

## RECYCLING

A review was performed of the recycling opportunities available in Henderson County. At the present time, the County offers recycling collection facilities at the Stoney Mountain Road Landfill facility through the citizen's recycling/convenience center. The center presently collects such items as mixed paper products, mixed container products, waste oil and scrap tires. Scrap metal and white goods are collected at a separate location within the facility. County wide recycle collection opportunities are not available through the County's existing solid waste services. Presently, some of the permitted haulers offer recycle collection services to their customers. This service is predominately done in those areas where a hauler has an agreement for waste collection for a more concentrated clientele such as through a homeowners association. Some permitted haulers offer recycle collection services to their customers through collection stations strategically located within their general collection service areas. The City of Hendersonville offers its citizens curbside recycle collection services on a weekly basis through a contract with Curbside Management headquartered in Asheville, NC. The Town of Fletcher offers its residents curbside recycling collection on a bi-weekly basis through a contract with Curbside Management. These two municipalities initially offered a "blue bag" type collection service though the trend is now toward a bin type collection service. The Town of Laurel Park offers curbside recycle collection services through its contracted residential waste collector.

### **Stoney Mountain Road Landfill Citizen's Convenience/Recycling Center:**

As noted above, the County presently operates recycle collection facilities for the Citizens at the Stoney Mountain Road Landfill facility. The disposal of recyclable material is provided free of charge to the citizens. The consolidation of the material and hauling off-site for further processing is provided by the County. The main two items tracked by the County have been the "fiber" or mixed paper products and the "containers" which encompasses the various types of recyclable plastic containers. The following table provides a summary of the total tons of containers and fiber collected as well as the monthly average for each product for the period covering calendar year 2005 through the first two months of calendar year 2009:

Table 14: Recyclable Material Collected at the Citizen's Convenience/Recycling Center  
Calendar Year 2005 Through February 2009

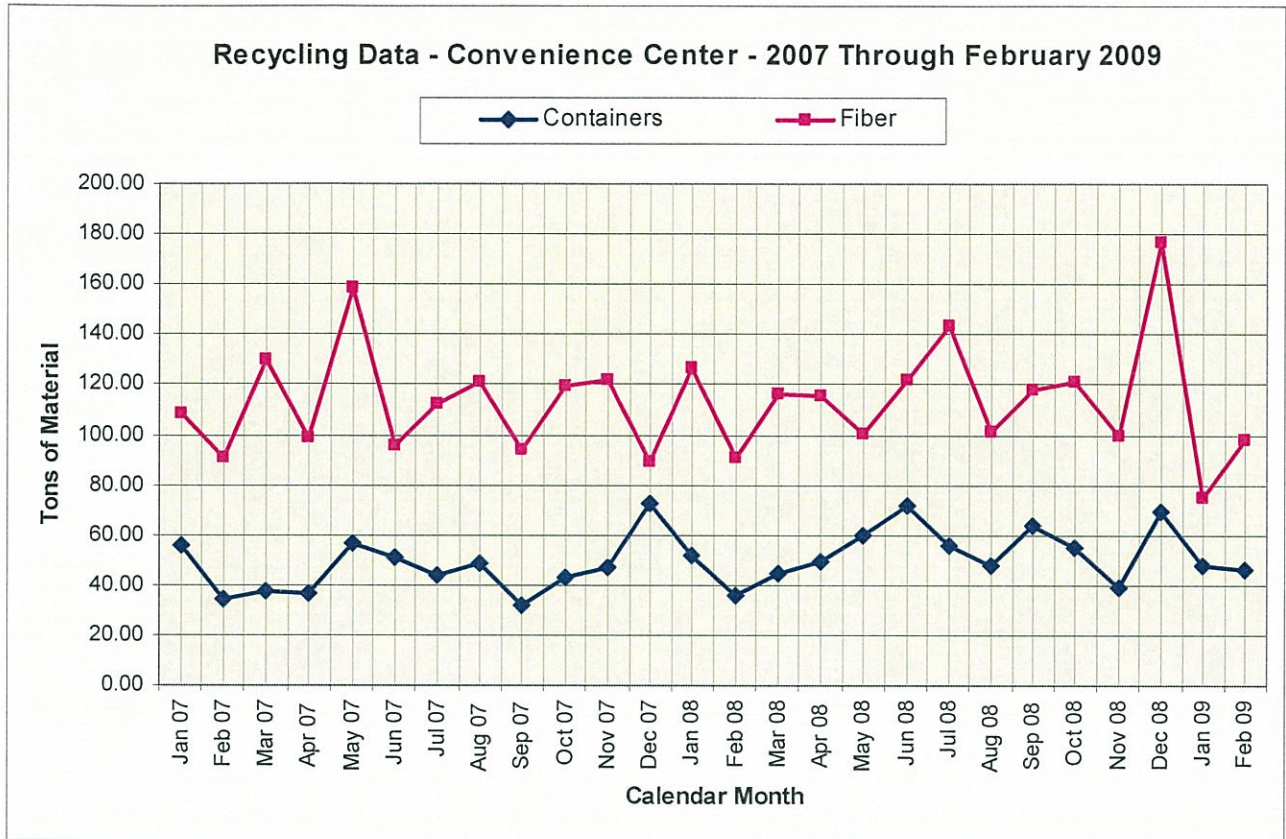
Calendar Year	Containers		Fiber		Total Collected For Recycling (tons)
	Total (tons)	Average Per Month (tons)	Total (tons)	Average Per Month (tons)	
2005	479.81	39.98	1,182.51	98.54	1,662.32
2006	717.92	59.83	1,149.01	95.75	1,866.93
2007	524.48	43.71	1,355.18	112.93	1,879.66
2008	642.75	53.56	1,432.67	119.39	2,075.42
2009*	-----	46.51	-----	86.66	-----

