

**A RESOLUTION RECEIVING THE STATUS REPORT ON SOLID WASTE
MANAGEMENT AND RECYCLING
Resolution No. 152/2001-02**

WHEREAS, the Carrboro Board of Aldermen seeks ample opportunities to review policy and regulations.

NOW, THEREFORE BE IT RESOLVED by the Carrboro Board of Aldermen that the Aldermen has reviewed the report on solid waste management and recycling provided by the Planning Staff.

BE IT FURTHER RESOLVED by the Carrboro Board of Aldermen that the Aldermen receive the report.

This is the 28TH day of May in the year 2002.

TOWARD ZERO WASTE



A Report to the Board of Aldermen - May 28, 2002

Town of Carrboro
Planning Department

Status Report:



Solid Waste and Recycling in Carrboro

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Status Report: Solid Waste and Recycling in Carrboro

Description:

The Town of Carrboro 2002 –2003 Action Agenda directs the Planning Department to prepare a report analyzing Carrboro's Recycling Program, and if necessary, produce a scope of services for a consultant study.

This report is prepared as a background paper that describes the current status of the programs for single family and multi-family residential, and commercial solid waste collection and recycling in Carrboro. This paper identifies opportunities for further improvements in the recycling program through comparisons with other jurisdictions. This report further lays out the groundwork for specific recommendations about Carrboro's solid waste management system and provides the basis for evaluating change options to ensure Carrboro meets or exceeds expectations based on commitments within the Comprehensive Solid Waste Management Plan. From this starting point of this report, Town Staff can chart a course to intersect the goals and objectives set out by the Board in its subsequent Action Agenda item, and move the Town further down the path *toward zero waste*.

Background: The North Carolina Legal Framework

In 1989, the North Carolina General Assembly adopted SB (Senate Bill) 111, an "Act to Improve the Management of Solid Waste," which dramatically changed the course of solid waste management in the State. The Act set goals and policies, established new programs, banned certain materials from landfills and incinerators, and mandated planning and reporting requirements. The Act was significantly amended by HB 1109 in 1991 and in 1996 by HB 859. The following excerpts and summaries lay out the elements of the law related to waste reduction requirements.

Solid Waste Management Hierarchy (G.S. 130A-309.04 (a))

A waste management hierarchy refers to a policy decision to prioritize various waste management techniques according to criteria related to environmental and human health protection and resource conservation. The North Carolina General Assembly established the following hierarchy as a standard of conduct for the entire state.

1. Waste Reduction at the Source
2. Recycling and Reuse
3. Composting
4. Incineration with Energy Recovery
5. Incineration for Volume Reduction
6. Landfill Disposal

The 40% Statewide Waste Reduction Goal

In the 1991 amendments to the Solid Waste Management Act of 1989 (G.S. 130A-309.04(c)) -also known as Senate Bill 111), the General Assembly established a statewide goal to reduce the disposal of waste in landfills by 40% by June 30, 2001. This landfill disposal reduction was to be measured on a per capita basis from 1991 as the baseline.

Local goals:

- ✓ Good faith effort to achieve state's 40% goal
- ✓ Shall develop a goal for waste reduction by June 30, 2001
- ✓ Shall develop a goal for further waste reduction by 2006

Local Planning (G.S. 130A-309.09A (b) required

- ✓ Counties must prepare solid waste management plans consistent with the State plan.
- ✓ Municipalities must cooperate with preparation of county plans *or* prepare their own.

Excerpt from the Statute:

Each plan shall be updated at least every three years. In order to assure compliance with this subsection, each unit of local government shall provide the Department with a copy of its current plan upon request by the Department. Each plan shall:

- (1) Evaluate the solid waste stream in the geographic area covered by the plan.
- (2) 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 as set out in G.S. 130A-309.04(c).
- (3) Be designed to achieve the solid waste reduction goals established by the plan.
- (4) Include a description of the process by which the plan was developed, including provisions for public participation in the development of the plan.
- (5) Include an assessment of current programs and a description of intended actions with respect to the following solid waste management methods:
 - a. Reduction at the source.
 - b. Collection.
 - c. Recycling and reuse.
 - d. Composting and mulching.
 - e. Incineration with energy recovery.
 - f. Incineration without energy recovery.
 - g. Transfer outside the geographic area covered by the plan.
 - h. Disposal.
- (6) Include an assessment of current programs and a description of intended actions with respect to:
 - a. Education with the community and through the schools.
 - b. Management of special wastes.
 - c. Prevention of illegal disposal and management of litter.
 - d. Purchase of recycled materials and products manufactured with recycled materials.
- (7) Include a description and assessment of the full cost of solid waste management, including the costs of collection, disposal, waste reduction, and other programs, and of the methods of financing those costs.
- (8) Consider the use of facilities and other resources for management of solid waste that may be available through private enterprise.

Waste Reduction Required

§ 130A-309.09B. Local government waste reduction programs.

(a) Each unit of local government shall establish and maintain a solid waste reduction program that will enable the unit of local government to meet the local solid waste reduction goals established pursuant to G.S. 130A-309.09A(b)(2).

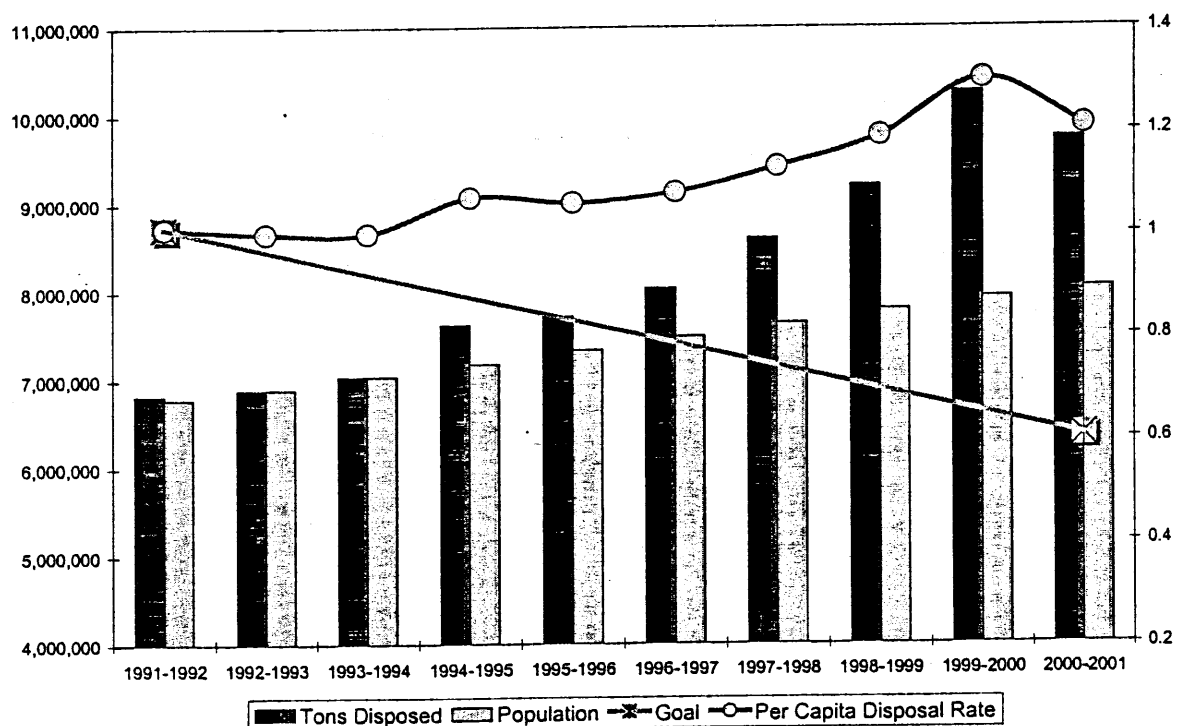
While local governments are the primary target of expressed goals and mandates in the law, every generator of solid waste (i.e., every household, school, church, hospital, business, industry, community, etc.) plays an important role in helping the city/county in which they are located to meet the state's 40-percent reduction goal.

Background: North Carolina Progress Toward the Goal

How has North Carolina Done Toward Meeting the Waste Reduction Goal?

The goal was not met. The latest solid-waste management annual report, released by the N.C. Department of Environment and Natural Resources, shows that solid-waste disposal grew from 6.8 million tons in fiscal year 1991-92 to 9.75 million tons in fiscal year 2000-01. In that same time, the population increased from 6.78 million to 8.05 million. Recycling has helped stop the disposal rate from growing even faster, the report said. It recommended that legislators find ways to further reduce waste. The report shows that North Carolina missed its 10-year goal of reducing per-capita disposal by 40 percent by June 30, 2001. Instead, waste disposal increased from 1.01 tons per capita in fiscal year 1991-92 to 1.21 tons per capita by June 30 of last year (Figure 1).

Figure 1: Statewide Progress Toward the Goal



According to the chart below (Table 1), per capita rates decreased, and waste reduction rates, which have been negative since 1996 (meaning an increase in waste rather than reduction) improved slightly (less negative) over the past fiscal year (2000-2001). The decrease in disposal and per capita rates in that reporting year may be attributed to several factors. Previous year's economic growth slowed in the 2000-2001 fiscal year. This slow-down resulted in less consumer and businesses expenditures, and hence less waste. Additionally, there was no major natural disaster, such as Hurricane Fran or Floyd. Natural disasters dramatically increase waste disposal.

