North Carolina

SOLID WASTE MANAGEMENT

Annual Report

July 1, 1998 - June 30, 1999

State of North Carolina
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Department of Environment and Natural Resources
Bill Holman, Secretary

Reduce, Reuse, Recycle

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This document, required by state law, is an annual report on the status of solid waste management in North Carolina. Information for this document was gathered from solid waste facility reports submitted by operators of permitted facilities (both public and private), and from annual solid waste management reports submitted by local governments.

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Introduction

Ten years ago, the North Carolina General Assembly adopted the *Solid Waste Management Act of 1989* (Act). This Act did four basic things regarding solid waste management:

- it established goals and policies;
- it established landfill bans on specific materials;
- it established new waste management programs; and
- it required reporting and planning for both state and local governments.

Each of these has been accomplished, to one degree or another, and indeed solid waste in North Carolina is far better managed than it was ten years ago. This Act, coupled with the regulatory requirements for more protective sanitary landfills (known as "Subtitle D" requirements or the "98 Rule") resulted in significant changes to and improvement in the management of solid waste in North Carolina.

Goals and policies

The Act focused on waste reduction; safe, protective management of waste being disposed; and the establishment of policies that lead to changes in North Carolina solid waste management. Some of the major results have been the growth of the recycling industry in North Carolina, implementation of recycling programs in industry, development of local government recycling and waste reduction programs, and "buy recycled" initiatives.

Sustaining and enhancing the efforts devoted to the waste reduction goals and policies has been difficult as solid waste management has improved and addressing solid waste management issues is no longer seen as an emergency. It has logically lost public attention as other environmental and public health issues have emerged and therefore, waste reduction has lost momentum. Though the state reduction goal will not be met, the goal has served as a strong incentive and has guided program development.

Landfill bans

Yard waste, used motor oil, white goods (appliances), untreated regulated medical waste, aluminum cans and whole scrap tires were banned from landfill disposal in the Act. These bans have been successful in reducing demand for landfill space, encouraging recycling, and reducing the risk to the environment and public health inherent in a landfill.

New programs

Some of the new programs developed since implementation of the Act include:

- management of scrap tires;
- clean-up of nuisance scrap tire sites;
- recycling in state and local governments;
- regulation of medical waste;
- establishment of compost requirements;
- training of landfill operators;
- environmental education; and
- use of recycled materials.

These programs have enhanced the state's public health, increased protection of the environment, and contributed to the conservation of resources and improvement of North Carolina's economy.

Reporting and planning

Prior to 1989 there was no reporting of solid waste activity in the state. Information available was often incorrect, anecdotal and highly unreliable. State and local solid waste management plans did not exist. This Annual Report marks the ninth report on solid waste management since passage of the Act and provides detailed information on waste disposal, recycling and other solid waste related activities. Local governments report annually on their waste management programs, are in the third year of their ten-year plans and are currently updating their plan through 2010. This report satisfies reporting requirements of the *Solid Waste Management Act of 1989*.

A state solid waste management plan was adopted in 1991. It was developed as a result of the Act and set forth goals and programs to guide solid waste management for the following ten years. The North Carolina Department of Environment and Natural Resources is in the process of updating the 1991 state plan using public forums, surveys and input from individuals involved in solid waste management. **This "bottom-up" planning approach is being used to establish solid waste management goals, direction and programs for the next ten-year period.** This approach was taken to solicit a large range of ideas, discussions and concerns from those directly involved in solid waste management across the state.

Part 1 Overview and Summary

The state of solid waste management in North Carolina for Fiscal Year 1998-99 can be summarized as follows:

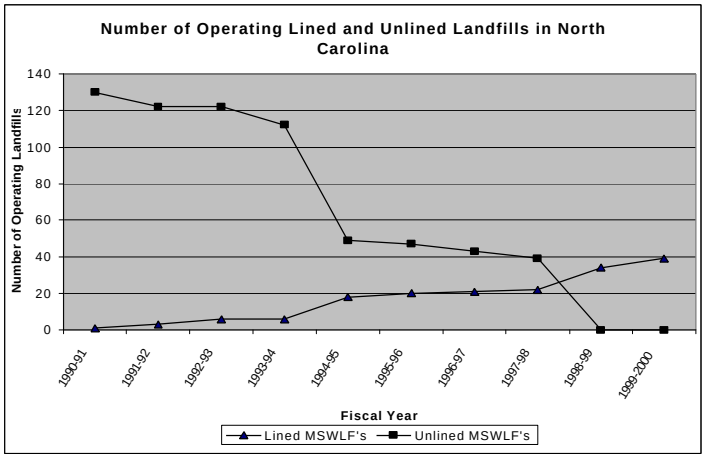
1. For the first time, an entire year's worth of municipal solid waste landfilled in North Carolina was placed in lined facilities.
2. Waste exports increased over the past fiscal year.
3. Recycling continued strong.
4. Waste generation continued to increase.
5. Increased landfill requirements resulted in solid waste management infrastructure changes.

By strengthening solid waste legislation and regulations the environment and public health of North Carolina has been enhanced and waste management techniques other than landfilling have gained in popularity. The consequences of these actions are implementation of new programs, development of new types of facilities, establishment of tip fees, increased private sector involvement in solid waste management, and additional options for recycling or disposal of a variety of materials.

Part 2 Regulated Waste Management Facilities & Activities

Municipal Solid Waste (MSW) Landfills

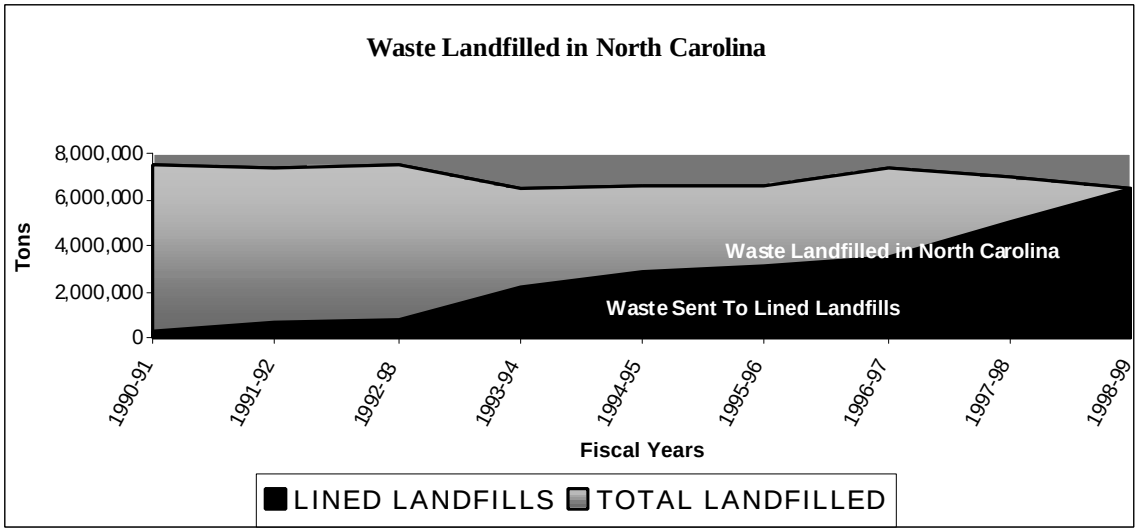
Since the January 1, 1998 implementation of the requirement that all municipal solid waste (MSW) landfills have landfill liners and leachate collection systems



(Subtitle D requirements), all non-compliant landfills across North Carolina have closed. As a result, 1998-99 was the first entire reporting year that all MSW landfilled in North Carolina was in lined landfills. In 1990 there were 130 unlined MSW landfills, all of which are now closed.

Currently, there are 39 lined and operating MSW landfills in North Carolina. This transition achieved the primary goal in the initial state plan of having an adequate capacity of environmentally protective solid waste disposal facilities to meet the needs of the citizens of North Carolina.

In Fiscal Year 1990-91, 338,845 tons or 4.8% of MSW was disposed in lined landfills. During the Fiscal Year 1998-99, 7,161,455 tons of MSW, or 100%, was disposed in lined facilities. Although the chart appears to reflect that solid waste has decreased over the past ten years, the chart is not reflective of waste being exported to lined out of state landfills. **The reduction in number of landfills in the state and increase in tons managed in more protective landfills across the state is one of the more dramatic changes in North Carolina solid waste management in the last ten years.**



As the number of landfills decreased and the volume of wastes sent to lined landfills increased several other changes to North Carolina waste occurred. One of the major changes is the movement of construction and demolition (C & D) waste out of MSW landfills into facilities dedicated to C & D waste.

Transfer Stations: Waste Imports and Exports

As fewer landfills for MSW exist, transfer stations have become a prominent part of North Carolina's solid waste infrastructure. These facilities receive waste from a variety of sources including individual homeowners and businesses, local governments, and private waste hauling companies. At the transfer station these wastes are consolidated into larger truckloads (typically a tractor-trailer with cargo loads of 20 tons) that are more suitable for transporting greater distances. The City of Durham, for example, has the state's largest transfer station volume. The city loads waste for transfer 90 miles to a landfill in Brunswick County, Virginia.

