

Chapter Three: Accomplishments in Solid Waste Management in North Carolina

Despite dynamic changes since the late 1980s, North Carolina can claim many notable accomplishments. The following section summarizes those successes and the factors that contributed to their achievement. Public input and a review of achievements were used to determine the common denominators of success.

SUCCESS STORIES

The findings in Figure 3.1 provide a foundation for this plan’s goals and recommendations. The most notable conclusion is that strong mandates are an essential tool to achieve solid waste goals. Other tools play an important role as well. The findings are discussed in detail below.

Figure 3.1. Specific Accomplishments and Reasons for Success	
Accomplishment	Reason for Success
Unlined MSW landfills closed	Clear and enforced statutory mandate Long preparatory time before mandate was enforced
Recycling increased and recycling markets developed	Public demand Encouragement from state law Generators responded to rising disposal costs Profit-making businesses entered the market
Statewide disposal bans and local disposal diversion ordinances	Clear and enforced statutory mandates Local incentives
Local governments began solid waste planning	Clear and enforced statutory mandate
Waste reduction grant program created	Availability of state funding Grantees provided fundable proposals
Tire program began (includes clean-up of nuisance scrap tire sites)	Program was provided a strong statutory basis Availability of state funding through advance disposal fee
White goods program implemented	Clear and enforced statutory mandate (on the disposal ban) Availability of state funding through advance disposal fee
State agency efforts to buy recycled began	Clear statutory and executive order mandates
Landfill operators certified	Clear and enforced statutory mandate Cooperation and support from landfill operators

Moving from Unlined to Lined Landfills

As Chapter Two described, one of North Carolina’s most significant solid waste management accomplishments in the past decade was the closure of unlined, municipal solid waste landfills. By January 1, 1998, all municipal solid waste went to lined facilities for disposal. The change was an important step in the plan to protect North Carolina’s groundwater resources.

Although met with initial resistance, the mandate to close unlined landfills was enforced without exception after a long preparation period. The mandate was promulgated in 1991 and enforced beginning January 1998. Support of the “98 Rule” by EPA’s Subtitle D landfill regulations also played an important role. Success is clearly attributable to the mandate and the preparatory period that preceded it.

Increased Recycling & Recycling Market Development

Since 1989, North Carolina has made remarkable progress in the diversion of waste through recycling. Local and state programs, coupled with private initiatives, contributed to the dramatic increase in recycling and composting programs.

Municipal curbside recycling programs increased nearly threefold between 1990 and 2000 and the number of programs rose from 88 to more than 260. At the same time, more than 90 percent of North

Carolina's counties established recycling drop-off programs. Many counties also developed staffed "convenience centers" to service solid waste from unincorporated areas without curbside programs. Consequently, local programs increased total material recovery from 244,000 tons to more than 1.09 million tons between 1990 and 2000, a 346 percent increase. By the year 2000, almost every North Carolinian had access to a public recycling program.

At the same time, private sector recycling expanded rapidly. Although there are less data available from private efforts, elevated recovery rates for materials such as corrugated cardboard, office paper and pallets indicate a healthy rise in commercial and industrial recycling. Anecdotal information gathered from the state's industrial waste assessments also indicates increased recycling of byproduct wastes and general packaging discards.

North Carolina's recycling market infrastructure expanded as new companies began recycling un-recovered waste streams. In 1991, the *Directory of Markets for Recyclable Materials* listed 382 companies accepting recyclable materials; the 1999 version contained 564 companies - a 48 percent increase in just eight years.¹ New markets also appeared in the 1990s. For the first time, materials like fluorescent lights, vinyl siding, computers, gypsum wallboard, oil filters and a host of industrial byproducts became marketable.

This market development is partially attributable to the state's establishment of the Recycling Business Assistance Center (RBAC). Created in 1994 with EPA funding, it develops recycling markets by providing business management, technical and financial assistance to businesses. To date, it has assisted more than 600 businesses and helped create more than 200,000 tons of new recycling capacity.