Table 1: North Carolina Solid Waste Disposal Rate
 [From the 2000-2001 North Carolina Solid Waste Management Annual Report]

Fiscal Years	Tons Disposed	Population	Per Capita Disposal Rate	Waste Reduction from Base Year
2000-2001	9,752,510	8,049,313	1.21	-13 %
1999-2000	(adjusted*) 9,937,355	7,938,062	1.26	-18 %
1999-2000	10,267,137	7,938,062	1.30	-22 %
1998-1999	9,214,323	7,797,501	1.19	-12 %
1997-1998	8,607,578	7,645,512	1.13	-6 %
1996-1997	(adjusted*) 8,041,734	7,490,812	1.08	-1 %
1996-1997	8,741,727	7,490,812	1.17	-10 %
1995-1996	7,722,795	7,336,228	1.06	1 %
1994-1995	7,624,144	7,180,525	1.07	0 %
1993-1994	7,038,505	7,036,927	1.00	7 %
1992-1993	6,890,818	6,892,673	1.00	7 %
1991-1992	(managed**) 7,257,428	6,781,321	1.07	(Base Year Rate)

*The 1996-1997 and 1999-2000 fiscal years are adjusted by subtracting the tonnage estimated to have been created by Hurricanes Bertha, Fran (1996-1997) and Floyd (1999-2000).

**The tons managed figure used for the baseline was determined by adding the total amount of municipal solid waste disposed in landfills and incinerators (6,822,890) to the amount of waste managed through local governments' recycling, composting and mulching efforts in fiscal year 1991-1992. This was done in recognition of the fact that some local governments had begun waste reduction before 1991.

Looking at this data, the obvious question is why has there been such a severe backslide. The State has offered theories to explain the increase in per capita waste disposal in the face of the goal of a 40 percent reduction.

- ◆ Alternative technologies that were envisioned never materialized
- ◆ In the absence of flow control, private firms entered the market and moved waste to private facilities that earn a profit by maximizing the amount of waste disposed over the shortest practical time frame.
- ◆ Public and political commitment to waste reduction, while maintained in some communities, waned statewide.
- ◆ The market price of landfilling did not increase to the levels projected.
- ◆ The decade of the nineties saw a healthy economy and economic growth with 30% increase in per capita retail sales and subsequent increased waste generation, and an increase in new construction, which resulted in increased waste contribution from that sector from 22 percent of the waste stream to 29 percent.

Background: North Carolina's Plan for the Future

Prompted by the poor statewide performance and a recognized need to revise the State Solid Waste Management Plan, DENR began a planning process in the summer of 1999 to determine where solid waste management efforts should be directed for the next decade. A Draft State Solid Waste Management Plan framework emerged from a systematic planning process that emphasized public participation.

The Draft is actually a synthesis of recurrent goals that emerged from a series of forums and surveys coupled with a compilation of the actions presumed necessary to achieve those goals. The following is a draft version of the three primary goals.

Draft Recommendations for Goals and Actions of a Draft State Solid Waste Management Plan April 5, 2000

The three goals identified in the planning process are:

- Goal Number 1: By 2010 improve landfill technology and reduce landfill waste disposal to further secure the long-term protection of the environment.**
- Goal Number 2: By 2010 reduce waste by 10% per person from 1998-1999 levels.**
- Goal Number 3: By 2010 reduce litter and illegal disposal by 50% from 2000-2001 levels.**

Goal number two "responds to the concern that too much material is being disposed of in landfills and that more should be recycled or composted." Since the focus of this report is waste reduction, goal number two is highlighted here and the key actions resulting from the public planning process are outlined below (for details on all three goals, see Appendix 3).

Key actions to accomplish goal two: By 2010 reduce waste by 10% per person from 1998-1999 levels.

- Require pay-as-you-throw for municipalities with a population over 25,000 by 2005
- Require "buy recycled" programs from state and local governments
- Enact a bottle bill
- Establish a statewide tip fee
- Require state institutions to compost organic waste
- Incorporate recycling into disaster debris management plans
- Establish a \$5.00 per unit ADF on electronics such as computers, copiers, televisions
- Ban landfill disposal of electronics by 2004
- Ban disposal of cardboard from counties with populations over 100,000 by 2004
- Ban disposal of clean wood waste

Background: How has Orange County Done?

Orange County established a goal of 45 percent reduction by 2001 in the County's Solid Waste Management Plan. The County has experienced an estimated 26 percent population growth since the baseline year of 91-92, while at the same time realizing approximately a 35 percent reduction in per capita waste disposal at the landfill.

The County Solid Waste Management Department explained this reduction in an April 8, 2002 memo to be attributable to the following factors:

- ◆ UNC power plant coal ash diverted from the landfill (about 30,000 tons per year)
- ◆ County-wide, zero tolerance ban on landfill disposal of corrugated cardboard (effective March 1, 1996)
- ◆ Commitment, with increased investment in county-wide recycling programs
- ◆ Expanded diversion of organics
- ◆ Focused effort on reducing construction and demolition debris
- ◆ Continuous public education and outreach on recycling and solid waste issues

Orange County: The Plan

Plan Framework for Mixed Municipal Solid Waste:

- Waste Reduction: The Plan Framework lists 5 regulatory or economic strategies for reducing the amount of waste presented for disposal. The County alone can set landfill fees. The other options are available to Carrboro for implementation at some level
 1. Public education - more targeted information
 2. Differential Landfill Fees - encourages increased separation for recycling
 3. Non-economic incentives - regulatory requirements that influence behaviors
 4. Mandatory Recycling / material bans - requires that certain materials be recycled and hence prohibited from waste containers
 5. Unit-based user fees - also known as "pay as you throw." A properly set fee can reduce the amount of waste disposed and provide an incentive for waste reduction and recycling.
- Recyclables Collection - The plan calls for *status quo* for residential collection. The most notable change proposed to the system is the initiation of universal commercial recyclables collection. This sector provides the largest untapped source of recyclable materials.
- Processing - The plan proposes the establishment of a materials recovery facility (MRF) to better handle processing of increased volume of materials and to be in a better position for marketing materials.

Plan Framework for Construction and Demolition Waste

Orange County estimates that one third of the waste landfilled in the County is construction and demolition (C&D) debris with as much as seventy percent of it

recyclable (wood, metals, inert debris, some plastics, fixtures). In December 2001, the County passed a "Regulated Recyclable Material Ordinance" requiring all construction, demolition and renovation projects to obtain a waste permit and file a waste management and recycling plan for the project. The County has been in discussion with Carrboro and the other municipalities to coordinate implementation of the ordinance later in 2002.

Orange County: Waste Management Scheme

Orange County Solid Waste Department and Orange Regional Landfill

The Orange County Solid Waste Management Department, formerly part of the Town of Chapel Hill, was transferred to the County on April 17, 2000. The Department is charged with operating the Orange Regional Landfill, operating Orange Community Recycling and providing county-wide comprehensive solid waste planning. The County operates solid waste services as an enterprise fund, with costs paid primarily from tipping fees charged at the landfill and other miscellaneous revenues (Table 2). Until recently, the revenues received by the department have been sufficient to cover current expenses, and the several reserve funds operated by the department used to cover property acquisition, equipment replacement, and landfill closure and post-closure care.

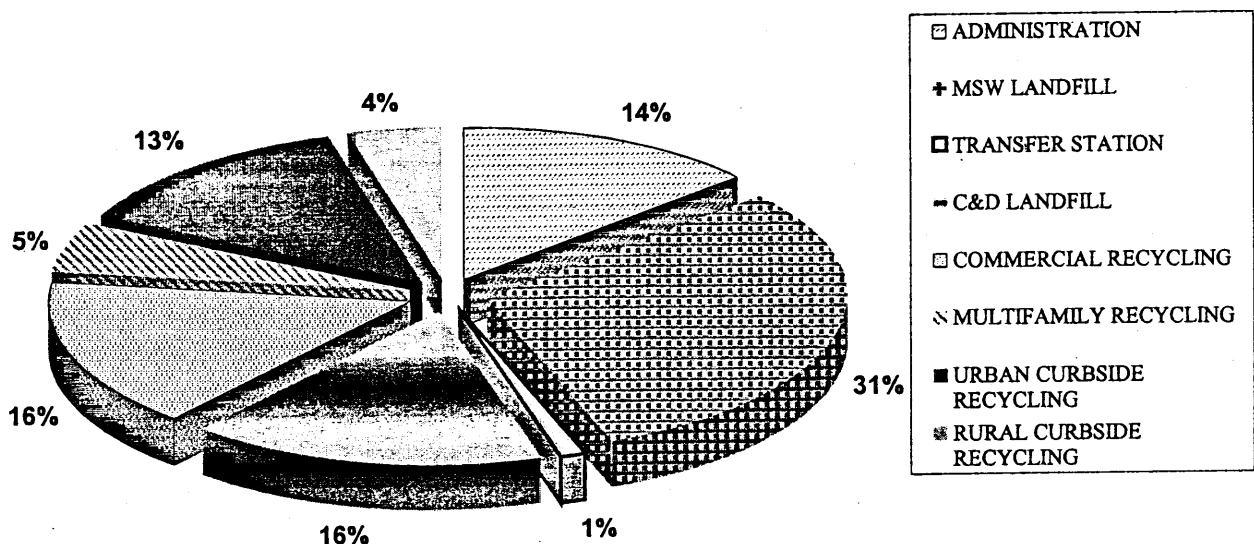
The municipal solid waste (MSW) landfill is expected to reach capacity in the year 2006, and close without a replacement landfill in the County. The County has plans to construct and operate a transfer station and dispose of waste outside the County after the landfill has closed. This will result in significant negative impacts on cash flow for the enterprise – in other words higher cost for Carrboro's solid waste management. Alternative financing for solid waste services - *such as increased fees or taxes* - will need to be addressed prior to closure to avoid larger fiscal burdens in later years.