2009\* - Average per month for January and February 2009. No totals shown for total tons collected.

The data supporting this table is included in Appendix G.

A review of the aforementioned data reveals some fluctuations in the tons of material collected from year to year; however, the total tonnage of material collected for recycling has increased each year since 2005. Basically, the total tonnage of containers plus fiber products collected for recycling increased approximately 25% between 2005 and the end of 2008. However, the average tons of containers and fiber products collected per month for the first two months of 2009 has shown an approximate 6% and 19% decrease respectively. This decrease may be attributable to the time of the year (winter months) as well as the overall downward trend in the economy.

The following graph depicts the general trend of the tonnages of containers and fiber collected at the Citizen's Convenience/Recycling Center for calendar year 2007 through February 2009.



As can be seen from the above referenced graph, the tonnage of fiber received at the Citizen’s Convenience/Recycling Center has ranged from a high of approximately 177 tons per month in December 2008 to a low of approximately 75 tons per month in January 2009 with the overall trend being an average of approximately 107 tons per month. The tonnage of containers collected has ranged from a monthly high of approximately 73 tons in December 2007 to a low of approximately 32 tons in September 2007 with the overall average monthly trend being approximately 49 tons per month.

Traffic counts were provided for the months of July 2008 through November 2008 for the number of vehicles bypassing the scales and traveling to the Citizen’s Convenience/Recycling Center for the disposal of predominately their recycling materials. During this time period approximately 55,171 vehicles bypassed the scales. During the same time period the County collected approximately 260.89 tons of containers and 583.92 tons of fiber material. Based on the aforementioned data, it can be assumed that the average vehicle disposed of approximately 9.5 pounds of containers and approximately 21.2 pounds of fiber per trip into the landfill facility. The following table provides a monthly breakdown of the vehicle count, tons of material collected and the assumed average pounds per vehicle per trip:

Table 15: Average Pounds per Vehicle of Recycle Material Delivered to the Citizen's Convenience/Recycling Center at the Stoney Mountain Road Landfill Facility

Calendar Month/Year	By-Pass Vehicle Count (No. Veh.)	Containers		Fiber	
		Tons Collected Per Month (tons)	Average Pounds Per Vehicle (pounds)	Tons Collected Per Month (tons)	Average Pounds Per Vehicle (pounds)
July 08	12,140	56.14	9.3	143.63	23.7
Aug. 08	11,552	47.81	8.3	101.52	17.6
Sept. 08	10,527	63.54	12.1	118.03	22.4
Oct. 08	10,177	54.69	10.8	121.34	23.9
Nov. 08	10,775	38.71	7.2	99.40	18.5
<b>Total / Avg.</b>	<b>55,171</b>	<b>260.89</b>	<b>9.5</b>	<b>583.92</b>	<b>21.2</b>

Traffic count data for the citizen's convenience center is included in Appendix G. The tonnages, recorded for the containers and fiber, are included in Appendix G.