To strengthen support for new recycling businesses, the RBAC developed an alliance with the Community Center of Self-Help, a private institution that specializes in small business lending. In 1999, this public/private alliance created a recycling business loan fund. The fund, supported in part by an EPA grant, offered approximately \$660,000 in loans to recycling businesses in North Carolina. By early 2003, Self-Help had closed on \$306,300 in DENR-reimbursable loans to recycling companies. An additional \$237,810 in funds has been leveraged on those projects. The projects created or retained 31 jobs and produced 12,798 tons of recycling capacity. In addition to its DENR-reimbursable loans, Self-Help provided two loans valued at \$380,000 to recycling companies through its Small Business Assistance program. An additional \$670,000 has been leveraged on those two loans. These projects created or retained 16 jobs and produced 5,920 tons of recycling capacity.

Market expansion created a number of jobs in the state's recycling sector, showing that recycling contributes to the state's economic growth. A study conducted in FY 99-00 by the state's Division of Pollution Prevention and Environmental Assistance documented a 12 percent employment increase in private sector recycling over five years. More than 12,000 jobs statewide now rely on recycling, making its economic value equal or greater than traditional sectors such as crop agriculture and livestock operations.²

Calculating overall recovery rates and rates for certain commodities illustrates recycling growth during the last decade. For example, between FY 90-91 and FY 97-98, newsprint recovery more than doubled – from 53,000 tons to more than 122,000 tons. This helped North Carolina achieve a 57 percent recovery

¹ In 1998, the Division of Pollution Prevention and Environmental Assistance placed a searchable database on the Internet at www.p2pays.org/dmrm/. In the beginning of calendar year 2001, the Directory was searched 1,800 times per month.

² N.C. Department of Environment and Natural Resources, State Recycling Business Employment Numbers Increase, (21 November 2000). < http://www.p2pays.org/news/press_releases/112100.pdf > [August 2003].

rate for that commodity. Glass bottle recycling increased from 17,000 tons to 44,000 tons. Moreover, by FY 97-98, more than half of North Carolina's corrugated cardboard was recovered, an increase boosted by local ordinances that discouraged its disposal. The 1998 *State Assessment of Recycling Markets* estimated four million tons of material was recycled in 1997. When compared to the 1995 estimate, the statewide recycling rate was only 22 percent (2.1 million tons recycled and 7.6 million tons disposed) compared to 1998's 34 percent. Going back even further, the 1991 State Solid Waste Plan estimated the state's recycling rate at 17 percent. Had recovery rates not doubled throughout the 1990s, North Carolina's per capita disposal rate would be 1.5 tons instead of its current rate of 1.23 per capita. Instead of taking up scarce and increasingly costly landfill space, recycled materials were used to create jobs and economic value.

Progress in recycling and composting can be attributed to a variety of factors: public awareness and demand, state mandates and economic opportunity and efficiency. As recycling came to the forefront of environmental issues in the late 1980s and early 1990s, public demand led to government action on both state and local levels. Mandates directed action and proper funding supported operations. As disposal costs rise, recycling becomes more cost-efficient for many materials. Market development led the way for more economic opportunities that simultaneously reduced the amount of solid waste disposed in landfills.