Table 2: 2000-01 Orange County Solid Waste Revenues

Revenues	
Mixed Waste	2,636,010
Construction & Demolition	1,197,200
Vegetative Waste	65,800
Clean Wood Waste	0
Penalty Surcharges	65,000
Interest on Investments	260,000
Sale of Recyclable Materials	85,655
Misc. Revenues	16,000
Tire Tax Reimbursement	110,000
White Goods Reimbursement	30,000
Sale of Mulch	52,200
Sale of Compost	
License/Permit Fees	8,240
Recycling Grant	
Appropriated Fund Balance (Reserves)	783,189
Total Revenues	5,309,294

Figure 4 below shows the distribution of the Department budget to operation of the two landfills, operation of various recycling programs, other program areas, and administration.

Figure 4: Allocation of County 2000-01 Solid Waste Budget



Contracts for services

Orange County Solid Waste Management Department provides the Towns of Carrboro, Chapel Hill, and Hillsborough with contract recycling services for single-family curbside, multi-family recycling, household hazardous waste, and commercial food waste programs. Commercial glass and cans are collected, processed and marketed by Orange Community Recycling staff. The County is planning to shift to in-house collection of multi-family recyclables this year and currently collects recyclables from government facilities using County staff and equipment. Program costs are paid primarily from landfill tipping fees.

Interlocal agreement

The Interlocal Agreement for Solid Waste Management, adopted by the Board of Aldermen on September 28, 1999 and amended as adopted by Board resolution on March 28, 2000, provides for the County to be responsible for operating the system; providing solid waste disposal facilities and recycling services; determining policy; taking on employees; acquiring system assets; assuming system liabilities; acquiring property; providing for compliance with the law; making reports; establishing fees, and approving the budget. Each municipality can make decisions regarding collection and transportation of solid waste it manages, but is obligated to take waste and recyclables collected by the municipality to Orange County facilities.


Solid Waste Advisory Board

The Interlocal Agreement provides for a Solid Waste Advisory Board (SWAB) to be made up of representatives of all the participating jurisdictions. Two members are appointed by each of the Orange County Board of Commissioners, the Town of Carrboro, Town of Chapel Hill, and the Town of Hillsborough. This Board recommends programs, policies, expansions and reductions of services, and other matters related to the operation of the Orange County Solid Waste System, and furthers such missions and goals for the Solid Waste System as the County may adopt. It suggests amendments to the Solid Waste Management Plan and provides recommendations concerning any proposal for a change to rates, fees and charges. The SWAB provides advice to the Solid Waste Department and Manager for use in developing the annual budget for the Solid Waste System.

The SWAB has initiated the process of evaluating the current Solid Waste Plan and projected budget analysis to make component-by-component recommendations on continued implementation or revision of the Plan. The SWAB is also examining potential financing mechanisms to augment the current revenue stream. The SWAB is tentatively scheduled to provide recommendations on the Plan and on financing alternatives by late fall of this year (2002). Carrboro currently has only one of its two positions on the SWAB filled.

Shaping Orange County's Future

Additional recommendations for solid waste reduction have also been made in the Shaping Orange County's Future (SOCF) Provisional Report. Action strategies recommended for consideration in the report include raising tipping fees; instituting a Pay-As-You-Throw system; encouraging more regional planning regarding recycling and management of solid waste to include locating a materials transfer site that would include construction and demolition building materials.



How Has Carrboro Done?

Figure 2 below shows the trend in solid waste disposed by Carrboro from Town businesses and residents at the Orange Regional Landfill during the time frame of the waste reduction goal – 1990 through 2001. These figures show a trend in increased waste disposal by fifteen percent (15%) during this period. It should be noted that the high peak in 1996-1997 is attributed to the large amount of debris – primarily woody material – that was generated as a result of Hurricane Fran.

Figure 2: Carrboro Waste Disposal Trend

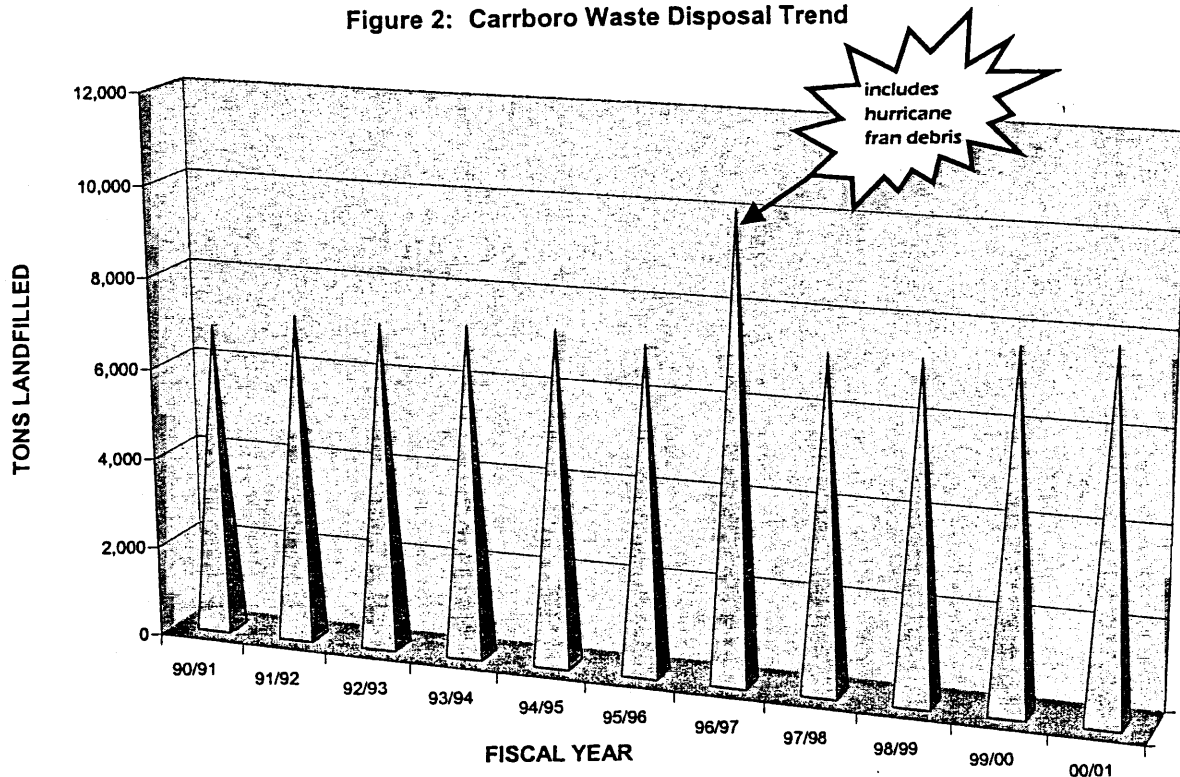
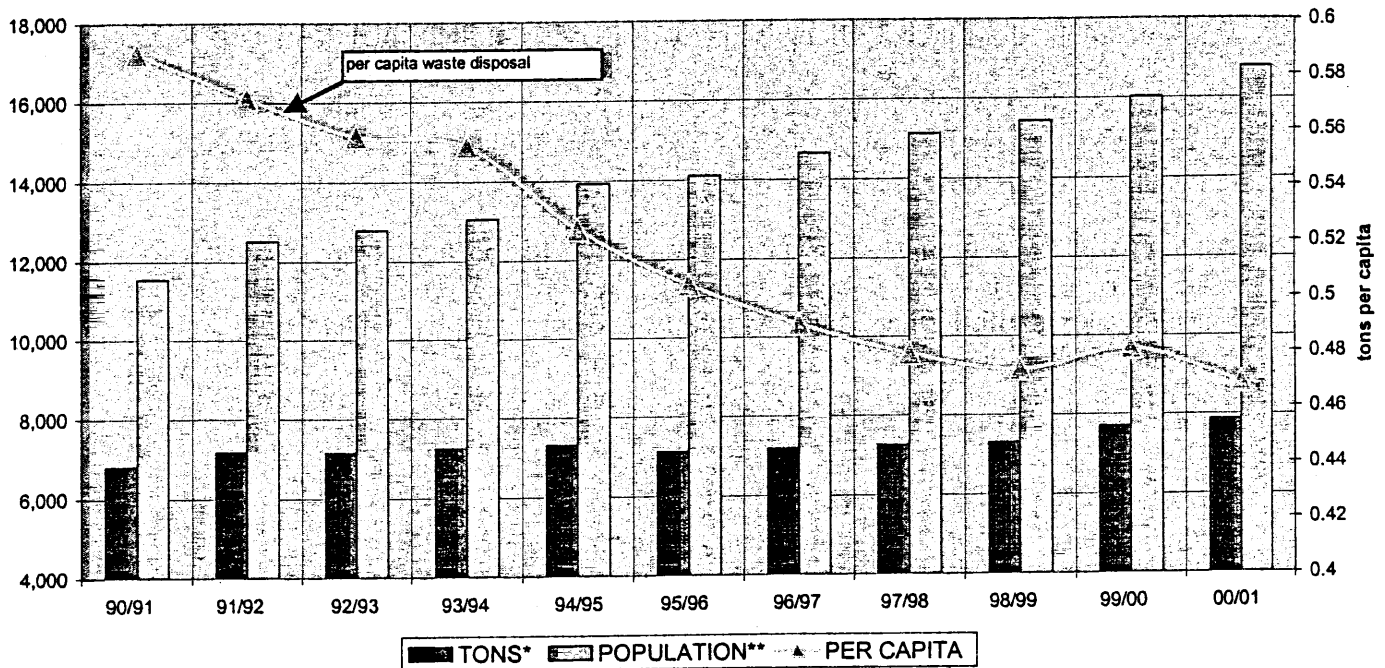


Figure 3 below shows the trend in Carrboro waste disposal compared to the trend in population over the same time period. The yellow line in the graph is the trend in per capita waste disposal. For purpose of this trend analysis, the 1996-97 peak has been smoothed to mask the effect of hurricane debris. This analysis suggests an eighteen percent (18%) decrease in per capita disposal rates during the period beginning with 1991-92 as a baseline.

