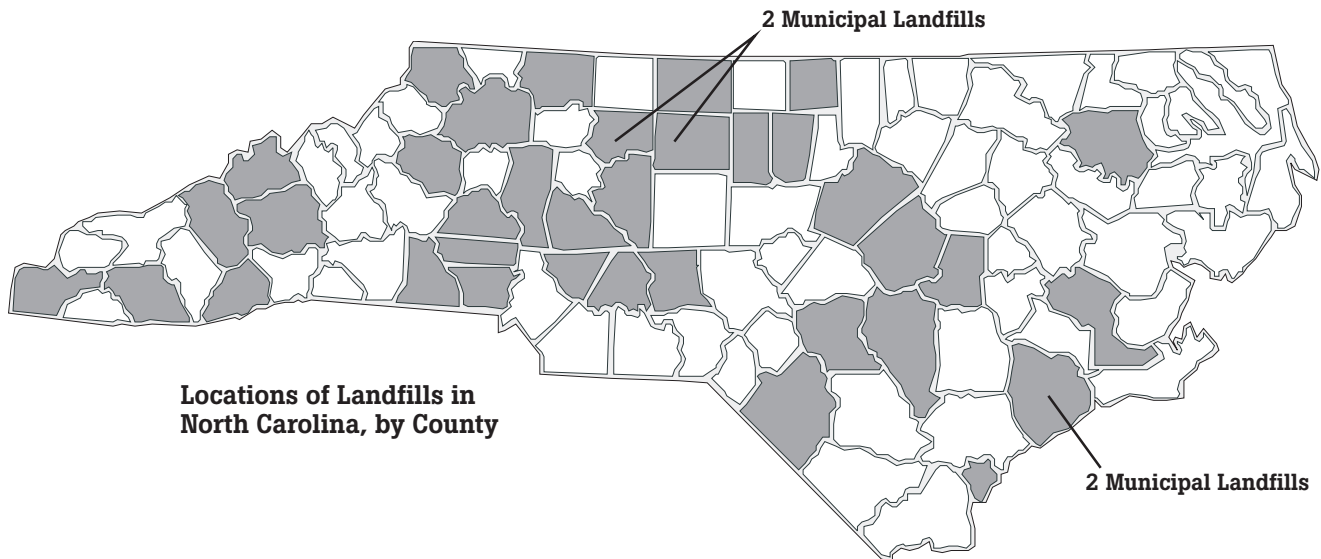
tribute to the success of recycling programs, MRFs give a marketing stability that allows greater flexibility in the kinds of materials collected and the control of collection costs. MRFs enable numerous haulers individually marketing collected materials to sell them at a centralized location. MRFs thereby effect economies of scale and greater market demand.

MRFs also have proven their worth by offering much-needed market outlets for small municipalities and counties. The Eastern Carolina Vocational Center, an MRF in Greenville, receives materials from many small towns and counties surrounding Pitt County and serves as a critical regional outlet for collected glass. Private haulers who serve small municipalities with curbside services rely on the Eastern Carolina Vocational Center to take their materials, sometimes from communities more than 100 miles away. Similarly, Mecklenburg County's MRF offers a market for materials collected by local governments in Union County.

Availability of markets for recycled goods. Revenue from recycled materials depends on the prices of particular materials, and they vary widely. For example, in 2001 the market price for steel cans ranged from \$17.25 per pound in eastern North Carolina to \$26.25 in the western part of the state and \$30.00 in the central region, and the market price for clear glass ranged from \$25.00 per pound in the east to \$38.50 in central and western North Carolina.

Governments can improve their markets by doing the following:

- *Regularly communicating with purchasers of materials.* There is no substitute for direct and frequent communication with markets.
- *Tracking market conditions.* Knowing current market conditions and market projections enables local units to get the most competitive prices.
- *Improving processing efficiency.* Reducing processing and transportation costs increases markets.
- *Partnering with markets on processing capacity.* Markets often are willing to supply processing equipment in return for materials.