Currently, there are 64 transfer stations operating in North Carolina. Municipal solid waste tonnages or exports from these facilities have increased significantly over the past fiscal year. In

Fiscal Year 1998-99, 2,825,120 tons of waste was received at North Carolina transfer stations, or 31% of the waste landfilled (MSW and C&D).

Waste Imports

Waste imports to North Carolina facilities are tracked through the annual facility reporting process. In Fiscal Year 1998-99, 90,956 tons of waste was imported to North Carolina. This represented a decrease over Fiscal Year 1997-98's 101,509 tons and continues the downturn from a high of 103,510 tons in Fiscal Year 1996-97. Virginia exported 73,317 tons to North Carolina. This waste was primarily from the Danville area and was disposed of in the Piedmont Sanitary Landfill in Forsyth County.

Waste Exports

Waste exports are tracked through North Carolina transfer station reports and by voluntary reporting of out-of-state facilities. In Fiscal Year 1998-99, 1,166,875 tons, or 13% of North Carolina waste was exported out of state. If only municipal solid waste (no C&D or industrial waste) is considered, this figure represents 15% of total municipal solid waste disposed in Fiscal Year 1998-99. Landfills in Georgia, South Carolina, Tennessee, and Virginia were the recipients of North Carolina's exported waste.

There was an increase of 536,012 tons from the previous year's 630,863 tons. Part of the increase can be attributed to the City of Durham transferring a full year of waste in Fiscal Year 1998-99 (FY 1997-98 represented only six months).

Construction and Demolition (C & D) Landfills

Prior to the lined landfill requirements C & D waste was primarily disposed in the same landfill as municipal solid waste. As more restrictive requirements were implemented for municipal solid waste there was an increase in separate C & D facilities. Though this waste may still be disposed of in lined landfills, it primarily goes to C & D facilities. These facilities receive 16% of the State's waste stream (MSW & C & D). While there is no historical base on which to analyze trends in C & D waste disposal, it is clear that this material is an important segment of the State's waste stream. Though not a part of this current report, it is obvious that the impact of Hurricane Floyd in September 1999 will have a significant impact on the State's infrastructure of C & D facilities.

Incinerators

Since Fiscal Year 1995-96 there has been one operational municipal solid waste incinerator in North Carolina, the New Hanover County Waste-to-Energy facility. The tonnages at this facility had a slight decrease from a high of 133,439 tons in Fiscal Year 1995-96 to 127,589 in Fiscal Year 1998-99. Waste incinerated achieves an 80% reduction in volume and a similar weight reduction. The waste incinerated in New Hanover is used for energy production. Approximately 6,000 British Thermal Units (BTU's) are produced per pound of solid waste. This equates to one-half that of coal.

Industrial Landfills

In Fiscal Year 1998-99 the 21 private industrial landfills in North Carolina disposed of 1,693,235 tons of solid waste. These facilities are primarily associated with power plants, paper mills or a particular industrial plant. This tonnage is not counted by the state when calculating the state per capita disposal rate.

Part 3 Consequences of Increased Landfill Requirements

Tipping fees

In addition to transfer stations, fewer total number of landfills, C & D landfills separate from MSW landfills and previously mentioned changes in solid waste management, there have been other changes to solid waste management in the past ten years. One of the consequences of the higher standards for landfill construction and operation was the implementation of the tip fee for landfill use. Prior to 1989, most landfills did not have scales to weigh the solid waste entering the facility and did not charge a fee for disposal of waste. A local government usually owned and operated the landfill and funding was from general revenues. As costs associated with higher standards increased and pressure was put on the local government general fund from many different sources, solid waste services were among those government services which moved from general fund support to a form of self-supporting operations frequently referred to as an "enterprise fund".

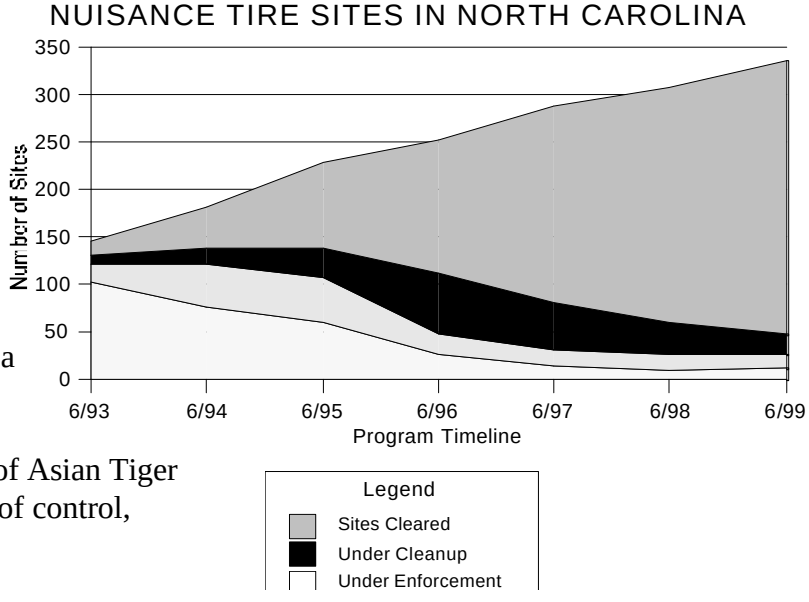
Landfill tip fees in North Carolina in 1998-99 averaged approximately $31 per ton. This average is somewhat misleading and should not be accepted as an accurate reflection of landfill costs. Some form of public funds support many of the local government landfills. Large corporations that are vertically integrated with waste hauling operations and transfer station facilities primarily own the privately held landfills in North Carolina. Additionally, these corporations have multiple sources of revenue and therefore the tip fee may not be an accurate reflection of costs.

Private Sector Landfills

An additional consequence of increased landfill standards was the movement from publicly-operated solid waste facilities toward privately-owned or operated facilities. This phenomenon of publicly-operated landfills occurred during the 1990's. This was not only related to solid waste but to many other local government activities, nor was it confined to North Carolina. An additional consequence of this has been the movement of waste across state borders. Presently three large landfills located in neighboring states accept significant amounts of North Carolina solid waste.

Part 4 Consequences of the Solid Waste Management Act of 1989

A feature of the 1989 solid waste management legislation was the establishment of a variety of waste management programs. The cumulative impact while, difficult to measure, has certainly improved the public health and environment of the state.

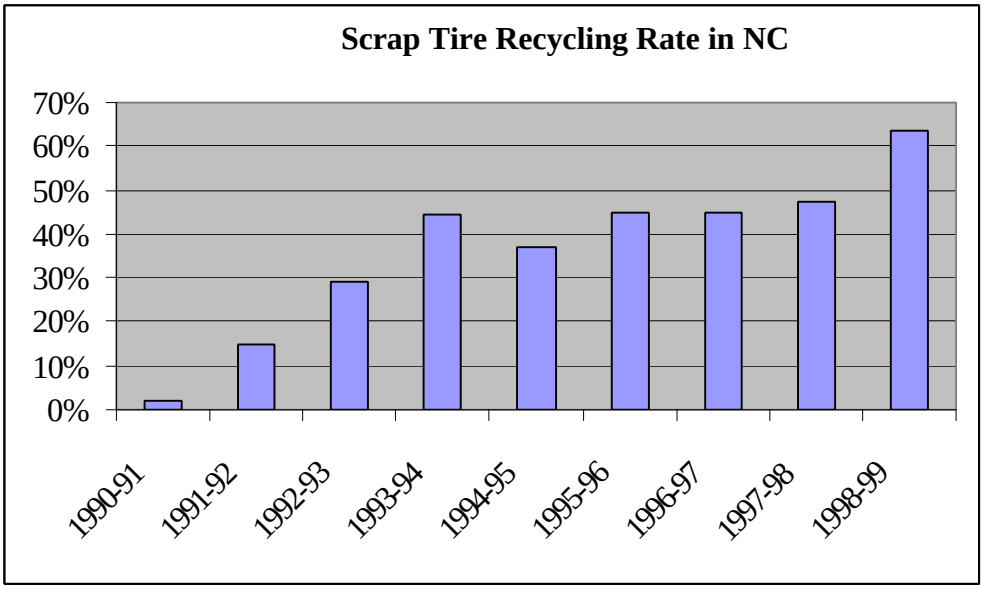


Elimination of Scrap Tire Sites

A significant accomplishment has been the virtual elimination of nuisance scrap tire sites. These sites ranged in size from a few hundred to over a million scrap tires and represented a major public health and environmental threat due to the presence of Asian Tiger Mosquitoes and the potential to burn out of control,

producing cancer-causing smoke. The clean up of these sites, funded by an advance disposal fee on new tire sales, has been aided by use of prison inmate work details. The clean-up program has a statutory provision for cost recovery which has enabled the state to recover costs associated with clean up for some of these sites. This cost recovery provision has prompted a number of known site clean-ups by responsible parties and the state has additional evidence of sites being cleaned up that were not part of the state inventory of sites.