Even under a conservative estimate, the County should anticipate continuing to collect somewhere in the range of 1,800 to 2,200 tons of recyclable containers and fiber per year through the present collection system in place at the Stoney Mountain Road Landfill facility. The construction of a new Citizen's Convenience Center adjacent to the landfill facility should help some, but more importantly it will allow for the collection of recyclable material not presently collected by the County. Additional collection containers should allow for more separation of the material by constituent type.

**Convenience Center Collection of Recyclable Material:**

One option the County is exploring is the construction of additional convenience centers strategically located throughout the unincorporated areas of the County. In addition to a location for citizens to personally dispose of their residential waste, the centers would provide recycling collection facilities for at least the presently collected items of fiber and containers. The collection of additional recyclables could be included at the facilities provided space is available for the additional collection containers.

The County should realize an increase in the recycling participation rate with the construction of additional convenience centers; however, the rate should not reach the participation rate of an option such as countywide franchised residential waste and recycle material collection. This is simply due to the convenience of franchised collection versus the inconvenience and time involved with personally delivering residential waste and recyclable material to a site for disposal. Those citizens presently using the Stoney Mountain Road Landfill Convenience Center are generally avid supporters of recycling and will make whatever effort is necessary to participate in the program. The density of the population served by a convenience center is also a factor in the recycle participation rate.

For the purposes of this evaluation, it was assumed the County would construct five (5) additional convenience centers in addition to the existing site at the Stoney Mountain Road Landfill. It was assumed the Stoney Mountain Road facility would see a decrease in participation as other sites would be more convenient to approximately 50% of the present users. Therefore it was assumed the Stoney Mountain Road facility would serve approximately 200 vehicles per day relative to the recycling services. Participation in the recycling services at two of the sites was assumed to be approximately 150 vehicles per day and participation at three of the sites in the more rural areas was assumed to be approximately 100 vehicles per day. Using the assumption that each vehicle represents a household and they would visit the site on an average of once every ten (10) days (36.5 trips per year on average) equates to a usage of the site by approximately 8,000 households a year for recycling purposes.

<u>1</u> site at <u>200</u> vehicles per day times once every <u>10</u> days =	2,000 households
<u>2</u> sites at <u>150</u> vehicles per day times once every <u>10</u> days =	3,000 households
<u>3</u> sites at <u>100</u> vehicles per day times once every <u>10</u> days =	<u>3,000 households</u>
Total Households Utilizing the Recycling Services:	8,000 households

Assuming the number of pounds of recyclable material delivered by each vehicle will coincide with the poundage presently being received at the Stoney Mountain Road Landfill Facility (9.5 pounds of containers plus 21.2 pounds of fiber equals 30.7 pounds of recyclable material per visit) then each household should contribute approximately 1,120.6 pounds of recyclable material each year (36.5 visits per year times 30.7 pounds of recyclable material per visit). Therefore approximately 8,000 households contributing 1,120.6 pounds of recyclable material per year equals approximately 4,482 tons of recyclable material collected through the convenience centers per year. This would be an approximate 2,482 ton per year or 124% increase in recyclable material collection over the present system of recyclable collection at the Stoney Mountain Road Landfill facility. A disadvantage to this type collection system would be the County's initial cost to construct the additional five sites. In addition to constructing the additional facilities, the County would incur additional costs to operate the sites as well as continually collect and transport the various collection boxes to a central consolidation point or processing facility.