It is important to note that neither of these graphs accounts for any of the 30,000 tons of privately generated construction waste or other private wastes delivered to Orange County Landfill that must be used in assessing the County-wide waste reduction rate. These waste loads are not tracked from their point of origin, so there is no data on how much of this waste originates in Carrboro.

FIGURE 3: CARRBORO WASTE DISPOSAL PER CAPITA



Carrboro's Commitment:

Carrboro's Vision 2020:

The section of the Carrboro Vision 2020 that sets guiding principals for the Town related to solid waste is excerpted here.

5.1 Solid Waste

- 5.11** The town should aim to recycle all solid waste as a "No Waste" community, and should devise strategies to minimize waste landfill. The town should encourage source reduction through all available means, including mandatory or "pay as you throw" collection of recyclables.
- 5.12** Carrboro should develop and encourage a network of neighborhood composting facilities. The town should also explore the creation of a town compost heap that would benefit the community's gardeners.
- 5.13** Recycling facilities should be readily available throughout the town.
- 5.14** The town should investigate ways to increase the life span of the current landfill.
- 5.15** Carrboro should work with the county to educate all citizens about waste reduction. Creative, non-traditional programs, such as turning garbage into art, should be pursued.

Adoption of the County Plan

The Town adopted by Resolution dated June 24, 1997, as required by State statute, a waste reduction plan framework as part of the Orange County Comprehensive Waste Management Plan. State law also requires that the plan, which has a 20-year horizon, be updated and reaffirmed with a new 20-year horizon, every three years at a minimum. Carrboro adopted the update Orange County plan by resolution dated September 5, 2000.

In doing so, The Town has adopted the County's goals of 45% waste reduction per capita by 2001 and 61% per capita by 2006 or 53% overall. Based on the figures above showing an 18% reduction, the Town is well below its goals.

Additionally, by adopting the plan, Carrboro adopted the framework that calls for the establishment of a MRF coupled with the expansion of commercial and residential recycling along with further education efforts, and subsequently implementing mandatory recycling and/or Pay-As-You-Throw (PAYT) programs to further reduce solid waste. There is no stated time horizon for implementation of major waste reduction activities.

Specific Plan Elements

The 2000 Plan Update lays out a series of recommendations and intended actions to further County progress toward the goals of the plan. While many of these actions are clearly within the realm or control of the County, others are options *available* for consideration by Carrboro for independent or complementary action. These elements should be evaluated for potential implementation in the Town's report on Zero Waste.

- ✓ Backyard Composting - promotion and demonstration of backyard composting and sale of compost bins.
- ✓ Xeriscaping - provide support to individual homeowners and businesses for "xeriscaping" projects that eliminate yard waste.
- ✓ Enviroshopping - provide more information to the public on enviroshopping (buying products that use less packaging, are recyclable, or contain fewer toxins, for example)
- ✓ Toxics Substitution - Promote the use of non-toxic alternatives to toxic household and institutional products such as cleaning supplies
- ✓ Waste Assessment - Promote waste audits and waste reduction programs with Carrboro businesses.
- ✓ Collection efficiency - Evaluate frequency of collections and number of containers to reduce costs and increase efficiency. Provide information to improve and increase separation of recyclables.
- ✓ Participation Rates - Promotional and incentive campaigns to improve participation in recycling programs in the residential and commercial sectors.
- ✓ C&D Recycling - Assist contractors and developers with programs to maximize separation of recyclable materials from projects.
- ✓ PAYT - Implement volume-based user fees as an incentive to waste reduction.
- ✓ Special Waste - Institute or promote *private collection and recycling* of used oil, oil filters, anti-freeze, batteries and other toxic materials.
- ✓ Education - Institute an educational program to promote the programs operated by the County and to increase participation numbers and quality.

Current Waste Management System provided by Carrboro:

Dumpster Collection Services

Currently, the Public Works Department provides dumpster collection services to approximately 93 businesses and about 73 multi-family developments containing more than 4700 units. Dumpster collection is provided twice weekly at no charge for base service. The full cost of providing dumpster collection services, including direct and indirect cost of collection plus landfill disposal cost, at current levels is calculated at \$460,158. For a full analysis of dumpster collection services, refer to the April 23, 2002 report to the Board of Aldermen.

Rollout Collection Services

The current solid waste program for residents and some businesses serviced by roll-out containers provides weekly household waste along with biweekly collection of leaves and yard debris. This service is provided without charge to 39 businesses and 2,706 households (single family and some smaller multi family units). The full cost of providing this service to these customers, including direct and indirect costs associated with collecting waste plus landfill disposal cost, at current levels is calculated at \$311,262.86.

Bulk Trash / Yard waste / Leaf Collection Services

Carrboro also provides residents that receive roll-out service with collection of yard waste approximately twice per month at no cost. Leaves must be bagged for collection from March through October, but may be raked to the curb for collection November through February. Bulk trash is collected at the curb on demand for a fee. The full cost of providing the bulk trash and yard waste collection service, including direct and indirect costs associated with collecting waste, plus landfill disposal cost at current levels is calculated at 331,300.96.

Costs of Waste Disposal

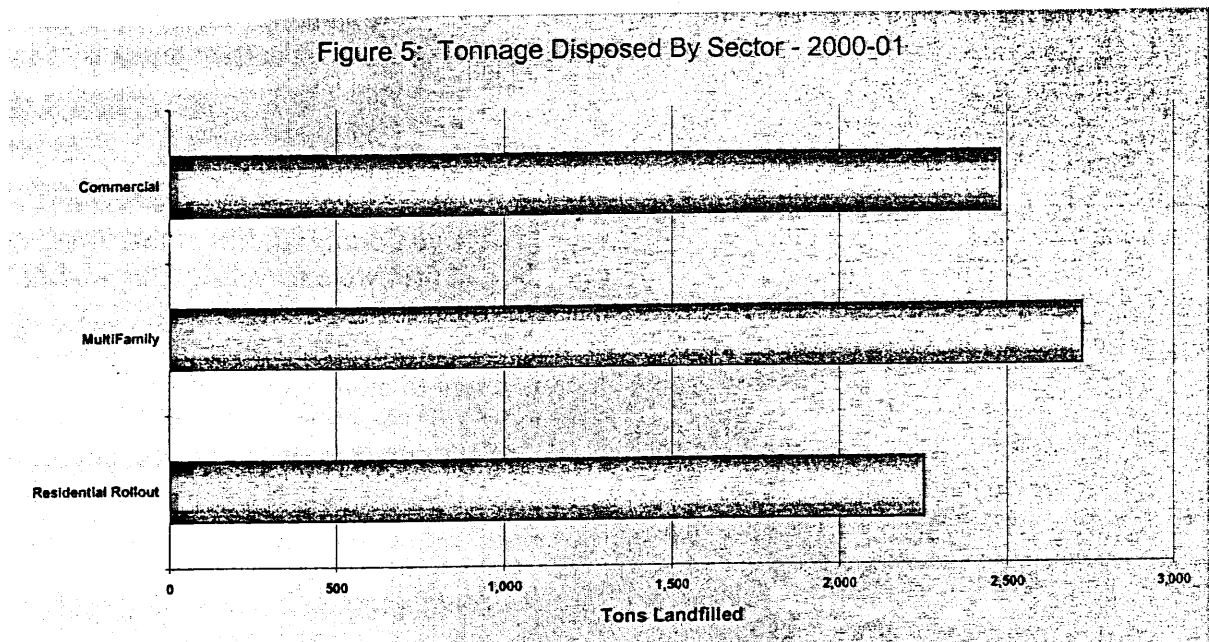
Carrboro spent approximately \$324,142 in 2000-01 in landfill costs at Orange County Landfill. A reported 7,869 tons were delivered to Orange County landfill of that 7,562 were disposed and 307 tons of brush, white goods, and tires were recycled. This was an increase of 2.1% in waste delivered to the landfill from 1999-2000 when 7,441 tons were delivered including mixed solid waste brush, bulky items, construction, and demolition debris. These totals do not include some materials sent to other disposal sites.

Of the total 7,869 tons in 2000-01, MSW was 7,455 tons or 95 percent. Of that, single family residential tonnage was 2,251 (30%) landfilled at a cost of about \$94,542, multi-family was 2,725 (37%) at \$114,450 and commercial 2,479 (33%) at \$104,118. Both the rise in tipping fees per ton and the total tonnage resulted in an increase in disposal costs from the previous year. Landfill penalties for loads containing brush or non-residential corrugated cardboard were \$847.

Table 3. Tonnage and Costs of Solid Waste Disposal by Town of Carrboro FY 2000-01

Sector	Tonnage	Percent of Solid Waste	Tipping Fee Costs
Single Family Residential	2,251	30%	\$94,542
Multi-family Residential	2,725	37%	\$114,450
Commercial	2,479	33%	\$104,118
Subtotal MSW	7,455	100%	\$313,110
White goods	24		\$0
Constr & Demolition	97		\$4,452
Brush (mulched)	284		\$3,878
Tires	9		\$0
Penalties & late fees	--	--	\$2,702
Subtotal non-MSW	414		\$11,032
Totals	7,869		\$324,142

Figure 5 shows graphically the breakdown in landfill disposal cost to the Town by the three primary service sectors.



