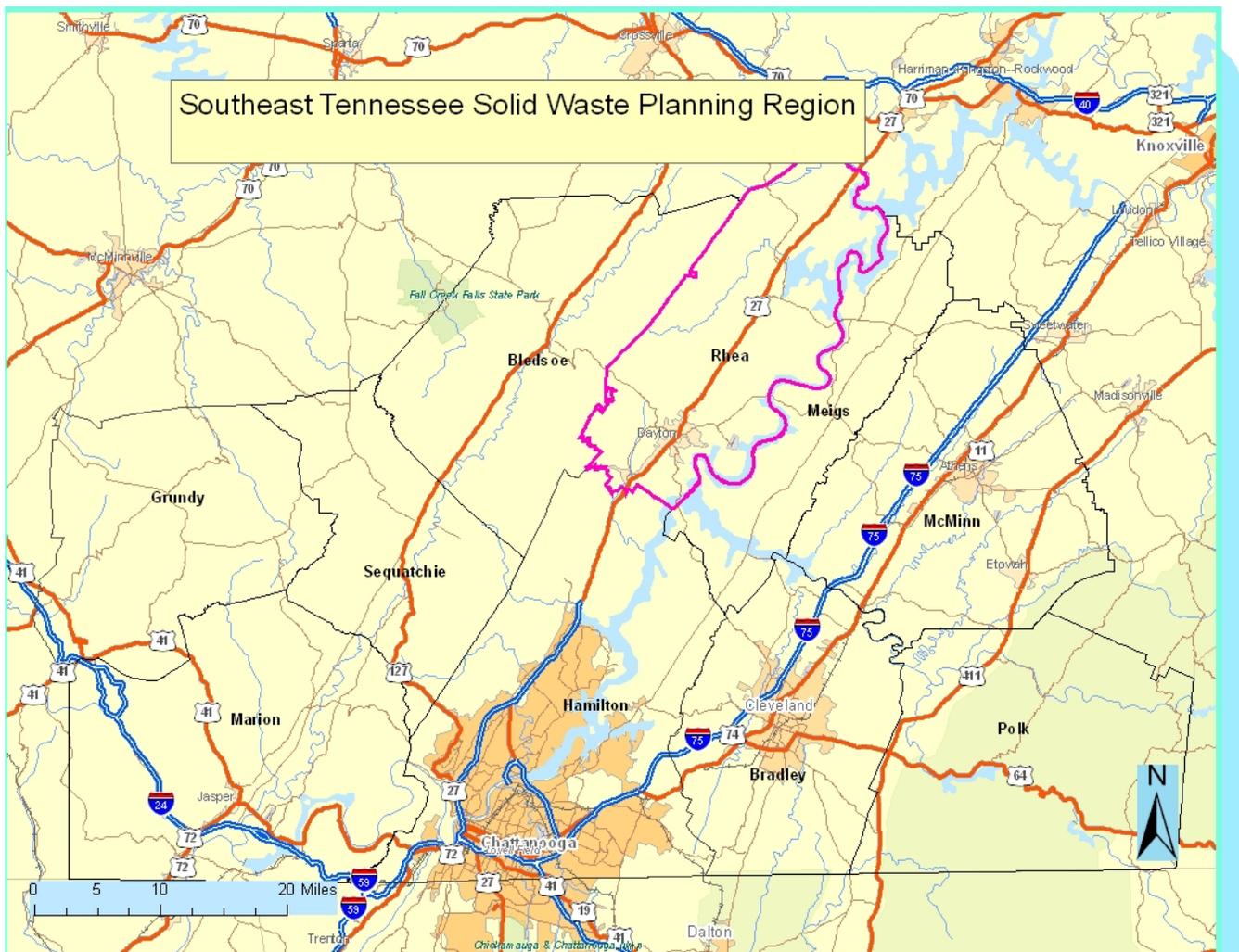


SOUTHEAST TENNESSEE MUNICIPAL SOLID
WASTE REGION

RHEA COUNTY

SOLID WASTE NEEDS ASSESSMENT

SPRING 2010



INTRODUCTION

The Solid Waste Management Act of 1991 (SWMA) was written to avert extreme financial hardships that could have occurred if small local governments were suddenly required to upgrade landfills to meet Resource Conservation and Recovery Act (Subtitle D) regulations. Rules were promulgated by the Tennessee Department of Environment & Conservation to implement Subtitle D included provisions requiring landfill operators to line facilities with impermeable clay and synthetic materials; install leachate collection systems and monitoring wells; and provide thirty years of post-closure care. These were, at the time, extremely expensive changes in the development and operation of disposal facilities, and there was fear in the legislature that some counties would not have a disposal option.