Scrap Tire Management



Scrap tires present unique disposal and environmental problems. Landfill disposal of whole scrap tires was banned in 1989 as part of the Scrap Tire Management Act. This required more cutting and processing of scrap tires, which has led to significant increases in tire recycling. Landfill disposal of whole tires is not appropriate because they use large amounts of space, cannot be compacted, and tend to "float" to the surface due to vibration and the presence of trapped gas.

Recycling

Recycling of disposed tires has increased from about two percent in 1990-91 to over 60% in Fiscal Year 1998-99. The largest use of recycled tires is in civil engineering mainly in construction of septic tank drainfields in South Carolina. There has been some use as tire-derived fuel and crumb rubber, but the tonnage is much lower.

Scrap Tire Monofills

Processing at scrap tire monofills has increased over 50% since Fiscal Year 1993-94. During last fiscal year 127,098 tons of tires were received at the two disposal sites in North Carolina. Of this amount 30% was from out-of-state.

Medical Waste Management

Comprehensive medical waste management regulations were enacted in 1989 to cover packaging, labeling, storage, transporting, and treatment of medical waste. The regulations define regulated medical waste and designate appropriate types of treatment for various types of medical waste.

Incineration was widely used at hospitals to treat regulated medical waste prior to 1990. During the 1990's most hospitals closed their incinerators as a result of increasingly stringent air quality regulations. Most hospitals have begun to send waste off-site for treatment, but some have shown interest in alternatives to incineration for on-site treatment of their waste.

A number of innovative technologies have been developed for treating medical waste. This includes use of microwave energy, infra-red heat, and plasma arc. Several steam sterilization

technologies have also been approved which use treatment parameters other than those specified in the regulations.
The Solid Waste Section has approved ten innovative technologies for use in North Carolina. Microwave treatment, used by Forsyth Hospital in Winston-Salem and Moore Regional Hospital in Pinehurst, is the only new technology to be used by North Carolina hospitals. SafeWaste uses microwave technology on mobile units to treat medical waste on-site at various hospitals.

Approved Alternative Technologies

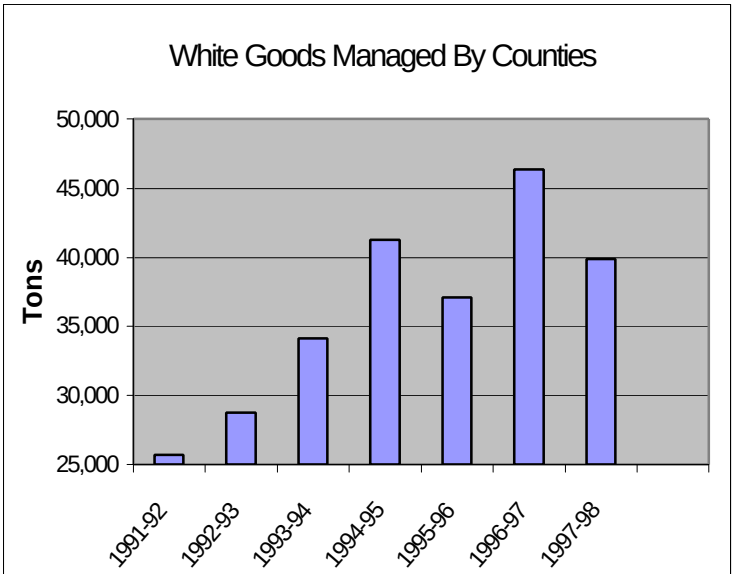
COMPANY	EQUIPMENT NAME	TYPE OF TECHNOLOGY
Spintech, Inc	TAPS	Thermal treatment
Winfield Environ Corp	Winfield Condor	Shred/Chemical treatment (chlorine dioxide)
Mediclean Tech, Inc	IWP-1000	Shred/Chemical (chlorine dioxide)
Ecomed Company	Ecomed	Shred/Chemical (iodophor)
Medical Safetec, Inc.	Medical Safetec	Shred/Chemical (sodium hypochlorite)
Medifor-X Corporation	Dispoz-All 2000	Infra-red heat treatment
Isolyzer Company	Sharps Disposal System	Chemically treat/solidify
D.O.C.C. Inc.	Demolyzer	Thermal treatment
Steris Corporation	Steris 20/EcoCycle 10	Shred/Chemical sterilant (peracetic acid)
MedAway, International	MedAway 1	Dry heat sterilization
Sterile Technology Industries, Inc.		Shred/Heat/Chemical (sodium hypochlorite)
EWMC		"Reverse polymerization"

White Goods Management

"White goods" are defined in GS 130A-290 (a)(44) as: "refrigerators, ranges, water heaters, freezers, unit air conditioners, washing machines, dishwashers, and clothes dryers, and other similar domestic and commercial large appliances." Discarded white goods generally have lower market value than other forms of scrap metals, and environmental concerns about chlorofluorocarbon refrigerants (CFCs) in some appliances have made white goods management more difficult.

Prior to 1989, proper management of disposed white goods received low priority, and appliances were frequently dumped in woodlands, streams, and down road banks. The presence of dumped white goods often encouraged dumping of other types of wastes, such as tires, shingles, and household garbage.

White goods were banned from landfill disposal in 1989 to encourage recycling and proper management. More



comprehensive white goods management laws were enacted in 1993, which included an advance disposal fee to cover the cost of white goods management. The advance disposal fee and restriction on local governments charging a white goods disposal fee will be in effect through June 30, 2001.

A major accomplishment of the white goods management program has been to drastically reduce illegal dumping of white goods by requiring counties to provide collection sites and to receive white goods at no cost to the disposer. The white goods program has also provided funds and equipment for counties to clean up existing white goods dumps.

Septage

Domestic septage from septic tanks and portable toilet waste are managed in North Carolina through land application and by discharges at wastewater treatment plants. Grease trap pumpings are also managed through land application, by wastewater treatment plants, and sometimes by recycling.

In Fiscal Year 1998-99, there were 162 permitted land application sites in use in 54 counties. Wastewater plants in approximately 77 counties allowed some form of septage to be discharged and treated. Twelve counties (Avery, Beaufort, Chowan, Clay, Granville, Hoke, Hyde, Jones, Madison, New Hanover, Perquimans and Yancey) have no approved means of managing the septage produced in those counties.

Many of the wastewater treatment plants that allow the discharge of domestic septage and portable toilet waste do not accept grease trap pumpings. There are four companies in North Carolina that will collect and recycle or render the grease trap pumpings and one company that will compost it.

Composting

In the state solid waste management hierarchy composting is preferred over the practice of landfilling, the least desirable management technique. The division continues to use the rules allowing compost pilot or demonstration projects to encourage composting. These rules enable interested parties to implement and study composting programs and techniques with minimal initial expense and paperwork.

Composting in North Carolina is a viable but under-used method of managing wastes. The compost process will breakdown organic wastes to a relatively stable and pathogen-free material that can be used as a soil amendment or as a source of nutrients.

Most of the material that is composted today in North Carolina is classified as yard waste. Yard waste includes silvicultural wastes and untreated and unpainted wood wastes. This is a direct result of the state's ban on placing yard waste in MSW landfills. There are 17 permitted yard waste facilities in the state and over 100 smaller notification sites. The notification sites are generally used by smaller towns, are less than two acres in size, and process less than 6000 cubic yards of waste in a three-month period.

There are eleven permitted compost facilities and ten permitted compost pilot or demonstration projects in the state that receive materials in addition to yard waste. The facilities are primarily small and receive less than 1,000 cubic yards of material per three-month period. Among the materials composed at these facilities are restaurant waste, food processing waste, animal waste,

source separated mixed paper, fish and seafood processing waste, hatchery waste, agricultural waste and waste engineered wood products.

Land Application

The division supports the beneficial reuse of waste products through approval of projects for the land application of wastes such as tobacco dust, wood ash, and whey. These wastes can provide valuable nutrients or act as soil liming agents.

Nutrient management planning is required on all sites that receive waste for beneficial reuse. The purpose of a nutrient management plan is to ensure that nutrients are applied to a site in quantities and during a season that the crop will benefit. Nitrogen is normally the nutrient that determines the application rate. There were nine permits allowing generators to land apply waste following certain best management practices in Fiscal Year 1998-99.

Part 5 Waste Reduction Efforts

Annual Reports received from local governments provide data on source reduction, recycling, and composting activities statewide, as well as other aspects of solid waste management. In addition to this local data, the *1998 NC Markets Assessment* report completed by the Division of Pollution Prevention and Environmental Assistance (DPPEA) provides supplementary information on the overall recycling picture for North Carolina.

Trends in County and Municipal Source Reduction and Reuse Programs

The number of local government reuse and source reduction programs remained relatively constant in Fiscal Year 1998-99. The number of counties and municipalities with source reduction or reuse programs dropped from 123 to 110 during Fiscal Year 1998-99. This drop can most likely be attributed to improved reporting by local governments.