Recycling Services provided in Carrboro by Orange County:

The current solid waste and recycling program provides weekly curbside recycling collection services on the same day designated for rollout carts. Multi-family recycling carts are serviced once a week. All multifamily complexes in Carrboro are reported to be provided recycling service. The reported, estimated cost of recycling in Carrboro comes out to about \$47 per unit annually for single family and multifamily residential *curbside* recycling and \$17 per unit for multifamily complexes serviced by rollout carts.

There are unstaffed recycling drop-off sites at University Mall, the Animal Shelter, Cedar Falls Park in Chapel Hill and Wal-Mart at Hillsborough Commons in Hillsborough. A drop-off site at the Carrboro Plaza was dedicated for service on Earth Day, April 22, 2002. Orange County Staff estimates 300 to 500 tons of recyclables per year diverted from disposal through use of this site.

Special Services

Other residentially generated materials such as motor oil, oil filters, lead-acid batteries; hazardous waste; tires; appliances; yard waste; reusable goods, and natural disaster disposal debris are collected for recycling at the landfill or County Solid Waste convenience centers. There is no way to determine how much of this tonnage is from Carrboro.

Evaluation of Existing Programs:

Limitations of Analysis

The Town depends on Orange County's Solid Waste Management Department to provide data on recycling and solid waste disposal. Recycling data is not currently tracked and analyzed separately by, or for the Town of Carrboro. The Orange County data is aggregated by program, not broken out by jurisdiction.

Staff tracks landfill totals delivered on a daily basis of all types of solid waste collection. This does not include recyclables collected by private contractors through Orange County Recycling. There is no methodical reporting of this data to Carrboro, unless it is requested. Therefore, it is difficult to ensure an accurate count since Carrboro routes are frequently collected along with the Chapel Hill routes. On occasion, trucks from rural routes or multifamily routes assist on the in-town routes or vice versa. Counts are estimated each month based on total households served. Estimated data are available to determine the percentage of the commercial waste stream that is currently being recycled. In an effort to better gauge recycling efforts in the future, Carrboro should request that Orange Community Recycling provide quarterly reports of amount of recyclables and participation rates in Carrboro.

Source reduction

A comprehensive evaluation of source reduction efforts would require an intensive survey of residents, businesses, and institutions. Such a survey is not anticipated to be conducted by the Town in the near future. However, it is expected that many businesses will practice source reduction simply to cut costs in resource purchases, waste

management, and waste disposal. The Town currently has no active source reduction efforts independent of Orange County programs.

Recycling - Residential

The residential recycling program appears to be relatively successful. It is quite possible that the residential program has reached the point of diminishing returns. The town should attempt to evaluate participation rates and determine if there is much opportunity for increased recovery from increased participation.

Residential -Curbside Analysis: Last fiscal year, 3,296 units were served by urban curbside recycling program in Carrboro - about 2,700 were single-family households while the rest were small businesses and small multifamily complexes serviced by rollouts. Orange Community Recycling Carrboro currently recovers 10 different types of materials curbside. These include: three colors of glass bottles and jars; plastic PET bottles #1 (such as soda bottles) and HPDE bottles #2 (such as milk jugs); steel/tin and aluminum food and beverage cans; newspapers, glossy magazines, and telephone books. A breakdown of materials collected throughout the County includes sixty-nine percent newspapers, glossy magazines and phone books, 20% was glass, and the remainder is divided between metal cans and plastic bottles.

Residential - Multi-Family Analysis: Multifamily residential recyclables are collected in carts, almost exclusively from large apartment complexes and some nursing homes (e.g. Covenant Place). Carrboro has 100% of its multifamily units receiving dumpster collection service also participating in the multifamily housing recycling program. Of materials collected Countywide, in 2000-01 47% was comprised of newspapers and magazines, and 45% from glass bottles

Residential – Dropoff analysis: Of the material delivered to urban dropoff sites in Orange County, 82% was paper and cardboard; 18% were cans and bottles. There is no tracking of how much Carrboro contributes.

Commercial Recycling Analysis

Last year, 2,479 tons of commercial waste were landfilled from Carrboro. In 2000-01, 190 tons of commercial waste were reported recycled from Carrboro by Orange Community Recycling including an estimated 100 tons of food waste and 90 tons of glass and cans. Additional material of an unknown quantity deposited at drop off sites likely came from the commercial sector. There is no information to date on private, commercial recycling efforts such as grocery store cardboard containers and plastic bags, or privately collected recycling from office or other commercial spaces.

Costs of the Recycling Program:

In Carrboro, Orange Community Recycling reportedly spent approximately \$130,000 for residential curbside recycling from 2,731 units and approximately \$83,000 to collect multi-family recyclables in Carrboro from 4,850 units.

With two commercial food stops and 13 glass stops, the estimated cost of commercial recycling was reported as \$10,250. Total recycling expenditures for services in Carrboro

by Orange Community Recycling were reported to be \$223,250. This does not include household hazardous waste programs, oil, filter or other dropoff site services.

Orange County Staff have provided an estimate of the amount of recyclables that might be coming from Carrboro based on *pro-rata* extrapolation from Countywide numbers. These numbers have been used to calculate per tonnage costs in Table 4 below.

Table 4: Summary of Recycling in Carrboro 2000-01

Sector	Pro rata Cost of Program in Carrboro	Tonnage Collected Curbside/cart (extrapolated)	Tonnage est. to dropoff (extrapolated)	Total tons recycled (extrapolated)	Percent of solid waste recycled * (extrapolated)	saved tip fee	adjusted cost per ton recycled
Residential	\$130,000	724	320	1,044	32%	\$46,980	\$79.52
Multifamily	\$83,000	540	130	670	20%	\$30,150	\$78.88
Commercial	\$10,250	90	35	125	5%	\$5,625	\$37.00
Total	\$223,250	1,354	485	1,839	20%	\$82,755	\$76.40

DISCLAIMER: These estimates assume that all sectors of the County participate equally, which has no basis. They are used here for the sole purpose of attempting a crude estimate of recycling rates and per-ton cost for recycling in Carrboro, and should not be cited or used for any other purpose.

*Note: percent of solid waste recycled reported in Table 4 above is a different measure than the previously reported 18 percent rate of waste reduction. The former is an estimate of the amount of the total waste generated that is collected for recycling. The latter is the change in the per capita amount of waste received at the landfill.

How does Carrboro Compare?:

A comparison of other jurisdictions provides insight into strategies that may be useful in increasing participation and enhancing opportunities for increased waste reduction.

The statewide recycling participation rate is estimated to be under 50 percent. While there is no data available to determine the rate of participation in Carrboro, the set out rate for all of Orange County can be used as an approximate gauge. The monthly set out rate overall for the County urban curbside program exceeds 85% meaning that at least 85% of eligible homes in Chapel Hill and Carrboro set out their recycling bins at least once a month.

Common Components of Local Waste Reduction Programs in North Carolina

[material adapted from the NC 2000-2001 Annual Report on Solid Waste]

There were no great improvements reported in the number of standard waste reduction components used by the average county program. The average county used only seven of the 18 common program components outlined in Table 5 below. While Carrboro has eight of the common elements within the town, nearly all of these are provided by the County with little added support by the Town. In order to make serious progress in reducing the amount of waste disposed of from Carrboro, additional components should be added. Although there are several no-cost or low-cost programs available, including buy-recycled policies, local disposal bans, and source reduction and reuse programs, these components continue to be overlooked by most communities.

Table 5: Waste Reduction Programs Implemented by Average North Carolina County

Program	Average program	Orange County*	Carrboro	Program	Average program	Orange County	Carrboro
In-House Reduction	Yes	Yes	Yes	Local Disposal Ban	No	Yes	No
Buy-Recycled Policy	No	Yes	No	Pay As You Throw	No	No	No
Backyard Composting	No	Yes	No	Oil Recycling	Yes	Yes	No
Source Reduction	No	Yes	No	Oil Filter Recycling	No	Yes	No
Reuse	No	Yes	No	Antifreeze Recycling	No	No	No
Curbside Recycling	No	Yes	Yes**	Battery Recycling	Yes	Yes	No
Drop-off Recycling	Yes	Yes	Yes**	HHW Collection	No	Yes	No
Other Recycling Program	Yes	Yes	Yes**	Mulching/Composting	Yes	Yes	Yes
Education Program	Yes	Yes	No	C&D Reuse/Recycling	No	Yes	No

[material adapted from the NC 2000-2001 Annual Report on Solid Waste]

* Program Provided by the County to serve all residents of the County

**Program provided by the County in Carrboro

The NC Annual Report also notes that like county governments, municipalities also continue to lack comprehensive waste reduction programs. Most municipal programs are limited to strictly curbside and/or drop-off recycling programs. For example, of the 297 municipalities with recycling programs, less than 20 percent have buy-recycled policies in-place and less than ten percent have backyard composting programs. The Report states that municipalities will need to increase the waste reduction options available to their citizens to make further substantial progress towards decreasing waste disposal.

Local Management of Special Waste

[material adapted from the NC 2000-2001 Annual Report on Solid Waste]

The following table on special waste (Table 6) shows a general consistency in local programs over the years. The number of used oil collection programs has varied little, while the number of gallons climbed steadily until dropping by about 3 percent in FY 2000-2001. Only a handful of local governments run oil filter recycling programs.