In order to ensure that local governments were protected from high costs and lack of disposal capacity, the SWMA promoted regional landfills, an attempt to guide small counties into alliances with other counties. Theoretically, small counties would form a regional board that

would then settle on a disposal site, and each local government would share in the cost of operation. The law even has a provision that would allow local governments to require all entities within their respective jurisdictions to dispose of their waste at the regional landfill. The premise behind the latter concept proved to be unconstitutional (see *Carbone vs Clarkstown*, U.S. Supreme Court, May 1994). While acknowledging that the flow control provision existed, no county in the State was willing to pledge public funds to facilities that may not receive enough waste to garner the tipping fees needed to meet costs.

During the same period in the early 1990s, the Tennessee Valley Authority was exploring ways to integrate solid waste into fuel supply systems at power plants that had the existing technology to properly combust waste material. One of these plants was located in Kingston, and local officials became interested in combining their respective waste streams, closing most of their landfills, and hauling everything to a waste-to-energy facility.

Engineers working with TVA had prepared studies for other power plants and suggested the Watts Bar site as an alternative because two moth-balled fossil fuel plants are located there. The engineers recommended installing a companion boiler system that would utilize existing infrastructure and reduce the haul distance for all southeast Tennessee counties. Other infrastructure planned for the site included a materials recovery facility (MRF), which would have diverted enough material to meet the SWMA waste reduction goal. This situation was the catalyst for the formation of the Southeast Tennessee Municipal Solid Waste Planning Region, which included all of the counties within the Southeast Tennessee Development District¹. Without the flow control provision, commitments from all counties and cities were vital in bringing this project to fruition.

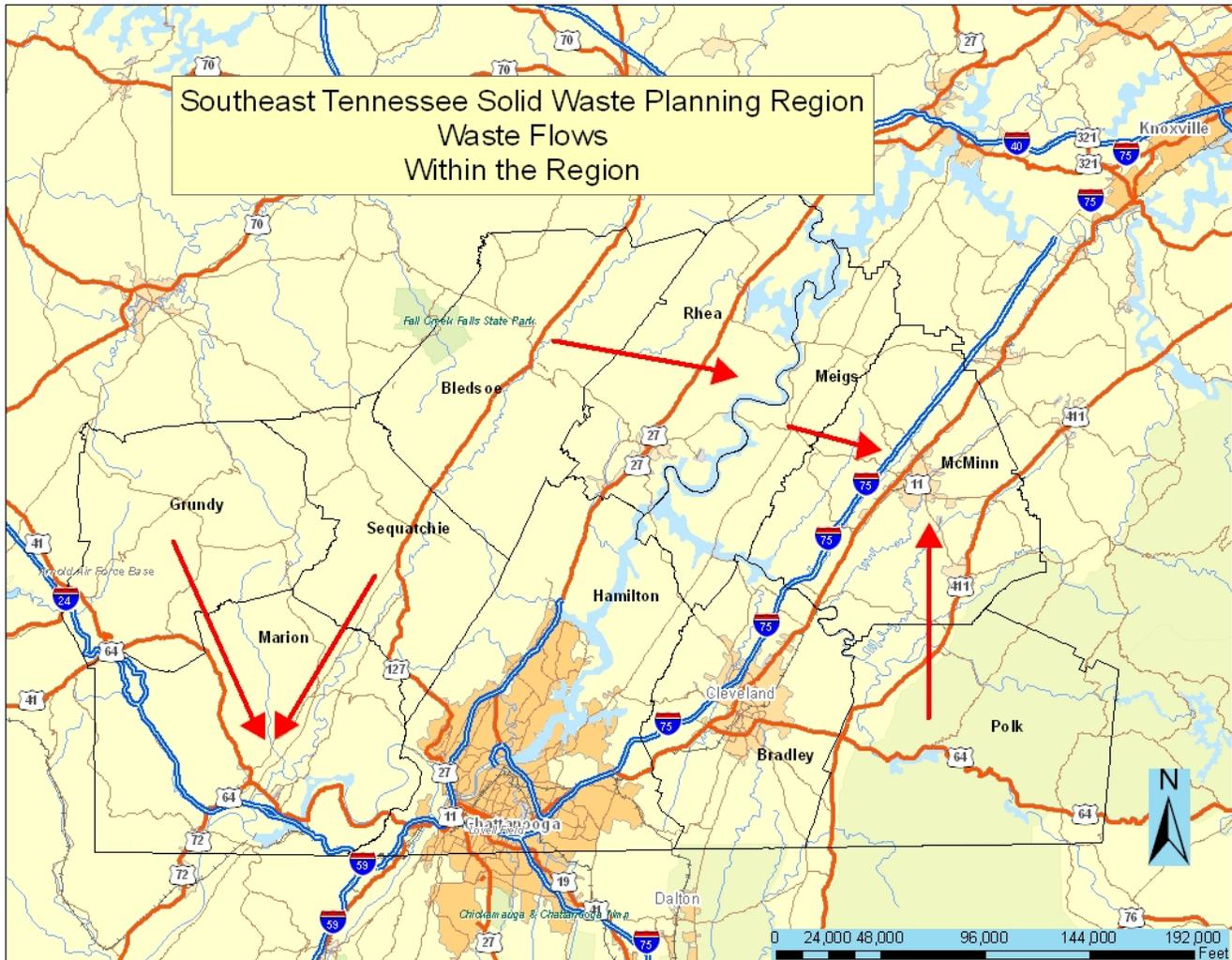
After the completion of studies funded by TVA, the utility lost interest in the project. No official reason was ever conveyed, but the decision was probably based on the fact that any emissions from the proposed plant would have a potential impact on the Cherokee National Forest and the Smokey Mountain National Park. TVA's involvement in the project was crucial because the utility had existing infrastructure and would have bought the steam produced by the plant. Tipping fees would have been a reasonable \$35 per ton, including MRF operations. Without TVA, the Board could not finance a stand-alone facility because tipping fees would have reached \$100 or more, far above existing landfill disposal costs.