**Recyclable Material Waste Stream:**

The City of Hendersonville and the Town of Fletcher provide curbside recycle collection service for their respective citizens. The City of Hendersonville collects on a weekly basis and the Town of Fletcher collects on a bi-weekly basis. Data was provided by these two entities relative to the estimated tonnage of material collected as well as the general breakdown of the tonnage by classification. Included in the data was the approximate number of households participating in the recycle program. The Town of Fletcher provided data for two months (July and September) during 2008 that indicated an approximate 69% participation rate at an estimated average of approximately 35 pounds of recyclable material collected per participant per month or approximately 30.3 tons of recyclable material collected per month. The City of Hendersonville estimated an approximate 83% to 90% participation rate with an estimated average of approximately 42.3 pounds of recyclable material collected per participant per month or

approximately 84.7 tons of recyclable material collected per month. The data provided by the City of Hendersonville and the Town of Fletcher is included in Appendix G.

The various classifications of material collected for each entity included: newsprint, OCC (corrugated cardboard), mixed paper, cans, glass and plastic. The City of Hendersonville also collected scrap metal. However, this was an incidental amount and was not utilized in this analysis as the County provides a place for the disposal of scrap metal and tracks this quantity under a separate classification. In addition, this is not a usual item collected as part of a curbside recycling waste stream. A review of the waste stream data for the City of Hendersonville and the Town of Fletcher was performed to determine the average percentage by weight of each of the aforementioned components of the recycle waste stream. The following table presents the average percentage of the recycle waste stream, by weight, of the aforementioned various components.

Table 16: Recycle Waste Stream Composition as a Percentage of Overall Weight Collected

	<b>Avg. tons / Month</b>	<b>News Print (Avg. tons/mo.)</b>	<b>Mixed Paper (Avg. tons/mo.)</b>	<b>Glass (Avg. tons/mo.)</b>	<b>OCC (Avg. tons/mo.)</b>	<b>Plastic (Avg. tons/mo.)</b>	<b>Cans (Avg. tons/mo.)</b>
Town of Fletcher	30.26	10.11	6.97	7.50	2.44	2.00	1.24
City of Hendersonville	84.72	26.99	24.36	18.05	6.01	5.43	3.88
Total	114.98	37.10	31.33	25.55	8.45	7.43	5.12
<b>Percent (%) by Weight</b>	<b>100%</b>	<b>32.3%</b>	<b>27.2%</b>	<b>22.2%</b>	<b>7.3%</b>	<b>6.5%</b>	<b>4.5%</b>

Based on the data collected from the City of Hendersonville and the Town of Fletcher, newsprint comprised approximately 32.3% by weight of the recycle material waste stream collected by the two entities. Mixed paper comprised 27.2% of the waste stream with glass accounting for approximately 22.2%. OCC, plastic and cans comprised the remaining portion of the recycle waste stream at approximately 7.3%, 6.5% and 4.5% by weight respectively. This data will be utilized to project the tonnage of recyclable material that may be realized through the implementation of curbside recycle collection throughout the unincorporated areas of the County. An analysis of data provided by the City of Asheville, NC, as a part of their Request for Proposals for Curbside Recycling Collection Programs, revealed similar percentages by weight of the aforementioned recyclable constituents. Through their collection program, newsprint comprised approximately 26.1% by weight followed by mixed paper at 25.5% and glass at 23.7% by weight. OCC, plastic and cans comprised the remaining portions of their waste stream at 7.1%, 5.8% and 3.7% by weight respectively.

## **Franchised Collection:**

One option available to the County for the collection of recyclable material is the implementation of a franchised countywide residential waste and recyclable material collection program. This could be easily done through the present permitted haulers or through a franchise program with a qualified recycle material collector. Presently three political entities provide this service to their respective residents. These are the City of Hendersonville, the Town of Fletcher and the Town of Laurel Park. The Town of Mills River and the Town of Flat Rock do not presently provide collection services for residential waste or recyclable material to their respective citizens. Through a mutual agreement with the County, franchised collection services (residential waste and recyclable materials) could be offered to these citizens as well as the unincorporated areas of the County.

It is estimated there are approximately 31,338 households in the unincorporated areas of Henderson County. This assumption was reached through an analysis of the population data provided by the State Demographics Branch of the Office of State Budget and Management and the U.S. Census Bureau. Using this same data, it was estimated that the Town of Mills River has approximately 2,778 households and the Town of Flat Rock has approximately 1,400 households. A portion of these households are presently participating in some form of recyclable material collection service provided through their permitted hauler for residential waste whereas some are presently utilizing the recycle collection services at the Stoney Mountain Road Landfill. However, for the purposes of this evaluation it is assumed there are approximately 35,516 households available to participate in a franchise type residential waste and recycle material collection program in the unincorporated area of the County (31,338 households) and the Town of Mills River (2,778 households) and the Town of Flat Rock (1,400 households).