Table 6: Local Government Special Waste Management, FY 1996-1997 to FY 2000-01

Program	FY 96-97	FY 97-98	FY 98-99	FY 99-00	FY00-01	Orange County	Carrboro*
Used Motor Oil							
Number of local programs	122	115	127	126	125	Yes	No
Gallons collected	575,859	646,646	736,436	871,533	845,670	26,825	0
Oil Filters							
Number of local programs	N/A	8	11	14	18	No	No
Tons collected	N/A	~6	6.61	10.34	16.15	0	0
Antifreeze							
Number of local programs	48	46	46	49	54	Yes	No
Gallons collected	9,026	8,770	9,568	15,977	33,304	No data	0
Lead Acid Batteries							
Number of local programs	90	84	79	90	90	Yes	No
Number collected	59,112	61,118	58,237	74,737	82,043	2,945	0
Household Haz. Waste							
Number of programs	20	20	17	24	24	Yes	No
Number of permanent sites	7	9	10	13	12	Yes	0
Tons collected	653.24	657.29	1,017.78	965.58	1361.11	49.9	
Total cost reported	\$1,402,485	\$1,301,638	\$1,672,271	\$1,644,818	\$1,792,125	—	—
cost per ton (calculated)	\$2,147	1,875	\$1,643	\$1,703	\$1,316	—	—

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

*No programs independent of those provided to residents by the County

The State reports there has been some expansion in anti-freeze programs and amount collected. Household hazardous waste programs declined by one, but the overall amount collected grew by 40 percent. Carrboro relies almost entirely on facilities provided by Orange County Outside the Town for handling these materials.

Although the lack of conveniently available collection points does not necessarily mean that large amounts of these materials are illegally dumped, it does pose an extra challenge to citizens to handle them properly. Moreover, the widespread lack of public oil filter collection programs makes it likely that most filters end up in the landfill, which, despite a ban on oil disposal, introduces between 3.5 and 8 ounces of oil per filter into landfills according to State estimates.

Materials Recovery Facilities (MRF) and Materials Marketing

According to the NC Annual Report, processing (e.g. the consolidation of materials, separation of commingled items, and transport preparation such as baling and containerizing) is the key link between collection programs and end markets. One of the best examples of a processing facility for residential and commercial recycling programs is called a "MRF" or "material recovery facility." Difficulty in accessing markets, except for perhaps for ferrous metals, is in part a function of weak processing infrastructure in many areas of the state according to the report.

How a MRF would work

The MRF would be designed to handle the mixed paper, cans, bottles and other recyclables from the waste stream employing a combination of automated and manual separation. A MRF provides the opportunity to shift labor from the curb to centralized processing and improving marketability of collected materials.

A MRF would allow the curbside collection of recyclables *commingled*, rather than curbside separation, which make collection quick and would cut labor costs, time on route, and number of trucks needed. Commingling allows a broader range of materials, to be collected more easily and processed to more market-ready degree. In addition, a MRF could be designed with the flexibility to add additional materials in the future, such as additional plastics, other scrap metal, and various grades of paper – depending on the market. This could divert an additional significant amount of material from disposal, and could make recycling more meaningful for residents and businesses and would likely increase the number of participants.

Table 7 below was included in the State Annual Report for FY 1999-2000 as an indicator of the health of the state-processing infrastructure. There have been no major changes for FY 2000-2001 in the population centers served and not served by MRF's.

Table 7: Distribution of Material Recovery Facilities in North Carolina FY 2000-2001

Major population centers served by MRF's	Major population centers not served by MRF's
<ul style="list-style-type: none"> • Greensboro • High Point • Charlotte/Mecklenburg • Winston-Salem • Durham • Greenville • Catawba County • New Bern/Craven • Davidson Co./Lexington/Thomasville 	<ul style="list-style-type: none"> • Asheville • Fayetteville • Raleigh/Cary/Wake Co. • Burlington/Alamance Co. • Wilmington • Jacksonville • Chapel Hill/Orange Co. • Kannapolis/Concord/Salisbury • Gastonia/Shelby • Wilson/Rocky Mount • Goldsboro • Statesville/Mooresville • Most rural counties in the state

[material adapted from the NC 2000-2001 Annual Report on Solid Waste]

A review by Public Works Staff of other communities shows that for residential waste to be recovered at a rate of 40 to 65%, these communities recover 17 to 31 different types of materials. In Carrboro, if one includes the materials collected at convenience centers and dropoff sites (mixed paper, corrugated cardboard, aluminum foil, yard waste and reusable household goods) as well as curbside, 15 material types are recovered.

A review by Public Works Staff of communities highlighted as record-setters in the EPA's Report *EPA-530-R-99-013, Cutting the Waste Stream in Half*, comparable to Carrboro in terms of population and number of households served, reveal a common trend among these record-setting communities. They each have some type of local ordinance that either bans setting-out designated materials with their trash or requires residents to separate waste. These communities reportedly recycle a wide range of materials, which increases the proportion of recoverable waste, with paper and yard trimmings accounting for 12 to 45% of the residential materials diverted.

For example, Public Works Staff report that Crockett, Texas, which serves 2,834 households, generates approximately 4.5lbs. of waste per household per day. Crockett reduced their numbers from 6.1 lbs. in 1991 to 4.5 lbs. in 1996 with the implementation of mandatory, weekly curbside recycling and composting programs; the use of clear trash bags, and continuous resident education. Crockett's local recycling ordinance designates 20 categories of materials that residents must recycle and requires residents to separate yard debris for recovery. The clear bags allow collection staff to see contamination in bags of recyclables and yard debris and to see if designated materials are mixed in trash set out for collection. Crews do not collect improperly set out materials. Instead, they tag them with an explanation of why they were not collected.

Barriers to Enhanced Waste Reduction:

Making any significant changes to the current solid waste management system will in all probability face one or more of the following barriers:

- Lack of Control due to contractual arrangements
- Cost of adding services
- Lack of incentives
- Lack of participation from low awareness
- Political Priorities
- Constraints of interlocal agreement

Potential Benefit of Enhanced Waste Reduction:

While Carrboro's waste reduction rate appears better than many communities in the state, more can be done to target those recyclables that are readily recyclable in the current residential, multi-family and commercial waste stream. An examination of the potential savings that could result from enhancing programs to recover half of the recyclable materials currently disposed in the landfill is provided below for each of the primary service sectors and summarized in Table 7. These estimates were made by Public Works Staff based on data from Orange County and extrapolated on a *pro rata* basis to Carrboro's waste stream.

Commercial Sector Potential Savings

Potential for savings in the commercial sector using only current programs for glass, cans and food waste with an additional 50% diversion of what is currently estimated in the waste stream would be approximately 250 tons of food waste of the 500 now discarded and 75 tons of the 150 tons of cans and bottles estimated as now discarded. Tip fee savings could be as much as \$14,625. (Paying for these expansions in the recycling program is not now part of the Orange County budget.)

Enhanced Multi-Family Residential Diversion Potential

The Orange County multi-family waste sort for 1999-2000 showed that 28% of the waste that went to the landfill were materials that could be readily recycled at the housing complexes, including metal cans, glass and plastics bottles, newspapers, glossy magazines, phone books, and corrugated cardboard.

An enhanced multi-family program designed to recover half of the approximately 763 tons of recyclables estimated by extrapolation to remain in the Carrboro multi-family waste stream - or 382 tons - would translate into a savings of as much as \$17,190 in tip fees, at the current rate of \$45 per ton. Corrugated cardboard is included here, because it is already banned from dumpsters and recycling opportunities for it exist at most multifamily complexes. Mixed paper recycling opportunities are only at dropoff sites. Sixteen percent of multifamily waste is mixed paper. Recycling half of that - or 218 tons - could save as much as \$9,810 in tipping fees.

Enhanced Residential Curbside Diversion

The residential waste characterization conducted in 1999-2000 showed that 19% of the residential waste that was landfilled from single family collection consisted of recyclables for which curbside collection is currently offered. This does not include mixed paper or corrugated cardboard, which made up an additional 18% of the total single family waste, since these materials are not currently recycled at curbside.

If 50% of the approximately 428 tons of recyclables that are estimated by extrapolation to remain in the Carrboro single family residential waste stream could be diverted via mandatory recycling, or other combination of program changes, then the potential for diversion could be as high as 214 tons or potential savings of as much as \$9,630 in tip fees at \$45 per ton.

If an additional 50% of the estimated 405 tons of mixed paper and recyclable corrugated cardboard could be recovered, this would translate into approximately 203 tons diverted or potential savings of as much as \$9,135 in tip fees. Cardboard and mixed paper are currently accepted at drop-off sites only. Accepting them at the curb would presumably increase recycling, and would require changes to the collection system. Total potential tip fee savings from targeting recyclables now disposed from this sector could be as high as \$18,765.

By diverting 50% of all recyclables remaining in the waste stream that could be diverted at the curb or at multifamily carts in today's program, the total potential annual tip fee savings would be approximately \$26,820. Adding fifty percent of the single family mixed paper and corrugated cardboard still in the waste stream plus multifamily mixed paper could increase tipping fee savings by an additional \$18,945 to a total of \$45,765. Adding in the potential savings from commercial of \$14,625 results in a total potential savings of over \$60,000 by recovering 50% of the recyclables in the waste stream (see Table 7 for summary).