The failure to implement the waste-to-energy project did not deter the Board from remaining a regional planning entity. Board members were comfortable with the situation and wished to remain together in the event that other regional opportunities arose.

¹ The Southeast Tenn. Municipal Solid Waste Planning Board is composed of Rhea, Bradley, Rhea, Hamilton, Rhea, McMinn, Meigs, Polk, Rhea, and Sequatchie Counties.

Saving landfill space was a primary goal of the SWMA. Many experts believed early on that the cost per ton of garbage would be in the \$40 - \$90/ton range at Class I facilities. Consequently, recycling, waste diversion, and saving landfill space became paramount goals. High tipping fees failed to materialize, however, as competition and economies of scale drove down development costs. Subsequently, many cities and counties found themselves with expensive recycling and waste diversion programs. Studies by several jurisdictions showed costs of \$280+ to recycle a ton of waste material versus \$25-\$28 dollars to simply dump it in the landfill. It is no surprise that many cities dropped their recycling programs (they weren't required by law to have one in any case) and shifted most of the burden to county governments, which were required to meet SWMA goals. There was no crises, no shortage of landfill space, and most of the landfill operators were marketing their space to any and all, inside of Tennessee or out, in the region or not. The more waste coming into the landfill, the more money is made for the operators. Few landfill operators were (or are) working diligently to save space; they are generally selling as much space as possible for the best price.

In Southeast Tennessee there are six (6) operating Class I Landfills. SANTEK Environmental, Inc. operates two of these facilities for Bradley and Rhea Counties respectively. SANTEK can generally landfill all of the waste that it can attract to either landfill, some of it from Georgia. In return, the counties get reduced or no disposal costs, income from disposal operations, and assistance with programs, including the State's Household Hazardous Waste collection events.



Meadow Branch, a private landfill located in McMinn County, provides disposal for several counties in East Tennessee, including several outside of the region. McMinn County receives a host fee for Meadow Branch, and operates its own landfill, which also accepts waste from outside the region.