Locations of Landfills in North Carolina, by County

- *Taking advantage of existing processing capacity.* In some areas, counties have developed processing capacity that other counties can use. Regional cooperation improves the ability to market materials.
- *Using contracts wisely to build long-term relationships.* Chasing “spot markets” for short-term windfall revenues in good times is risky over the long run. The better option is to enter into long-term contracts for materials that include a “floor,” or minimum price. Prices are generally lower than current market prices but provide protection during market downturns.
- *Investing in processing capacity.* The best way to optimize relationships with recycling markets is to invest in processing capacity, such as an MRF or smaller facilities housing balers or storage trailers. Local governments also can encourage private processing through bans on disposal of materials and long-term collection contracts.
- *Buying products made from recycled materials.* Extensive research has shown that recycled products are competitive with virgin products in quality and cost.
- *Developing markets.* Local units should disseminate good data that show processors’ market potential.

Existing and future landfill capacity. The extent of existing and projected landfill capacity may significantly affect

a local unit’s motivation to recycle. Policy makers whose landfills have relatively little capacity and who have limited options regarding the location of new landfills have the most incentive to follow best recycling practices. (For the locations of existing landfills, see the map on this page.)

Conclusion

Reducing waste makes both economic and environmental sense. Governments of all sizes can educate their citizens about reducing waste and can promote waste reduction at the source. Communities also might take a hard look at creating a PAYT system and adopting a DDO for troublesome materials such as aluminum cans and corrugated boxes.

Finally, and most important, jurisdictions can evaluate the effectiveness of their recycling programs by seeing where they stand relative to other jurisdictions in regard to amount of waste recycled (see Tables 2 and 3). Cities and counties now recycling relatively low amounts would do well to emulate the best practices of the high-performing localities. Policy makers might contact the high-performing localities to learn what practices can be emulated. Following up with a site visit might enable them to understand and apply best practices better.

Notes

1. N.C. GEN. STAT. § 160A-325, 153A136(c).
2. Nora Goldstein, *The State of Garbage*, BICYCLE, Apr. 2000, pp. 32, 33.

3. NORTH CAROLINA DEP’T OF ENV’T AND NATURAL RESOURCES, SOLID WASTE MANAGEMENT ANNUAL REPORT (Raleigh: NCDENR, 2000).
4. Goldstein, *The State of Garbage*, at 34.
5. As well as exporting waste, North Carolina imports it because the state has a medical waste facility that other states use and because some out-of-state local governments near North Carolina have limited disposal capacity.
6. *Id.* at 33.
7. NORTH CAROLINA DEP’T OF ENV’T AND NATURAL RESOURCES, SOLID WASTE MANAGEMENT ANNUAL REPORT (Raleigh: NCDENR, 1999).
8. UNITED STATES ENV’TAL PROTECTION AGENCY, ENVIRONMENTAL FACT SHEET: RECYCLING GRASS CLIPPINGS 1 (Washington, D.C.: EPA, July 1992).
9. To have their names removed, people can write to Mail Preference Service, Direct Marketing Association, 11 West 42nd Street, P.O. Box 3861, New York, NY 10163. This is a free service.
10. Further information on PAYT systems is available at www.p2pays.org/payt.
11. LISA SKUMATZ, MEASURING SOURCE REDUCTION: PAY AS YOU THROW/VARIABLE RATES AS AN EXAMPLE (Seattle, Wash.: Skumatz Economic Research Assoc., Mar. 2000).
12. James Hickman et al., *Recycling Rules in Durham*, RESOURCE RECYCLING, Sept. 2000, p. 17.
13. For more information, see NORTH CAROLINA DEP’T OF ENVIRONMENT AND NATURAL RESOURCES, DISPOSAL DIVERSION ORDINANCES, Aug. 1999 update, available at www.p2pays.org/search/pdf/frame.asp?pdfurl=/ref/01/00782.pdf.
14. NORTH CAROLINA DEP’T OF ENV’T AND NATURAL RESOURCES, SOLID WASTE MANAGEMENT ANNUAL REPORT (Raleigh: NCDENR, 1999).