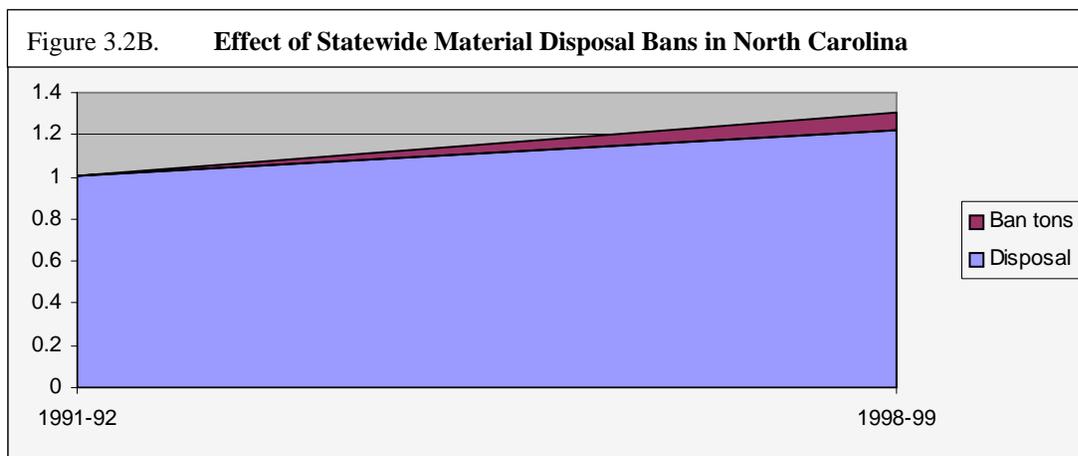
Statewide Solid Waste Disposal Bans and Local Disposal Diversion Ordinances

The 1989 Solid Waste Management Act banned certain recyclable materials from disposal in municipal solid waste landfills. The bans that took effect in the early 1990s were supplemented by local ordinances that discouraged the disposal of additional materials. Figures 3.2A and 3.2B clearly show the effectiveness of these diversion efforts and bans. Without them, North Carolina's per capita disposal rate for 1998 would have been seven percent higher.

Figure 3.2A. Effect of Statewide Material Disposal Bans in North Carolina by 1998

Material*	Tons Diverted Annually	Percentage of Waste Stream Increase Without Diversion	Per capita Disposal Rate Increase without Diversion
Lead Acid Batteries**	51,300	0.55	.007
White Goods***	81,320	0.87	.011
Tires****	47,000	0.51	.006
Yard waste*****	515,083	5.29	.068
TOTAL	694,703	7.00	.092

* Aluminum cans, used oil and antifreeze also have disposal bans. They are not included here due to the difficulty assessing the effect of their diversion.
 ** Calculation based *Assessment of the Recycling Industry and Recycling Markets in North Carolina*, 1995 Update. It assumes a 90 percent recovery rate using projected 1997 generation levels.
 *** Data from 1998 *Recycling Markets Assessment*, N.C.DENR. Assumes an 81 percent recovery rate using 1997-estimated generation.
 **** Data from 1998 *Recycling Markets Assessment*, N.C.DENR. Assumes a 55 percent recovery rate of 1997-estimated generation. Whole tires are banned from disposal, but many chopped or sliced tires are disposed of in tire "monofills."
 ***** Data from 1998-99 *Local Government Solid Waste Annual Reports*.



Local diversion ordinances have supplemented statewide bans to North Carolina's to boost waste reduction efforts. Throughout the 1990s, a number of North Carolina cities and counties passed local disposal diversion measures placing a tipping fee surcharge on loads containing specified recyclables. By FY 1999-2000, 31 counties and five municipalities enacted similar measures, making North Carolina a national leader in this innovative strategy. Although a few communities targeted a broad range of materials, most focused on corrugated cardboard. Estimates show these measures diverted at least 80,000 tons of cardboard above normal, annual recovery rates. Communities with ordinances saw local disposal rates decrease by as much as four to five percent.

Advance Disposal Fees for Tires and White Goods

The statewide disposal bans on tires and white goods have been effective for two reasons. First, they are clear, enforceable, statutory mandates; second, they have included funding. Thanks to this combination of strong mandates and advance disposal fees, North Carolina continues its successful diversion of whole tires and white goods from disposal.

As part of the disposal ban, counties must offer separate collection points for tires and white goods. It is easier to divert separated materials to recyclers. Advance disposal fees facilitated diversion by providing funds for local management programs. Funds are also used to develop recycling markets and clean up illegal dumpsites with these materials.

Used Tires. Before the Solid Waste Management Act passed in 1989, scrap tires were one of North Carolina's more serious solid waste management problems. Tire disposal posed large problems for tire dealers and a number of illegal dumps existed – some containing hundreds of thousands of scrap tires – which helped the spread of Asian Tiger mosquitoes.