Program Type	FY 1993-94	FY 1994-95	FY 1995-96	FY 1996-97	FY 1997-98	FY 1998-99
Source Reduction Programs						
Backyard Composting	90	92	70	82	81	53
Grass Cycling	52	49	40	41	43	41
Xeriscaping	10	12	12	11	13	12
Junk Mail Reduction	16	20	40	56	55	57
Enviroshopping	35	35	27	36	35	35
Promotion of Non-toxics	29	38	34	39	35	30
Other	14	11	10	9	1	5
Reuse Programs						
Swap Shops	N/A	N/A	13	10	17	23
Paint Exchange	12	17	22	28	25	27
Waste Exchange	14	18	13	11	14	8
Pallet Exchange	N/A	N/A	N/A	N/A	N/A	7
Other	N/A	N/A	N/A	4	6	15
Local Governments with Programs	**N/A**	**N/A**	**104**	**116**	**123**	**110**

The most noticeable change in source reduction programs was the drop in backyard composting programs, which fell from 81 in Fiscal Year 1997-98 to 53 in Fiscal Year 1998-99. Previous questions on the Local Annual Report form inquiring about backyard composting programs were

clarified in Fiscal Year 1998-99, which resulted in more accurate reporting. Local governments with backyard composting programs distributed over 13,000 backyard composting bins since programs began to appear in the early 1990's. **At an average of 275 pounds per bin, these distributions result in an estimated 1788 tons of solid waste diverted from disposal facilities per year.**

Swap shop programs continued to increase at a steady pace in Fiscal Year 1998-99. Six new programs were added last year bringing a total of 23 programs now in operation. The popularity of these reuse programs is expected to continue to grow in the future.

Tonnages Diverted or Recovered

The table below presents tonnages of recyclable materials collected by local governments from Fiscal Year 1991-92 through Fiscal Year 1998-99. Fiscal Year 1998-99 data indicates a 6.75% increase in recovery over Fiscal Year 1997-98. This increase to 960,000 tons was driven mainly by a rise in the recovery of paper, organics and "other" materials. The "other" category had the largest percentage increase (77%) and is reflective of increased local government activity in construction and demolition debris recycling.

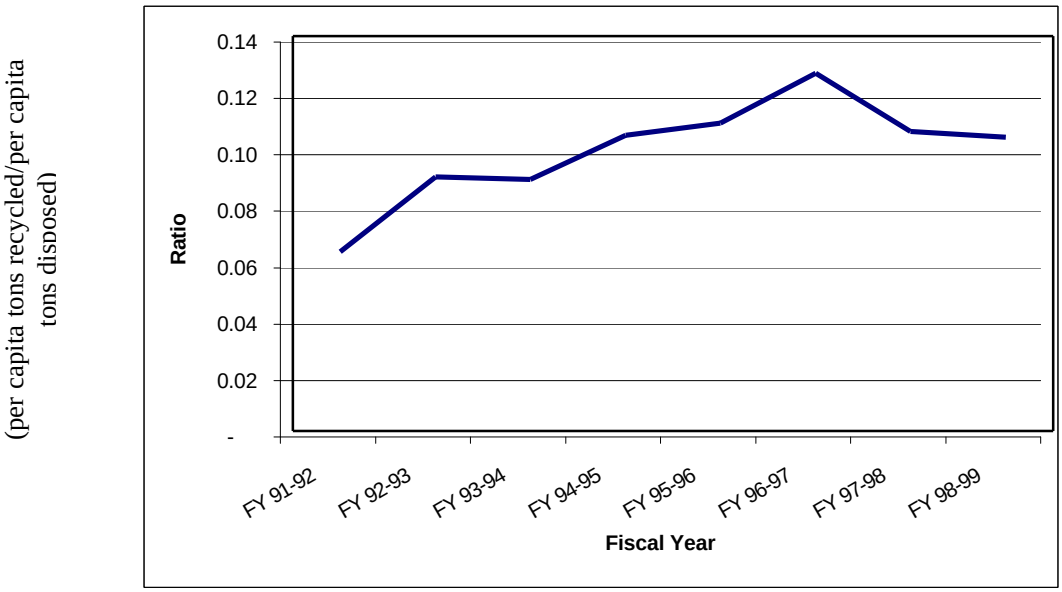
Glass recovery fell just over 4% in Fiscal Year 1998-99, expanding this downward trend to three years. The recovery of metals also experienced a decrease in Fiscal Year 1998-99. Unlike the steady decrease in glass each year, the decrease in metal recovery is likely the result of weak markets for steel experienced during the Fiscal Year 1998-99. Special wastes and plastics recovery each experienced small increases in recovery during the year.

Material	**FY 91-92**	**FY 92-93**	**FY 93-94**	**FY 94-95**	**FY 95-96**	**FY 96-97**	**FY 97-98**	**FY 98-99**
Total Paper	98,729	151,676	164,806	185,270	212,577	228,025	216,121	233,339
Total Glass	25,997	32,611	37,537	38,088	49,601	44,978	43,449	41,623
Total Plastics	6,128	9,264	9,797	12,339	16,253	13,699	14,399	14,835
Total Metal*	34,148	44,302	51,468	59,483	65,977	77,252	81,262	77,564
Total Organics**	267,428	378,516	350,142	495,034	498,583	640,410	504,554	525,033
Special Wastes***	1,265	1,715	2,106	2,466	3,212	3,230	3,527	3,817
Other	N/A	4,272	16,387	5,987	333	12,762	35,977	63,794
Totals	**433,695**	**622,356**	**632,243**	**798,667**	**846,536**	**1,020,356**	**899,290**	**960,005**
Per Capita Recovery (lbs.)	**128.54**	**182.17**	**182.00**	**226.19**	**235.59**	**279.19**	**242.03**	**254.40**
Recovery Ratio (Recycling:Disposal)	**0.06**	**0.09**	**0.09**	**0.10**	**0.11**	**0.13**	**0.11**	**0.10**

* Includes white goods, aluminum cans, steel cans, and other metals.
** Includes yards waste, pallets, and wood waste.
*** Includes used oil, oil filters, antifreeze and batteries.

While local government recovery increased 6.75% in Fiscal Year 1998-99, disposal in North Carolina increased by 6.91%. The chart below shows the ratio of local government recovery to disposal in the state. **It is clear from this figure that local governments are no longer keeping pace with increasing disposal**. Although local government recovery programs made steady

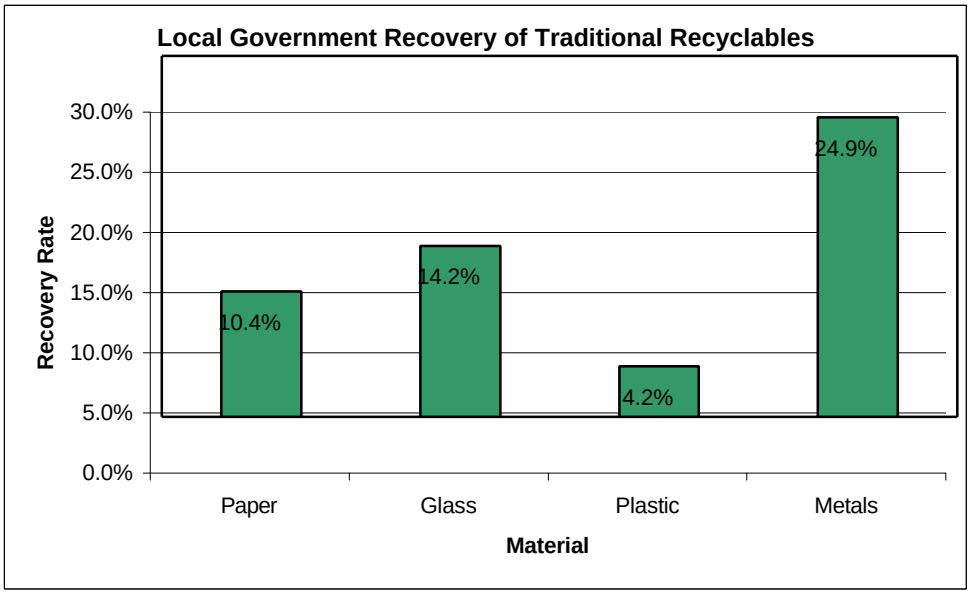
ground until Fiscal Year 1996-97, the past two years can be characterized by a steady decline in the recovery ratio.



Room For Improvement

Although local governments have made great strides in recycling since the early 1990's there is room for improvement. Metals enjoy the highest recovery rate of traditional recyclables at approximately 25 %. The higher recovery rate for metals is likely due to the state's advanced disposal fee for "white goods" (e.g., refrigerators) which places a $3.00 tax on the purchase of white goods to help ensure they are recovered.

Glass, paper and plastic recovery rates are 14%, 10% and 4%, respectively. Although it is fair to assume that no local government can recover 100% of any material due to private recovery efforts and waste streams that are outside the control of local governments, it is also fair to assume that through the use of comprehensive recovery programs, local governments could quickly double the recovery rates provided in the chart below. Such comprehensive approaches include program expansions, disposal diversion ordinances, pay as you throw, and increased public education.



Trends in County and Municipal Recycling Programs

Since the early-1990's, local governments have provided a consistent level of recycling services. The numbers of various kinds of recovery programs have held steady, giving the vast majority of North Carolina citizens' dependable access to recycling opportunities.