Table 7: Benefit of Diverting 50% of Recyclables Remaining in the Waste Stream

Sector	Tonnage available at curb/carts (50% recovery)	Tip fee savings	Tonnage to drop off sites (50% recovery)	Tip fee savings	Total Tonnage diverted	Potential Total tipping fee savings
Residential	214	\$9,630	203	\$9,135	417	\$18,765
Multifamily	382	\$17,190	218	\$9,810	600	\$27,000
Commercial	325	\$14,625	N/a	N/A	325	\$14,625
Totals	921	\$41,445	421	\$18,945	1,342	\$60,390

Disclaimer: These tonnages, and hence the potential dollar savings, are extrapolated on a pro rata basis from Orange County data and have an unpredictable margin of error. They are used here purely for illustrative purposes, and should not be cited or used for any other purpose.

What becomes of the savings?

Savings could be used to provide assistance to businesses for waste reduction, increase recycling education and enforcement as well as pay marginal costs to the contractor for increased collection needs in Carrboro that could result from an enhanced recycling programs.

Methods for Accomplishing Enhanced Waste Reduction:

In summary, most high-performing communities have most or all of the following characteristics as part of their waste reduction efforts. Carrboro should pick those programs that add the most value at the lowest cost first and proceed from there to achieve the Town's objectives.

Public Education

Perhaps the single most important part of a successful solid waste reduction and recycling program is public education. A successful education program should meet the following objectives:

- ◆ Increase public awareness of the problems and programs
- ◆ Increase sense of public ownership of the problems and programs
- ◆ Create high visibility programs which educate the public about the techniques and philosophies of waste reduction
- ◆ Move programs into the earliest years possible in the public school system
- ◆ Change attitudes and beliefs about waste and resources

Source Reduction

This should be a primary focus of any waste reduction and public education program.

The residential sector can be provided with source reduction information on a periodic basis that can be utilized to minimize the amount of waste generated in their homes. Since source reduction is not as tangible as recycling, it will be important to emphasize source reduction as a very important component of solid waste management. The Town's public support of this method of solid waste reduction will provide greater awareness by the general public. Source reduction methods that will be promoted to residential waste generators includes, but is not limited to:

- backyard composting;
- reuse of materials;
- buying in bulk; and
- non-toxic alternatives to household cleaners.

In addition to these efforts, government agencies should adopt and enforce office policies to reduce the volume of waste generated in their offices, thereby setting an example for local businesses. These policies include:

- copying on both sides of paper;
- keeping file copies on computer disks only;
- buying locally to avoid accumulating waste mail packaging; and
- buying recycled products.

Recycling

The following are elements that should be considered for multifamily and single family to enhance recovery rates:

- Implementing variable fee systems
- Collecting a wider range of materials

- Targeting improvements at low-performing sites / neighborhoods.
- Making participation mandatory
- Enhancing program convenience
- Equipping buildings with adequate containers at each dumpster site
- Evaluating use of private firms to collect recyclables
- Hiring additional staff to provide education and on-site technical assistance
- Maintaining detailed records and conducting performance measurement

Notes: It has been communicated by Orange County Staff to Carrboro that proceeding on its own with mandatory recycling that substantially increases the cost per household will result in Carrboro being required to pay the marginal cost of any added level of service. Implementing a fee structure or mandatory recycling would require enforcement.

Composting

Typically, composting is utilized for yard wastes although other organics including food waste, fibers and other wastes may be mixed with yard waste and composted as well.

- Depending on the nature and scale, this could require a permit from the state
- Back yard composting has the potential of reducing significant amounts of food waste and yard debris from the waste stream.

Mulching

Any non-treated wood waste may be converted to mulch.

- **Piece Lumber, Pallets and Other Wood Waste** - The potential exists for Carrboro to process wood wastes such as landscape trimmings, piece lumber, and pallets. Careful screening is necessary to prevent painted and treated lumber from contaminating the mulch.

Problem / Special Waste Diversion

The diversion special wastes from the landfill for recycling constitutes waste reduction, but equally importantly, prevents pollution, tipping fees, and / or handling problems at the landfill. Problem wastes include:

- ♦ Household hazardous waste
- ♦ Household and lead acid batteries
- ♦ Computers and electronic equipment
- ♦ Waste motor oil and oil filters
- ♦ Agricultural and yard care chemical residues
- ♦ Spill residues
- ♦ White goods
- ♦ Scrap tires
- ♦ Land clearing and construction debris
- ♦ Sludges

Non Residential Waste Stream

According to the North Carolina Recycling and Solid Waste Management Plan, an estimated sixty-eight percent of North Carolina's total waste stream comes from non-residential sources - construction, commercial, institutional, and industrial facilities. This portion of the waste stream presents tremendous opportunities for recycling and waste reduction programs due to the relatively high volumes of materials, and in some cases high value materials that may already be segregated at the point of generation within the facility.

Target Commercial Waste Stream

Commercial waste sector has the largest untapped potential for waste reduction [key: this fact recognized - needs to be the first priority]

Based on available data, it appears that the largest missed opportunity for waste reduction is in the commercial sector. The commercial sector component of the waste stream accounts for one third (33%) of the total Carrboro MSW waste stream at a cost for disposal of about \$109,000, which is about one third of the total disposal (tip fee) costs. Yet, Orange County reportedly spent only \$10,250, or 5% of the recycling program cost, on reducing the commercial portion of the waste stream in Carrboro.

The program currently focuses on only commercial food waste and glass. A large portion of the commercial waste stream with high potential rates of recovery are not addressed - especially office paper, and other paper products. In addition, a rising problem of the commercial waste stream - computers and other components - are not being addressed in Carrboro.

Considering bans on high volume, extractable, portion of the commercial waste stream could result in significant reductions in tonnages disposed by that sector. Alternatively, the focus could be mandatory recycling of certain materials at first with a ban once program logistics and infrastructure are in place. Enforcement of bans / mandatory recycling would be necessary.

In the absence of legal incentives, commercial waste reduction is driven by economics, convenience, and knowledge of recycling opportunities. Charging for waste disposal combined with enhancing opportunities for recycling, and providing technical assistance to business owners could have a significant impact on the amount of waste disposed.

While planning waste reduction and recycling programs in businesses is ultimately the under the control of the management of the individual company, the Town, in conjunction with the County, can provide significant guidance, networking, and assistance in setting up and expanding waste reduction programs. Awards programs for excelling in waste reduction could be used for business leaders.

Construction and Demolition Waste Stream

With the high level of development in Carrboro, much of the waste going to the landfill probably originates at project sites, and yet because the majority of this is served privately, little conclusive information is available on quantities or costs. A focus on

minimizing this portion of the waste stream may not have a direct impact on town costs, but it could have a significant impact on Carrboro waste contribution to the landfill.

The Town has the opportunity to control this by incorporating waste reduction into new construction, demolition, and renovation projects by making a waste reduction plan part of the permitting requirements. Orange County has adopted an ordinance to accomplish this, and County Staff have been working with the Town on proposed implementation strategies in Carrboro later in 2002.

Further, an enforced ban on certain types of waste in Carrboro planning limits (metals, vinyl, clean wood and pallets, for example) would impose that requirement on the contractors and hence the private haulers. Additionally, all new developments - residential or commercial - should be planned with adequate facilities and space to accommodate recycling.

Planning for Enhanced Recycling: Tying it All Together

In the previous discussion, a multitude of recycling, composting, and special waste management options were described. The next step for the town is to evaluate which options are appropriate for implementation in Carrboro and Orange County. Though all of the recommended programs could be beneficial, some are unlikely to be implemented due to funding limitations. Furthermore, because the design of some programs will be dependent on the outcome of others, the recommended recycling options should be phased in versus implemented simultaneously. The following guidelines will be used in developing strategies for implementing the Town's "Zero Waste Resolution."

Recommended Program Objectives

The following objectives go beyond the single goal of waste reduction, and are recommended for the town in moving forward with implementing an enhanced waste reduction program.

- Reduce toxic / problematic component of waste stream.
- Increase efficiency of services.
- Decrease cost of services.
- Improve specific service types.
- Evaluate role in regional programs.
- Evaluate cooperative opportunities outside Orange County.
- Evaluate sector-by-sector issues and opportunities.
- Evaluate cost of service and implement variable rate user fee to cover program costs and provide incentive for waste reduction.
- Identify the opportunities for further reducing waste in cost-effective manner equitable to all sectors of the community.

Specific Program Component Options for Long Range Consideration:

These are program elements that Carrboro will need to consider in making long range adjustments to the solid waste system. Many of these elements are under the control of the County, and will require Carrboro advocacy for any desired change.

- Source Reduction Program
- Procurement Specifications for Waste Reduction
- Backyard Composting Program
- Policy for Waste Reduction / Recycling in Government Units
- Enhanced curbside recyclables collection for single family households;
- Drop-off Center Expansion
- Enhanced central collection at multi-family housing;
- Business waste reduction assistance program
- Receptacles for the motoring and pedestrian public
- Composting facility for clean wood and yard waste;
- Material Recovery Facility (MRF)
- Special Waste / Toxics Reduction Program
- Policies / Incentives that support the system and maximize participation

Think System!

Evaluation Criteria

In order to accurately evaluate and prioritize the range of options, evaluation criteria should be selected that directly reflect town waste reduction objectives. Each component of this system should be evaluated for meeting a need, economic viability, compatibility, and desirability. The evaluation includes the estimated quantities of waste generated, types of materials, and programs/facilities required to manage that waste.