Funds from the Scrap Tire Disposal Account were used to clear approximately 7.3 million tires from 353 sites and fund numerous countywide cleanups. County collection programs now receive approximately nine million scrap tires each year and recycle nearly 65 percent of that total.

There are currently 42 sites with approximately 133,000 tires due for cleanup, but additional sites continue to be discovered. Figures 3.3A and 3.3B show the growth in tires managed by North Carolina counties and the number of tire dumpsites cleaned between 1990 and 2000. These charts reflect the success of the tire program and show a decrease in illegal dumping.

Figure 3.3A. North Carolina's Used Tire Program

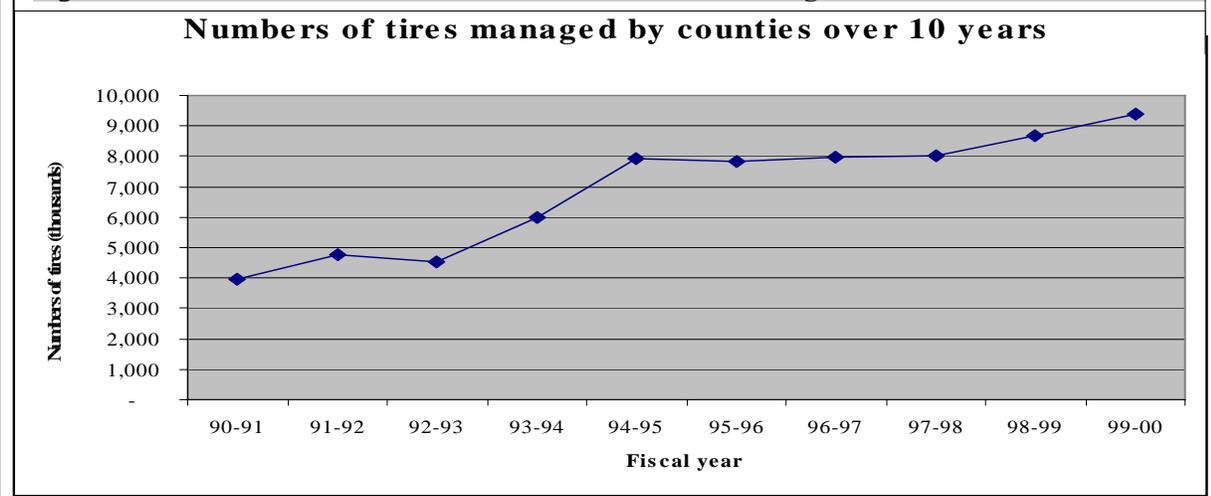


Figure 3.3B. Number of Tire Sites Cleaned Up in North Carolina				
Status	Number of Sites	Total Known Tires	% Total Tires	Cleared Tires
Cleaned Up	324	6,490,573	87	6,490,573
Under Cleanup	21	257,366	3	133,566
Countywide Cleanup	--	697,357	9	679,357
Remaining Sites	8	27,500	1	0
TOTAL	353	7,454,796	100%	7,303,496

White goods. White goods are another difficult-to-manage waste that was successfully addressed by advance disposal fees. Counties use the fees to support free disposal sites, clean up illegal dumpsites, and collect Freon gas from refrigerators and air conditioners. This program significantly reduced illegal dumping of white goods.

Medical Waste Management

The Solid Waste Management Act required the state to develop regulations to govern medical waste. In the late 1980s, medical waste became a national issue when it began washing up on beaches. In North Carolina, the health care industry had considerable influence on medical waste management levels. The regulations adopted require medical waste to be treated and processed. It also requires that certain medical wastes be rendered non-infectious before disposal and allows the use of approved alternative treatment technologies. North Carolina is a medical waste management leader with one of the nation's first microwave medical waste treatment processes and 14 approved alternative technologies.