For counties, the recovery method of choice remained "drop-off" programs. Ninety-three counties offer that service as opposed to eighteen counties offering curbside collection. By contrast, as in years past, the majority of municipal programs were curbside (261) rather than drop-off (90). Fourteen counties and 45 municipalities provided both curbside and drop-off programs. In addition to traditional service to households, over 40% of local governments offered commercial businesses access to curbside and drop-off programs. Less than 15% of the local governments extended curbside and drop-off to industrial users. Sixteen curbside and thirteen drop-off programs were added in Fiscal Year 1998-99, while two small municipalities cut curbside service and three others discontinued all recycling programs. Local government reliance on mixed waste processing recovery remained low with twelve programs in the State.

The cities of Kannapolis and Fayetteville are the only municipalities with over 30,000 residents that provide no recycling services of any kind. Robeson County is the only county with no public recycling program.

Local governments continued to go beyond offering traditional services in Fiscal Year 1998-99 by operating 30 school recycling programs; and providing 20 recycling "drives"; and 19 specific commercial-industrial collection programs. In all, communities offered 147 "other" programs in Fiscal Year 1998-99 to expand recovery efforts.

The table below shows the tonnage collected through the major types of recovery programs in Fiscal Year 1998-99. Both curbside and drop-off tonnages increased from the previous year and remained slightly weighted to curbside. Most significantly, tonnage collected in "other" programs increased 33% over Fiscal Year 1997-98 levels, accounting for over a quarter of all public sector recovery. As curbside and drop-off programs maintain their patterns of slow growth, the implementation of "other" programs (e.g., C & D or school recycling) may become increasingly important in expanding recycling.

Program Type	Total Tons	Percentage of Recovery
Curbside	162,450	37%
Drop-off	155,163	35%
Mixed Waste Processing	8,184	2%
Other Programs	115,308	26%

In conducting their recycling programs, local governments relied heavily on private contractors to operate curbside collections – less than a quarter of all communities conduct their own curbside pick-ups. However, 54% of drop-off services were more likely to be operated directly with local government employees.

Although popular interest in recycling and participation rates have lagged in the past few years, local government maintenance of public recycling services provides a strong foundation for increasing recovery efforts in the future.

Typical Programs

To develop an understanding of local government activity in waste reduction it is important to identify what constitutes the average waste reduction program in North Carolina. It is also important to highlight the communities that have developed outstanding programs and use such programs as models for other local governments. The following section outlines what an average county or municipal waste reduction program encompasses and provides a glimpse of what some communities have done to develop outstanding programs.

The average county waste reduction program in North Carolina is still quite **limited in scope**. The average county has a drop-off recycling program and one "other" recycling program, but no reuse or source reduction program (including backyard composting). The average county has a mulching or composting program, but does not have a local disposal diversion ordinance and does not use pay as you throw.

The average county also has not expanded recycling programs beyond the most traditional materials. Most counties recycle all three colors of glass; PET and HDPE plastic bottles; aluminum and steel cans; white goods; old newspapers and corrugated cardboard. Expansion into less traditional materials, such as mixed paper, textiles or construction and demolition debris is quite limited.

In general, the average North Carolina county has implemented a basic recycling program, but has gone no further. The table below provides a visual account of the average county waste reduction program. The average local government uses less than half of the program elements listed. **To meet local waste reduction goals, it is imperative that counties and municipalities expand existing recycling programs and add programs** outlined in the table below. The average per capita recovery for county programs is 88.17 pounds per person and ranges from zero pounds per person to 585 pounds per person. Although these per capita rates exclude municipal recovery and county compost and mulching programs, it is a good indicator of the level (or lack thereof) of activity at the county level.

Program	Yes/No	Program	Yes/No
Backyard Composting	No	Local Disposal Ban	No
Source Reduction	No	Pay As You Throw	No
Reuse Program	No	Recycles Oil	**Yes**
Recycling Program	**Yes**	Recycles Oil Filters	No
Curbside	No	Recycles Antifreeze	No
Drop-off	**Yes**	Recycles Batteries	**Yes**
One Other Program	**Yes**	HHW Collection	No
Two Other Programs	No	Mulching/Composting	**Yes**
Education Program	**Yes**	C&D Reuse/Recycling	No

Exemplary Programs

Two counties that have gone beyond the norm and implemented exemplary waste reduction programs are Orange County (Orange Community Recycling) and Craven County. Both counties accomplished this by addressing multiple waste generation sectors (e.g., commercial, construction and demolition) and by assuming a strong role in waste reduction in both incorporated and unincorporated areas of the county. This comprehensive approach, along with a high level of

services provided, has resulted in Orange and Craven County achieving, respectively, 35% and 52% waste reduction rates. As could be expected, both counties have recovery rates higher than the state average. Craven County recovers approximately 585 pounds per capita and Orange County recovers over 197 pounds per capita.

Programs or services provided by Orange and Craven Counties are identified below. Both counties offer many more outlets for waste reduction than the average county. The aspects that truly set these programs apart from others in North Carolina are Orange County's **aggressive commercial recycling program**, Craven County's use of **pay as you throw** to provide direct economic incentives to reduce waste, and the **recovery of construction and demolition debris (C&D)** by both counties.

Program	**Yes/No**		**Program**	**Yes/No**	
	Orange	Craven		Orange	Craven
Backyard Composting	**Yes**	**Yes**	Local Disposal Ban	**Yes**	No
Source Reduction	**Yes**	**Yes**	Pay As You Throw	No	**Yes**
Reuse Program	**Yes**	**Yes**	Recycles Oil	**Yes**	**Yes**
Recycling Program	**Yes**	**Yes**	Recycles Oil Filters	**Yes**	No
Curbside	**Yes**	**Yes**	Recycles Antifreeze	**Yes**	**Yes**
Drop-off	**Yes**	**Yes**	Recycles Batteries	**Yes**	**Yes**
One Other Program	**Yes**	No	HHW Collection	**Yes**	No
Two Other Programs	**Yes**	No	Mulching/Composting	**Yes**	**Yes**
Education Program	**Yes**	**Yes**	C&D Reuse/Recycling	**Yes**	**Yes**

Although the presence of county-run programs within municipal programs makes it difficult to identify what the average municipal waste reduction program looks like, it is fair to assume that the largest 15 municipal programs maintain enough autonomy from county programs to be characterized independently.

NC's Fifteen Largest Municipalities

Municipality	**July 1, 1998 Population**
Charlotte	521,478
Raleigh	269,211
Greensboro	205,260
Winston-Salem	173,524
Durham	162,273
Fayetteville	121,338
Cary	86,613
High Point	74,213
Jacksonville	74,213
Asheville	68,294
Wilmington	65,058
Gastonia	62,077
Rocky Mount	57,837
Greenville	56,853
Goldsboro	47,814

These larger cities should have the resources available to develop strong programs and to provide leadership to smaller communities in North Carolina.

An analysis of the 15 largest municipalities found that they rarely implemented anything beyond basic recycling programs. In fact, the only attributes common to at least half of these cities are curbside and drop-off recycling, an education program, a mulching or composting program and a source reduction program. It should be noted that of the 15 largest municipalities in the state, one community, the City of Fayetteville, currently does not operate a recycling program.

To be true waste reduction leaders in the state, these communities need to implement additional programs that expand the waste reduction opportunities available. However, less than half of the 15 largest cities have backyard composting programs or "other" recycling programs. It should be noted that although these 15 municipalities likely generate large quantities of construction and demolition debris, only one is operating a C&D reuse or recycling program. None of the 15 cities in the analysis are using pay-as-you throw to provide incentives for reduction.

More than half of the 15 largest communities in the state are recovering less than the statewide municipal recovery average of 109 pounds per capita for traditional recyclables. **Leadership from large cities in North Carolina is truly limited**. Most municipalities in North Carolina should be able to recover over 150 pounds per capita. Of the 15 cities analyzed, only Greensboro, Cary and High Point have managed to recover over 150 pounds per capita. If the remaining cities in the analysis were able to meet this target it would result in a 47,000 ton, or 11%, increase in recovery. North Carolina municipalities should follow the examples provided by Greensboro, Cary and High Point in expanding programs to comprehensively address waste reduction.

Education and Participation

Of the 409 local governments with recycling programs in North Carolina, 50%, or 203 communities, indicated having an education program to inform citizens of program requirements and the benefits of waste reduction. The table below shows that providing education to the public is critical for local governments to operate efficient and effective waste reduction programs. **Participation is 21% higher in municipal curbside programs that provide education to the public.** Furthermore, these programs recover an average of **110 pounds more** per household served. Local governments without education programs are missing opportunities to maximize the efficiency of their waste reduction programs.

Local Government	Number 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

The lack of strong educational efforts is a clear detriment to higher waste diversion. The average participation rate for all local government recycling programs is 45% (56 % for curbside and 32% for drop-off). To improve participation rates local governments should pursue options such as increased education; economic incentives for reduction (e.g., pay as you throw); disposal diversion ordinances and locally mandated recycling. An increase in the average statewide participation rate from 45% to 70% or 75% would equate to an estimated **200,000 ton increase in diversion**. Although an increase in participation would result in a dramatic increase in recovery, the expansion of existing programs into new materials (e.g., mixed paper) also has the potential to substantially increase recovery.