The City of Hendersonville and the Town of Fletcher provide curbside recycle collection services to their respective citizens. Based on an analysis of this data, it was determined the City of Hendersonville collects an estimated 8.8 pounds per week of recyclable material per household and the Town of Fletcher collects approximately 11.2 pounds of recycle material per household. It should be noted that these estimates are based on the estimated number of households within each entity and not the estimated number of households actually participating in the recycle collection program. It should also be noted that the weights of collected material are based on estimates of the total recyclables collected divided by the estimated number of total households. The City of Asheville, in their recent Request for Proposals for Curbside Recycling Collection Programs (April 2009) provided data on the tonnage of recyclable material collected for calendar year 2006, 2007 and 2008 in addition to the estimated number of households a bidder could anticipate serving as a part of their program. A copy of this data is included in Appendix G. An analysis of the recyclable material collected during calendar year 2008 divided by the estimated number of households revealed an average weekly collection of approximately 6.4 pounds of recyclable material per week per household. Based on information received relative to Buncombe County, NC, their recyclable material collection rate per household is similar to that of the City of Asheville. Using a weighted average of this available data, it was determined that Henderson County could anticipate collecting in the range of 7.0 pounds per week per household or approximately 30.3 pounds per month on average of recyclable material per household. The supporting analysis is included in Appendix G.

Based on the aforementioned analysis, Henderson County could anticipate collecting approximately 5,697 tons of recyclable material per year from the unincorporated areas of the County (31,338± households at 30.3 pounds per month equals approximately 5,697 tons per year). Including the Town of Flat Rock and the Town of Mills River in a franchised residential waste and recycle collection program could add approximately 760 tons per year of additional recyclable material to the program. This is based on the assumption of an additional 4,178 households participating in the program (Town of Flat Rock at 1,400± households and the Town of Mills River at 2,778± households) with each household assumed to contribute approximately 30.3 pounds per month on average of recyclable material. By including the Towns of Flat Rock and Mills River in a curbside recycle collection program, Henderson County could anticipate collecting approximately 6,457 tons per year of recyclable material.

Unincorporated

Henderson County: 31,338± households at 30.3 pounds/month = 5,697 tons/year

Town of Flat Rock: 1,400± households at 30.3 pounds/month = 255 tons/year

Town of Mills River: 2,778± households at 30.3 pounds/month = 505 tons/year

**Total Anticipated Recyclable Material Collection: 6,457 tons/year**

Based on the recycle waste stream composition as determined in a prior paragraph for the City of Hendersonville and the Town of Fletcher, the County could anticipate receiving the following estimated breakdown of recyclable material based on collecting approximately 6,457 total tons per year of commingled recyclable material:

Table 17: Estimated Waste Stream Composition Based On Collecting 6,457 Tons Of Recyclable Material Per Year.

<b>Recycle Waste Stream Composition</b>	<b>Percent (%) of Recycle Waste Stream by Weight</b>	<b>Estimated Tons Collected Per Year</b>
News Print	32.3%	2,086
Mixed Paper	27.2%	1,756
Glass	22.2%	1,433
OCC	7.3%	471
Plastic	6.5%	420
Cans	4.5%	291
<b>TOTALS</b>	<b>100%</b>	<b>6,457</b>

In general, the County could anticipate receiving approximately 2,086 tons per year of newsprint and 1,756 tons per year of mixed paper in addition to approximately 1,433 tons of mixed glass products. This would be in addition to approximately 471, 420 and 291 tons per year of OCC, Plastic material and cans respectively.