Marion County's landfill is operated by an Authority. Like the other landfills, waste is accepted from any source. In the past, landfill operators have received waste from Dade County, Georgia, Jackson County, Alabama, and both Hamilton and Franklin Counties in Tennessee. The landfill routinely accepts all of Grundy and Sequatchie County's waste.

Chattanooga operates the sixth landfill in the region. It is a facility that originally belonged to Hamilton County, but when the city's Summitt Landfill was closing, the city and county came to an agreement that allowed Chattanooga to own and operate the landfill. This landfill could accept waste from other areas, but there are currently no customers. A large proportion of the Chattanooga/Hamilton County waste stream, over 200,000 tons annually, goes to an Allied Waste landfill located in northern Alabama.

The original solid waste assessment for the entire region advocated sub-regions composed of natural “waste sheds.” In reality, these sub-regions have occurred, essentially as predicted, based on the economics of waste generation, hauling distance, etc. As the previous map indicates, these sub-regions consist of county groupings as follows: Bledsoe-Rhea; Meigs-McMinn-Polk; Bradley County; Hamilton County; and Grundy-Marion-Sequatchie.

The following is a detailed description of Rhea County’s waste collection, diversion, and disposal system and how these programs function in relation to other parts of the Region. Every attempt has been made to provide an objective assessment of the County’s infrastructure and program needs based on the legal requirements of the SWMA.

SECTION 1: DEMOGRAPHIC INFORMATION

Provide a table and chart showing the region’s population for the last ten (10) years with a projection for the next five (5) years. Provide a breakdown by sub- table and sub-chart, or some similar method to detail all county and municipality populations. Discuss projected trends and how it will affect solid waste infrastructure needs over the next five (5) years.

Like most of the rural counties in the southeastern section of Tennessee, Rhea County’s population decreased after 1950. This was primarily due to out-migration as people moved elsewhere for jobs. This trend began to reverse after 1970 when some economic development opportunities began to emerge in the region.

Two developments had a profound impact on the county: the completion of a four-lane highway connecting the county to the Chattanooga metropolitan area, and a bridge over the Tennessee River on Highway 60 that provides a link to I-75. Since then, population growth has accelerated, increasing 20 percent from 1990 to 2008.

Table 1.1 Historic Population

Year	Population
1950	16,041
1960	15,863
1970	17,202
1980	24,235
1990	24,344
2000	28,400
2008	30,374

Source: U. S. Census Bureau

The Census Bureau estimates that the 2008 population was 30,374, an increase of 1,974 individuals or 6.5 percent over the 2000 population of 28,400. The population density in the non-municipal portion of the county is 90 people per square mile (40 households), which is very near the national density of 86.2 persons/square mile but much lower than Tennessee's 149.4 (2007 U.S. Census American Community Survey).

Table 1.2 Population Projections

Year	Mathematical Model	Tenn. Dept. of Health	Mean
2000	28,400	28,400	28,400
2001	28,190	28,643	28,417
2002	28,465	28,958	28,711
2003	28,739	29,356	29,047
2004	29,013	29,601	29,307
2005	29,288	29,858	29,573
2006	29,562	30,330	29,946
2007	29,836	30,551	30,194
2008	30,110	30,804	30,457
2009	30,385	31,072	30,728
2010	30,659	31,357	31,008
2011	30,933	31,576	31,255
2012	31,208	31,803	31,505
2013	31,482	32,061	31,772
2014	31,756	32,337	32,047
2015	32,031	32,625	32,328

Sources: Southeast Tenn. Development District mathematical projection, and Tennessee Dept. of Health, Office of Policy, Planning, and Assessment, Division of Health Statistics cohort methodology.

The Census Bureau population estimate of 30,374 in 2008 is 264 more than the SETDD projection and 430 less than the Tennessee Department of Health estimate. There are likely to be fluctuations in the population because there is a significant population of migrant workers in the county, especially during the growing season. In order to take this variance into account, it was decided to average to two projection methods.

The county and its municipalities have the industrial, commercial, or institutional resources to support additional population growth. It is also near enough to the Chattanooga-Hamilton County Metropolitan Statistical Area to benefit from the metropolitan economic center.