Yard Waste

Local government yard waste management data for Fiscal Year 1998-99 is presented below. As in years past, yard waste diversion represented over half of all waste diversion accomplished by county and municipal governments. The table shows a slight increase in the total amount of diversion, but also a very large increase in the amount of actual yard waste disposed in C & D landfills by local governments (the state yard waste disposal ban applies to MSW landfills only – yard waste may still be disposed in C&D and LCID [land-clearing & inert debris landfills]). Over 85% of this increase in yard waste disposed occurred in 4 counties: Buncombe, Cumberland, Wake, and Wayne. The large increase in yard waste materials sent to "other public facilities" is in part reflected in increases in the other categories listed.

Destination of Materials	Number of Local Govts using destination	FY 98-99 Total tons by destination	Change from FY 97-98
End Users (direct delivery)	85	79,966	+ 6%
Local Government mulch/ compost facility	192	435,117	+ 5%
TOTAL DISPOSAL DIVERSION		515,083*	+ 5%
Other Public Facility	77	91,526	+ 96%
Private Facility	27	75,394	+ 6%
C & D Landfill	46	224,420	+ 114%
LCID Landfill	51	59,064	- 4%
YARD WASTE TOTALS		873,961**	+ 20%

* Tonnages under the row for Total Disposal Diversion not included in diversion because of data redundancy, uncertainty about actual disposition of the waste, and actual disposal of noted tonnages.

** Yard Waste Totals exclude tonnages for "other public facilities" because it is assumed these tons were captured under other categories.

Construction and Demolition Waste

Construction and demolition (C&D) debris recycling continues to be an area that needs further growth. As much as a third of disposed waste in North Carolina can be characterized as construction and demolition debris. In 1998-99 local government C&D debris recovery increased to 52,000 tons as compared to approximately 25,000 tons in Fiscal Year 1997-98. This increase represents improved reporting as well as a realization by some local governments that C&D debris recovery is critical to meeting both local and state waste reduction goals.

Thirty local governments reported operating a C&D recycling or salvage program during Fiscal Year 1998-99. Although most of these programs are small in scale, they represent the building blocks for larger programs and provide strong waste reduction examples to other communities. It should be noted that **four of the five counties with the highest per capita recovery rates are operating C&D recycling or salvage programs**.

The recovery of C&D debris is still in its infancy in North Carolina and developing an infrastructure should be addressed from both the public and the private sector. The Division of Pollution Prevention & Environmental Assistance (DPPEA) is attempting to address infrastructure development through grants devoted to expanding C&D recovery efforts. It is likely that grants, combined with an increased interest in C&D recovery, will result in a steady increase in recovery programs over the next few years.

Special Waste

Local government management of used motor oil, oil filters, antifreeze, lead acid batteries, and household hazardous waste (HHW) is presented in the table below. For the second year in a row,

used oil collections enjoyed a healthy gain, although DPPEA estimates there may still be as many as 4,000,000 gallons of "do-it-yourselfer" motor oil still not being captured. A factor perhaps explaining the gallon increase is the 11% increase in the number of public oil collection sites from the previous year. Oil filter collections increased slightly last year, although clearly these programs are still a novelty among local governments. The number of HHW programs dropped slightly, but the tonnage collected increased 55% while the aggregate average cost dropped 14% from the previous year. Antifreeze and lead acid battery collection efforts appear steady.

	FY 95-96	FY 96-97	FY 97-98	FY 98-99
Used Motor Oil				
Number of local programs	118	122	115	127
Gallons collected	601,744	575,859	646,646	736,436
Oil Filters				
Number of local programs	N/A	N/A	8	11
Tons collected	N/A	N/A	~6	6.61
Antifreeze				
Number of local programs	59	48	46	46
Gallons collected	18,859	9,026	8,770	9,568
Lead Acid Batteries				
Number of local programs	85	90	84	79
Number collected	50,458	59,112	61,118	58,237
Household Hazardous Waste				
Number of programs	19	20	20	17
Number of permanent sites	8	7	9	10
Tons collected	389.95	653.24	657.29	1,017.78
Total cost reported	N/A	$1,402,485 ($2,147/ton)	$1,301,638 (1,875/ton)	$1,672,271 ($1,643/ton)

Conversions: Oil, 1 gal = 7.4 lbs.; Antifreeze, 1 gal = 8.42 lbs.; Lead Acid Battery, 1 battery = 35.9 lbs.

Solid Waste Collection

The table below represents the sectors for which local governments either collect or contract for the collection of solid waste. The sectors served by local government remained relatively constant in Fiscal Year 1998-99. Local governments continue to view residential solid waste collection as their core service, although about half also provide collection services for the commercial sector. Only a small percentage of local governments provided collection services for the industrial sector.

	Residential	**Commercial**	**Industrial**
Municipalities	399 (76%)	295 (57%)	100 (19%)
Counties	82 (82%)	26 (26%)	19 (19%)

To meet the need for such services, some local governments develop franchise agreements to regulate and provide for certain aspects of solid waste collection. Franchises are most commonly used to ensure a solid waste collection infrastructure is in-place for commercial and industrial generators. However, in Fiscal Year 1998-99 three percent of local governments also relied solely on franchise agreements for the collection of residential solid waste.

In contrast to solid waste collection, it should be noted that some local governments provide or contract for the provision of recycling services outside of the residential sector. Although this is not yet a common practice, since 25% are providing curbside commercial recycling, local

governments should be encouraged to **expand into commercial and industrial recycling wherever possible**. In addition to improving diversion rates, expansion into commercial and industrial recycling can also improve efficiency of existing programs and develop the economies of scale necessary to add new materials and expand local processing capabilities.

Recycling Market Prices

Prices paid for recyclable materials indicate the relative health of recycling markets. Among the many sources of information on market prices, the NC Recycling Business Assistance Center (RBAC) conducts a quarterly survey of processors in the eastern, central, and western areas of the state. The survey is published on the back page of RBAC's newsletter, *Recycling Works*. The prices for the three regions were averaged for four quarters and are presented below.

Of note in Fiscal Year 1998-99 was the precipitous drop in steel can market prices, reflecting the effects of the Asian economic recession and the related drastic oversupply of scrap in US markets. Prices for plastics also failed to rise above relatively low levels last year, also a product of the Asian crisis and competition from increases in virgin resin production. Aluminum prices, on the other hand, rose steadily and paper prices enjoyed a healthy increase toward the end of the fiscal year. Glass prices remained remarkably consistent throughout the year.

During fall and winter of 1999-2000, steel can prices started to rebound and aluminum prices continued moving upward. Paper prices remained the highest since the dramatic price increases of 1995. Plastic markets, however, remained depressed.

Material	August 1998	November 1998	February 1999	May 1999
Aluminum Cans, lbs. Loose	$.39	$.42	$.43	$.45
Steel Cans, gross tons, baled	$67	$42	$3	$11
PETE, lbs., baled	$.12	$.08	$.06	$.06
HDPE, lbs., baled	$.11	$.06	$.06	$.07
Newsprint, ton baled	$28	$32	$28	$38
Corrugated, ton baled	$46	$48	$25	$76
Sorted office white paper, ton baled	$120	$127	$127	$140
Mixed paper, ton baled	$12.5	$10	$10	$12.5
Clear glass, ton	$36	$36	$36	$36
Brown glass, ton	$26	$26	$26	$25
Green glass, ton	$8	$8	$8	$7

It has become commonplace for “the lack of markets” to be blamed for the stagnation in local recycling programs in North Carolina. A review of the market prices over the past two fiscal years does indicate that there are indeed fluctuations in material prices, reflecting the volatility that is common in any commodity market. **At no time, however, have market prices indicated a lack of demand for recyclable materials**. On the contrary, over the past two Annual Report periods, prices for some of the leading materials collected by local governments have remained remarkably steady. Prices for newspaper, for example, never went below $28 per ton, occasionally spiking to the high $30's and low $40's. Aluminum cans only once went below 40 cents/pound. Even with the collapse of steel can prices in Fiscal Year 1998-99, steel cans continued to be successfully collected and marketed by North Carolina local governments.

Other Notable Events in Waste Reduction during Fiscal Year 1998-99

North Carolina took an important step in support of recycling markets at the end of Fiscal Year 1998-99 when the State Division of Purchase and Contracts in the Department of Administration

followed the federal government lead and removed virgin paper from many of the state term purchase contracts. In its place, "dual purpose" paper (copy paper) with 30% post-consumer content and numerous other recycled paper grades were made available to all state and local agencies (who may buy from the state term contract) at prices competitive with virgin paper. Similar efforts to "close the recycling loop" were also implemented for other products under Governor Jim Hunt's "NC Project Green" environmental sustainability initiative for state agencies.