**Summary:**

The first option is for the County to continue to collect recyclable material at the Stoney Mountain Road Landfill facility through the existing Citizen's Convenience/Recycling Center. Presently, the County collects approximately 2,000± tons per year of recyclable material. In conjunction with this option and as discussed in other sections of this report, the County should consider the construction of an upgraded convenience center adjacent to the landfill facility. The second option is to construct additional convenience centers in strategic locations throughout the County to facilitate residential waste disposal as well as the collection of recyclable material. This is in conjunction with the proposed upgrade of the convenience center at the Stoney Mountain Road Landfill. Through this option the County could realize an estimated increase in recyclable material collection of approximately 2,482 tons per year (124% increase) for a total of approximately 4,482± tons per year of recyclable materials collected for processing. However, the County would incur additional cost for constructing and operating the sites as well as collecting and hauling the material to a central consolidation point and/or processing facility. The third option is to franchise the collection of residential waste and recyclable material throughout all unincorporated areas of the County including those entities not presently offering this service to their citizens (Towns of Flat Rock and Mills River). This is in conjunction with the proposed upgrade of the convenience center at the Stoney Mountain Road Landfill. Through this option the County could realize an estimated increase in recyclable material collection of approximately 4,457 tons per year (223% increase) for a total estimated tonnage of approximately 6,457± tons per year of recyclable material collected for processing. The advantage to this option is the County does not incur an additional cost for the construction and operation of additional convenience centers nor does it incur additional cost to collect and haul the collected recyclable material to a central processing facility. The cost for franchised recycle collection service would be incurred by the participating citizens and should be minimal. A summary of projected tonnages collected through each of the aforementioned options is listed below:

Continue Present System at Landfill:	2,000± tons/year
Construct Additional Convenience Centers:	4,482± tons/year (124% increase)
Franchised Curbside Recycle Collection:	6,457± tons/year (223% increase)

The recommendation is for the County to consider the implementation of a franchised residential waste and recyclable material collection program for the unincorporated areas of the County. Those entities not presently offering this type of service to their citizens (Town of Flat Rock and the Town of Mills River) should also be included in the program. The collected recyclable material could either be processed by the franchised collector or the County has the option of constructing a processing facility for handling the recyclable material portion of the waste stream. At the present time, a processing facility may need to be located at a facility not in conjunction with the Stoney Mountain Road Landfill facility. This suggestion is due to present site constraints. Should space become available in the future then the County may wish to consider locating a more permanent recycle material processing facility on or adjacent to the present landfill facility.

Regardless of the option chosen, the best method to ensure the contributing factors (percent participation and pounds contributed per household) are at their highest is to continually inform the citizens on the value of recycling through various educational programs, brochures and other promotional activities.

### **Recycle Material Processing Equipment:**

The type of processing facility being considered by the County is a material recovery facility or MRF. This type of facility would generally receive a combined waste stream comprised of designated recyclable materials collected through some type of recycle collection program (i.e., franchised collection services, convenience centers, etc.). Once the material is received at the facility, it would be separated by constituent type and consolidated for eventual resale on the open market. The separation of the various constituents can be as simple or as complex as the County may desire. The degree of sophistication is generally driven by the available markets and market prices for the processed material.

During the initial planning stage for a MRF, the County will need to determine the level of sophistication that it desires in the final product. From there a specification would be prepared basically defining standards for the various types of equipment as well as establishing the overall system quality. Defining a clear understanding of what the system is expected to accomplish will help achieve the desired outcome. Utilizing the specification, equipment suppliers would design the individual process equipment generally using their own proprietary equipment and provide guarantees for their equipment's performance. This method of process equipment design helps to ensure compatibility between the various components of the system.

Most MRF processing operations require a certain amount of manual separation of the various recyclable constituents. However, automation of certain tasks is becoming more prevalent as newer processing facilities are being brought on line. Magnetic separators are being used to remove ferrous metals from the waste stream through the use of electromagnetic fields. Eddy-current separators utilizing induced magnetic fields are being used to separate non-ferrous metals consisting primarily of aluminum cans and foil products from the waste stream. Various types of air classifiers or air knives may be used to separate lighter weight material from the waste stream. Automated bins that tip directly onto a conveyor belt allow like material to be transported to a baler eliminating the need to pull and dump boxes with a piece of equipment. Generally the bins are sized in accordance with the baler capabilities thereby allowing a full bin to be compressed into a designated number of bales without undue waste or material overage. Again, the level of sophistication of the separation process will have a direct affect on the desired level of automation designed and built into the processing system.