Local Government Solid Waste Planning

The State Solid Waste Management Act requires that every North Carolina county and municipality either complete or participate in an approved a local solid waste management plan. The mandate gives communities the opportunity to assess their current solid waste management status and develop goals and programs for future improvement. Changes in the law allowed local governments to set individual waste reduction goals that were separate from the state's 40 percent per capita reduction goal. Local solid waste planning spurs communities to think long-term about solid waste management goals and objectives. Local plans play an essential role in meeting the state's goals.

Waste Reduction Grant Program

The Solid Waste Management Act established the Solid Waste Management Trust Fund to provide resources for a range of waste management activities. Research, recycling market development, public education, technical assistance and demonstration projects are just a few of its demonstrable successes.

After its initial appropriation of \$300,000 from the General Assembly, the Trust Fund largely depends on a fraction of the revenues generated by the tire and white goods advance disposal fees.³ On average, the Trust Fund dispenses \$500,000 through annual competitive grant cycles for waste reduction projects around the state. Other grant cycles were conducted over the years. Some have targeted specific commodities (e.g., plastics, paper and wood waste) and waste streams (e.g., C&D, industrial wastes); others have supported management methods (pay-as-you-throw). The Trust Fund helped finance successful research on projects ranging from illegal dumping to the use of discarded shingles in road building and mixed paper for animal bedding. Since it began, the Fund has awarded more than 300 grant and service contracts. The results are critical infrastructure, demonstrated new techniques, technologies and answers to pressing waste management research questions.

³ More specific information about the Trust Fund is provided by the Division of Pollution Prevention and Environmental Assistance in reports submitted to the General Assembly in January of each year.

Secondary, long-term and indirect benefits from funded projects make estimating the Trust Fund’s impact on disposal diversion efforts difficult to measure. However, analysis of a typical year indicates that at least 10,000 to 12,000 tons of solid waste are directly diverted through annual grant distributions. In the past few fiscal years, the Trust Fund targeted higher generation waste streams, such as wood waste, C&D and organics. Consequently, an estimated 40,000 tons or more of these wastes were diverted annually. The diversions are sustainable, permanent additions to the state’s waste reduction programs. The total estimated diversion achieved with Trust Fund grants is more than 200,000 tons. Without these diversions, the state waste stream would be two percent higher.

The Fund’s success lies in its ability to provide adequate resources to achieve solid waste management goals and objectives. Goals and objectives lose their effectiveness without funds to build programs or institute reduction measures.

Certification of Landfill Operators

The mandate requiring all landfill operators to be certified was a vital step toward professional landfill management. Training programs and continuing education provided by the North Carolina Chapter of the Solid Waste Association of North America have helped maintain high compliance levels with this requirement.

Positive Effects from Educational Efforts

Education and promotional campaigns have also affected levels of waste diversion. Public sector recycling programs are not successful without educational programs that help residents understand and participate in reduction activities. Figure 3.5 shows examples of past campaign effectiveness. It also shows that rejuvenating educational efforts would increase North Carolina’s recycling efforts.

Figure 3.5. Recovery from Curbside Recycling Programs With and Without Education Programs				
Local Government Recycling Program	# of Programs	Participation % (weighted avg.)	Pounds per Household Participating	Pounds per Household Served
Curbside w/ education	117	64	532.01	340.40
Curbside w/o education	145	53	433.83	230.11

CONCLUSION

The solid waste accomplishments share common threads of success. Mandates, as opposed to recommendations or voluntary directives, generate positive results. Funding availability, or a mechanism that generate funds, give programs the means to achieve planning goals and objectives. Public education and its resulting awareness raise participation in solid waste management goals and programs. Planning leads to well-defined goals and objectives and provides impacted parties ample time to prepare for difficult-to-implement policies and programs. Economic incentives spur innovation, entrepreneurship and leadership among public and private organizations that manage and reduce solid waste. Identifying solid waste management successes allows future strategic plans to build on effective measures while incorporating new approaches to address future challenges.