North Carolina also considerably improved its newsprint recycling law in the 1998-99 General Assembly session. Negotiations between newsprint publishers and the state resulted in maintenance of the high recycled content standards for newspapers in North Carolina but also added new incentives for publishers to help expand recovery of newspapers and magazines statewide. In the spirit of the law, the Raleigh *News and Observer* (N&O) has steadily worked to increase its recycling services, offering local governments in the eastern Piedmont no-cost programs for newspaper and magazine collection. As part of its recycling efforts, the N&O backhauls loads of 100% post-consumer newsprint into North Carolina from mills in Georgia.

One other recycling measure of note was briefly considered by the General Assembly during the 1998-99 session: Senate Bill 1000 to place an advanced disposal fee on the sale of motor oil and use the proceeds to increase the collection of used motor oil, oil filters, and oil bottles statewide. Although the bill was not brought up for committee action, its sponsor, Senator Fountain Odom, indicated the bill would be reintroduced in the 1999-2000 "short session." It is anticipated that the bill would dramatically improve the used motor oil recycling infrastructure in North Carolina, as it has already done in South Carolina (which passed a similar law in 1991).

One of the most encouraging signs for recycling in North Carolina is the persistent level of entrepreneurial activity in the collection, processing, and end-use of previously disposed materials. In Fiscal Year 1998-99, numerous private companies either started or expanded operations that resulted in real diversion of materials from disposal facilities and conversion of those materials into "value-added" products. Perhaps most promising, recycling businesses began to target some of the largest and most problematic waste streams that have had a relatively weak recycling infrastructure, such as construction and demolition wastes, organics (e.g., food wastes), and electronics (e.g., computers and cathode ray tubes). To encourage these developments, the state, in partnership with the Community Center for Self Help in Durham, established a Recycling Revolving Loan Fund to improve access to capital by recycling companies.

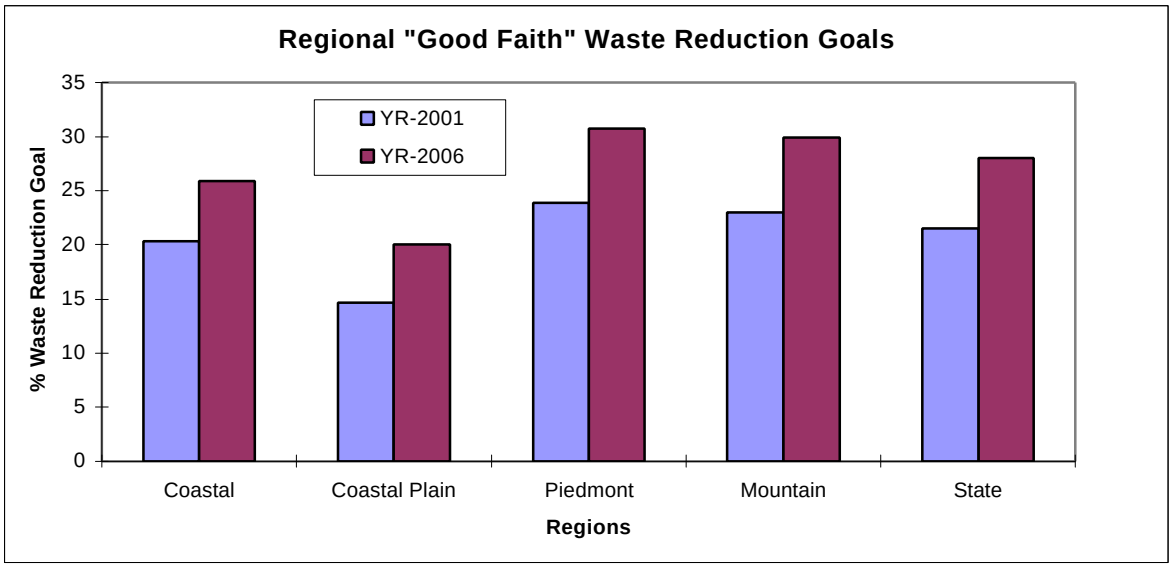
Waste reduction still faces many challenges in North Carolina. Low tipping fees continue to hamper recycling efforts, providing an incentive for waste generators to continue to dispose of recyclable materials in landfills. Some areas of the state have also struggled with the loss or lack of local recycling processing centers, which can provide a strong and necessary foundation for increasing recycling collections. Low disposal costs and gaps in local and regional infrastructures will need to be addressed if the state hopes to turn around it's trend toward increasing disposal of solid wastes.

Part 6 Waste Reduction Goals

North Carolina's "Act to Improve the Management of Solid Waste"[1] set a statewide waste reduction goal of 40% on a per capita basis. All local governments in North Carolina are required

[1] This legislation was originally passed in 1989, but was amended in 1991 and 1995.

by the Act to be a part of a local ten-year comprehensive solid waste management plan. General Statute 130A-309.09A requires that in addition to addressing other waste issues, each plan:



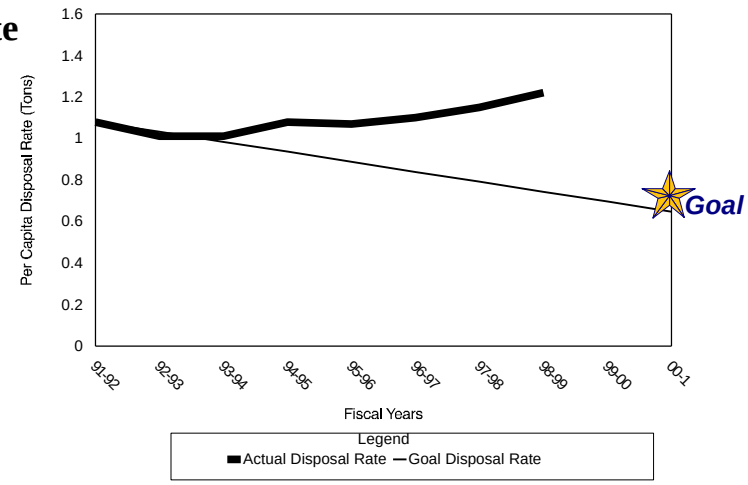
> *Include a goal for the reduction of municipal solid waste on a per capita basis by 30 June 2001 and a goal for the further reduction of municipal solid waste by 30 June 2006. The solid waste reduction goals shall be determined by the unit or units of local government that prepare the plan, and* ***shall be determined so as to assist the State, to the maximum extent practical, to achieve the State's forty percent (40%) municipal solid waste reduction goal…***

In 1998 the Solid Waste Section completed analysis of local government solid waste management plans developed in compliance with this law. A comparison of the goals in local plans to the state goal (using an average weighted relative to population) shows that if each of the local plans were successful in achieving their chosen goals, a 27% reduction could be achieved. This "good faith" effort from local government falls far short of the state's own 40% reduction goal. However, this goal if achieved would be a remarkable accomplishment.

As the local governments update their individual plans during Fiscal Year 1999-2000 the goals are expected to be less aggressive than the past plans.

Part 7 Assessment of State Waste Reduction Progress

The state measures waste reduction by comparing the amount of waste each person disposed (per capita disposal rate) in the base year (Fiscal Year 1991-92) to the per capita rate in the current year.



Formula: Total Tons Disposed ¸ Population = Per Capita Disposal Rate

The per capita rate for the Fiscal Year 1991-92 base year was 1.01 tons. Each year is compared to the base year to measure progress toward the goal. When new programs to reduce waste were implemented in 1991-93 the per capita disposal rate decreased slightly. This also compares to a downturn in the state and national economy. However, the disposal rate continues to climb as Fiscal Year 1998-99 shows a record per capita disposal rate of 1.22 tons.

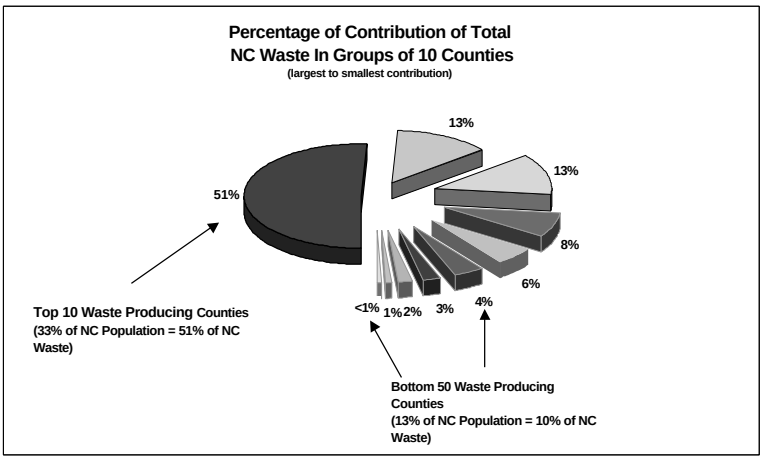
Fiscal Years	Tons Disposed	Population	Per Capita Disposal Rate	Percent Waste Reduction from Base Year 1991-92
1998-99	9,214,323	7,544,360	1.22	-13%
1997-98	8,493,921	7.431.161	1.15	-6%
1996-97	*8,041,734.00 (adjusted)*	7,323,085	1.10	-2%
1996-97	8,741,733.62	7,323,085	1.20	-11%
1995-96	7,722,794.78	7,194,238	1.07	0%
1994-95	7,624,144.85	7,064,470	1.08	0%
1993-94	7,038,505.34	6,949,095	1.01	6%
1992-93	6,890,818.15	6,836,977	1.01	6%
1991-92	*7,257,428.09 (managed)*	6,739,959	1.08 (Base Year Rate)	
1991-92	6,822,890.35	6,739,959	1.01	
1990-91	7,161,455.00	6,648,689	1.07	

* The 1996-97 fiscal year is adjusted by subtracting 700,000, the tonnage estimated to have been created by Hurricanes Bertha and Fran.