- The need evaluation includes tonnage diversion potential, environmental/health risk reduction, public demand
- The economic viability evaluation includes an assessment of each component cost and revenue to enable economic comparison of alternatives. This assessment includes cost of implementation, ease of implementation, performance track record, capital costs, operating costs, potential revenues, and markets for materials.
- The compatibility evaluation includes an analysis of the existing system. If that system will be maintained, what new components must be added to complement the existing system, and what current components may be discontinued.
- Public participation is necessary to determine the wishes of residents as well as to educate the public about the alternatives and consequences

The Town's Short Term Role

The role of the Town in enhancing waste reduction in the short term may most appropriately be viewed as follows:

- Adopt a waste reduction policy for all Town operations.
- Source reduction should be addressed in Town's education program,
- Backyard composting should be encouraged by the Town and by neighborhood organizations.
- Providing technical information and assistance on waste reduction and recycling methods and opportunities;
- Encourage the private sector to implement source reduction methods and provide educational resources to assist with source reduction methods.
- Serve as a catalyst to program development with Orange County for expansion of the existing collection, processing and marketing infrastructure.

The Next Step

The Board of Alderman Action Agenda includes an item assigned to the Planning Department:

“Implement Carrboro's Zero Waste Resolution”

Study and make recommendations on appropriate steps to move toward zero waste such as reducing solid waste, increasing recycling, identifying and attracting businesses that use local waste products as raw materials, and supporting national efforts toward zero waste.

Zero Waste is a philosophy and a design principle for the 21st Century. It includes 'recycling' but goes beyond recycling by taking a 'whole system' approach to the vast flow of resources and waste through human society.

From the National Zero Waste Campaign

This review provides the background and a starting point for going beyond the *status quo* and evaluating strategies and making recommendations to move the Town of Carrboro *toward zero waste*.

This will be a long-term endeavor and an ongoing process

Summary of Findings

1. This report focused on one primary goal - waste reduction. This report has presented other goals and objectives, which together with the objectives of the Vision 2020 report, will serve as a backdrop for the next step in evaluating potential program changes.
2. The Board has asked Staff in a subsequent Action Agenda item to study and make recommendations on appropriate steps to move toward zero waste such as reducing solid waste, increasing recycling, identifying and attracting businesses that use local waste products as raw materials, and supporting national efforts toward zero waste. That effort is seen on a continuum with this analysis and will result in strategies to implement elements selected from this report.
3. In light of having limited resources, Carrboro should target its efforts initially on large quantity, high quality recyclable sources and low cost efforts to enhance participation. These strategies should be elucidated in the "zero waste" report to follow.
4. The Town has committed in the short term through adopting the County Plan and through the Interlocal Agreement to work with the various jurisdictions towards a coordinated waste reduction strategy and the establishment of a materials recovery facility (MRF) and other program elements. The Town should continuously monitor the costs and benefits of this involvement and stay actively involved in future program decisions.
5. In the event that efforts in the above areas, and those strategies identified in the zero waste report are insufficient to meet the Town's goals, the Town should consider instituting mandatory recycling ordinances, bans on the disposal of selected recyclable materials, and / or charging waste collection and disposal fees to serve as mechanisms to increase recycling behavior. A citizen's task force may be a valuable vehicle to study pay-as-you-throw garbage collection or mandatory recycling.
6. In an effort to better gauge recycling efforts in the future, Carrboro should request that Orange Community Recycling provide quarterly reports of amount of recyclables and participation rates in Carrboro.
7. Carrboro has a vacant position on the Orange County Solid Waste Advisory Board, and should actively recruit a professional with solid waste or financing experience to serve on this Board. It will be essential to the Town to track emerging issues that will have a significant fiscal and policy impact on the Town, to assure that Carrboro receives equitable and satisfactory recycling services, and to advocate on behalf of the Town for enhanced services.

Appendices

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Select Web Pages:

Division of Pollution Prevention and Environmental Assistance

<http://www.p2pays.org/ref/01/00140.htm>

TJ COG Solid Waste Program assistance

<http://www.tjcog.dst.nc.us/cdwaste.htm>

Orange County Commercial Waste Program

http://www.co.orange.nc.us/recycling/commercial_recycling.htm

Grass Roots Recycling Network National Zero Waste Campaign

http://www.grn.org/zerowaste/zerowaste_faq.html

Draft Recommendations for Goals and Actions of a Draft State Solid Waste Management Plan April 5, 2000

This Draft State Solid Waste Management Plan was developed from a systematic planning process that emphasized **public participation**. This process was used to determine where solid waste management efforts should be directed for the next decade by seeking guidance from a wide range of citizens including solid waste professionals and representatives of organizations involved with waste management issues. **This Draft Plan reflects this citizen input.** The Draft presents a menu of options for the next ten years designed to move the state toward the goals identified through public participation. The Draft does not necessarily represent views or proposals of the Department.

Three goals emerged. The consensus from the public participants was that the goals should be supported by action. In fact, without supporting actions the goals become "three wishes" or "wouldn't it be nice ifs." An important part of the public participation process focused actions necessary to achieve the desired goals. Presented is a series of *key actions* that can be used to achieve the goals.

The three goals identified in the planning process are:

1. **By 2010 improve landfill technology and reduce landfill waste disposal to further secure the long-term protection of the environment.**
2. **By 2010, reduce waste by 10% per person from 1998-1999 levels.**
3. **By 2010, reduce litter and illegal disposal by 50% from 2000-2001 levels.**

Key actions to accomplish goal one

- Research bio-reactor landfill design requirements and adjust regulations accordingly
- Establish household hazardous waste (HHW) collection facilities
- Promote education on HHW
- Cap old closed out landfills as necessary
- Reduce volume of waste going into landfills
- Reduce quantity of waste with potentially harmful components from landfill disposal
- Establish requirements for construction and demolition waste that may include liners

Key actions to accomplish goal two

- Require pay-as-you-throw for municipalities with a population over 25,000 by 2005
- Require "buy recycled" programs from state and local governments
- Enact a bottle bill
- Establish a statewide tip fee
- Require state institutions to compost organic waste
- Incorporate recycling into disaster debris management plans
- Establish a \$5.00 per unit ADF on electronics such as computers, copiers, televisions
- Ban landfill disposal of electronics by 2004
- Ban disposal of cardboard from counties with populations over 100,000 by 2004
- Ban disposal of clean wood waste

Key actions to accomplish goal three

- Enact a bottle bill
- Increase educational efforts directed at those identified as prone to litter
- Require county solid waste plans to include a litter control plan that measures itself against standards
- Require the highway patrol and other law enforcement agencies to report on litter control efforts
- Require community service workers to "keeping a road litter free"
- Enact easier to use laws that give local governments more control over litter and illegal disposal

Goal Number One responds to two concerns raised by public participants regarding landfills. The first is a concern that some old landfills may represent a threat to the environment. The second is a concern that lined landfill technology may be improved to further secure the long-term protection of the environment.

Research on the "bio-reactor" type of landfill is a step toward this first goal. A "bio-reactor" landfill promotes the break down of waste into more stable components. The implementation of new regulations governing both MSW and C&D waste landfills by 2010 would be necessary to accomplish this part of this goal

Additionally, goal number one is supported by selectively removing materials from landfill disposal and by reducing the volume and number of landfills. *The reduction in both the quantity and type of materials disposed* will contribute toward further protection of the environment. Diverting the growing volume of electronics such as computers, televisions, and copiers from landfill disposal will have a beneficial impact on long-term protection of the environment and reduction in landfill volume.

The old closed out landfills will require risk-based analysis to determine a course of action. This action could include improved landfill caps, methane recovery programs, and pumping and treating groundwater.

Goal Number Two responds to the concern that too much material is being disposed of in landfills and that more should be recycled or composted.

An essential key action to achieving this goal is to *implement a significantly large tip fee* to serve as a catalyst to economically discourage landfill disposal while encouraging recycling and composting. The presence of a larger tip fee should encourage more source separation of materials and thereby cause a corresponding decrease in demand for landfill space. The recommendation also directs that *funds generated by the tip fee be used in a statewide priority such as education.*

Bans of materials have obvious impacts and selectively applying the bans to specific materials will aid in the achievement of this goal. A bottle bill, while not a ban, has a similar effect. The current landfill ban of aluminum cans, while certainly helping to reduce the amount of cans being landfilled has not eliminated the landfill disposal of aluminum.

In addition to bans, mandates or required programs such as "pay-as-you-throw" or "buy recycled" should support waste reduction. The public participation process identified the need to recognize the ability of the regulated community to respond to a mandate, the current performance levels of the regulated community, and the support needed by the regulated community to accomplish recommended mandates. Consequently, program mandates such as "pay-as-you-throw" should be implemented with population thresholds and with performance standards such that high-performing communities can have an exemption clause.

Goal Number Three responds to the concern over litter and illegal disposal and was clearly the most consistent response on the part of the participants in the planning process.

The proposed key actions present a combination of programs to reduce litter. These include programs such as a bottle bill and stronger enforcement of existing laws.

Participants expressed frustration with law enforcement efforts and the criminal legal system's response to litter and illegal dumping. Requiring reporting and measuring program efforts was suggested as an effective means of improving outcomes.

The identification of a method of measuring litter and illegal dumping will be a part of this effort. The inclusion of litter in the state plan is in response to extremely strong public concern that was identified as part of the public participation process.

Conclusion

Analysis of the previous state solid waste plan clearly indicated that the success or failure in achieving a goal depended upon whether the goal was voluntary versus mandatory. **The consensus among the public participants was that the presence of a mandate was the most essential tool** for achieving a goal. Consequently, the list of key actions associated with the goals includes several actions which could certainly be labeled as mandates. Many of the actions support more than one goal.

None of the goals presented here were discussed in quantifiable or measurable statements in the public participation process. However, in an effort to be able to assign progress, or define a lack of progress, goal statements are expressed in measurable terms. Each goal is based on a principle of being simple, straightforward, and associated with achieving the desired result.

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