** The tons managed figure was determined by adding the total amount of municipal solid waste disposed in landfills and incinerators to the amount of waste managed through recycling, composting and mulching efforts of local governments in FY 1991-92. Recycling, composting and mulching were added to the tons disposed in recognition of the fact that some local governments had begun waste reduction prior to 1991.

Some of the factors influencing the high waste disposal rate and failure to make progress toward the waste reduction goal include: **changes in the dynamics of solid waste management since 1991** (loss of flow control by local governments, alternative technologies not developing); **lack of commitment** (it was "just a goal"- not a mandate, few resources were devoted to it); and **economics** (landfills remain an inexpensive option, a strong economy encourages waste).

In Fiscal Year 1998-99 ten of the state's most populated and urban counties held 33% of the state's population but generated 51% of the state's waste. Conversely, 1/2 of North Carolina's counties had 13% of the state's population and produced 10% of the waste landfilled or incinerated during the same fiscal year.



These ten counties also produced 56% of the retail sales; 54% percent of total authorized construction, and had a 28% higher average median household income than the remaining counties[2]. The per capita disposal rate was 1.55 for the ten counties listed below. This per capita disposal rate is 33% above the state rate. **If North Carolina is to make progress towards the waste reduction goal, these counties must have a greater impact on the state's disposal rate**. If these ten counties reduced their per capita disposal rate to the state rate (1.22), the state per capita would drop to 1.09.

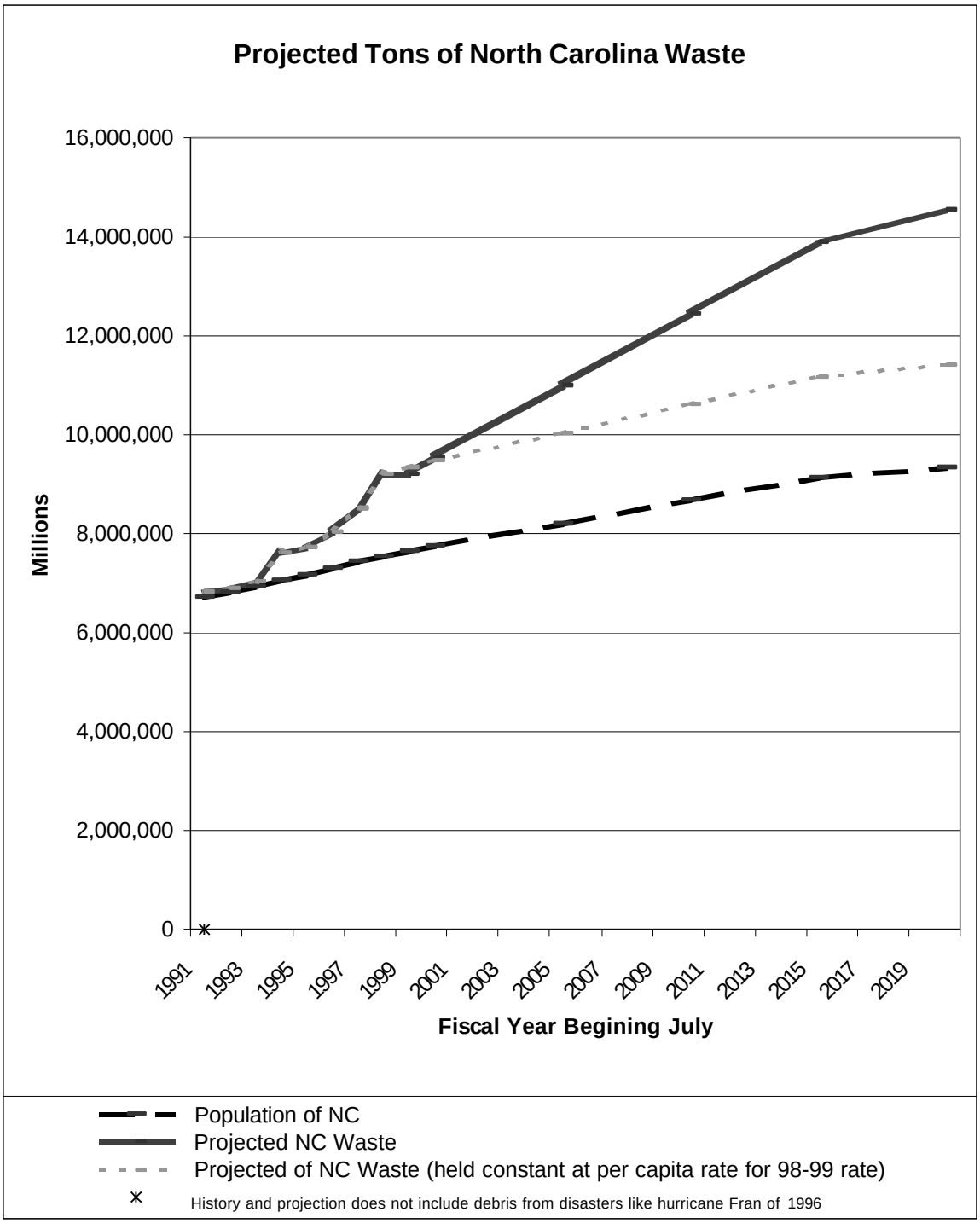
Counties listed below are projected to increase in population an average rate of 13.4% over the next ten years. To offset population increases new programs and initiatives, such as composting or C & D recycling, need to be implemented, especially in these ten counties.

County	Population July 1998	Tons Disposed FY 98-99	Tons (%) of Total Disposed	Cumulative Tons Disposed	Cumulative Tons (%) Disposed
MECKLENBURG	624,464.00	1,214,764.14	13.18%	1,214,764.14	13%
WAKE	575,696.00	1,001,578.21	10.87%	2,216,342.35	24%
GUILFORD	388,519.00	525,915.86	5.71%	2,742,258.21	30%
FORSYTH	290,790.00	445,673.58	4.84%	3,187,931.79	35%
CUMBERLAND	295,053.00	366,067.27	3.97%	3,553,999.06	39%
NEW HANOVER	149,975.00	266,602.19	2.89%	3,820,601.25	41%
GASTON	181,028.00	250,699.95	2.72%	4,071,301.20	44%
BUNCOMBE	192,459.00	224,805.74	2.44%	4,296,106.94	47%
DURHAM	200,219.00	219,208.80	2.38%	4,515,315.74	49%
IREDELL	111,624.00	167,214.33	1.81%	4,682,530.07	51%
TOTAL	**3,011,825 (33% of Total NC Population)**	**4,682,529.07**	**50.81%**		

Part 8 Forecasting North Carolina Waste Disposal

Achieving the 40% state waste reduction goal by the year 2001 would equate to a reduction in the current per capita disposal rate of 1.22 tons to .64 tons per person. The projected population of 7,734,401 for 2000, which is one year prior to 2001, would necessitate a reduction of over 4,500,000 tons of waste currently being disposed of by landfilling or incineration. This waste would need to be managed either through recycling, composting/mulching, or reuse. This goal is not attainable given the factors indicated above. However, by virtue of having the goal, **attention has been focused on waste reduction and has lead to a lower waste disposal rate than without such a goal**.

[2] calculated from data at NC Dept of Commerce and NC Dept of Labor Web sites



Future waste disposal quantities can be forecasted through linear regression analysis with records back to Fiscal Year 1990-91. This analysis shows the dramatic effect on an increasing per capita rate coupled with population growth. At this rate, **North Carolina would need nearly twice the existing landfill capacity over the next 20 years than exists today.**

Holding the rate constant at 1.22 tons per person per year (Fiscal Year 1998-99 rate) greatly reduces the need for additional disposal capacity. However, keeping the rate constant may be difficult. Note: using this same regression analysis to forecast from Fiscal Year 1990-91 to Fiscal Year 1998-99 was accurate to within five percent of the actual amount disposed.

Part 9 Additional Information

Additional solid waste information can be found in the following reports:

Annual Report on State Agency Waste Reduction and Buy-Recycled Activities
White Goods Account Annual Report
Scrap Tire Disposal Account Annual Report
Scrap Tire Management Report
Solid Waste Trust Fund Annual Report
DPPEA State Quick Waste Stream Assessments

For additional documents or more information please contact:

Division of Waste Management, Solid Waste Section
(919) 733-0692, telephone (919) 733-4810, fax
http://wastenot.enr.state.nc.us

Division of Pollution Prevention and Environmental Assistance
(919) 733-6500, telephone (919) 715-6794, fax
http://www.p2pays.org