Table 1.3 Municipal Characteristics

Year	Population		County Percent
	County	Municipal	
1950	16,041	N/A	N/A
1960	15,863	13,677	13.8%
1970	17,202	14,292	16.9%
1980	24,235	14,510	40.1%
1990	24,344	14,217	41.6%
2000	28,400	15,306	46.1%

Source: U. S. Census Bureau

It is significant that the county's population was primarily located in the municipalities through 1970, but sometime during that decade the non-municipal population increased considerably. Obviously, little or no annexation took place during this period and new development was outside municipal boundaries. From 1960 to 2000, the municipal population only increased by 1,629. The following projections assume that the municipalities will maintain a near parity population position with rural areas in the county.

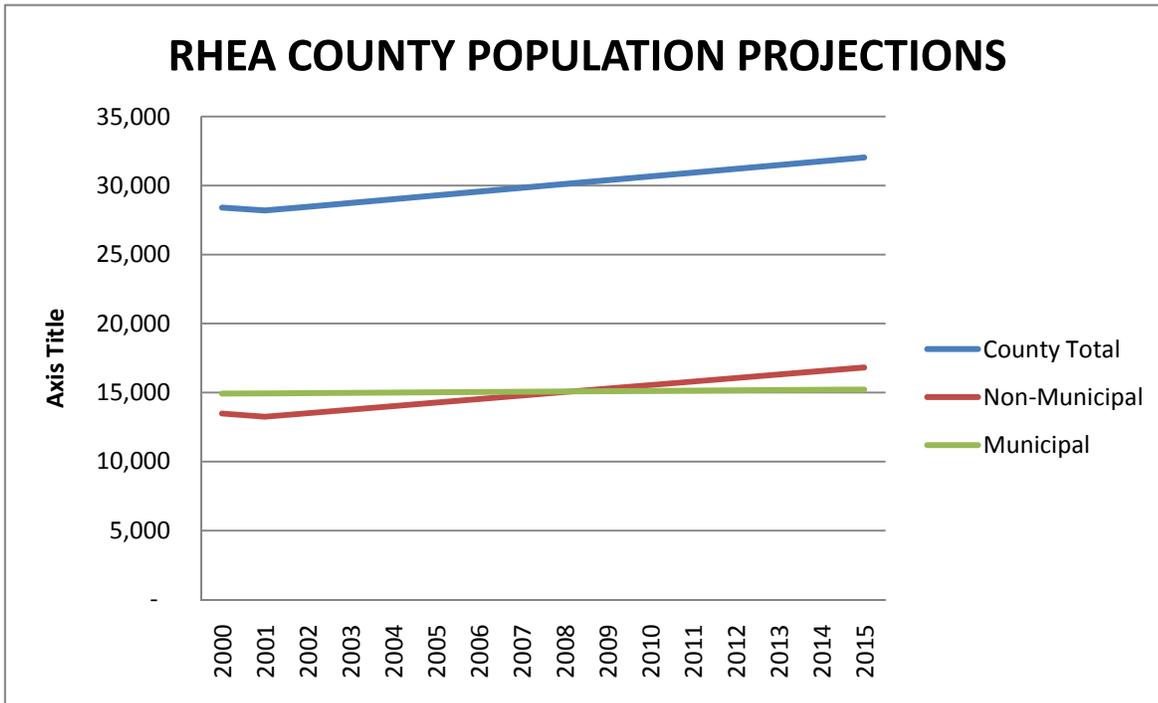
Table 1.4 Municipal Population Projections

Year	Rhea	Dayton	Graysville	Spring City	Non-Municipal
2000	28,400	12,749	516	1,652	13,483
2001	28,190	12,774	514	1,649	13,253
2002	28,465	12,799	511	1,647	13,508
2003	28,739	12,824	508	1,645	13,762
2004	29,013	12,849	505	1,642	14,017
2005	29,288	12,874	502	1,640	14,271
2006	29,562	12,899	500	1,638	14,526
2007	29,836	12,924	497	1,635	14,780
2008	30,110	12,949	494	1,633	15,035
2009	30,385	12,974	491	1,630	15,289
2010	30,659	12,999	488	1,628	15,544
2011	30,933	13,024	486	1,626	15,798
2012	31,208	13,049	483	1,623	16,053
2013	31,482	13,074	480	1,621	16,307
2014	31,756	13,099	477	1,619	16,562
2015	32,031	13,124	474	1,616	16,816

Sources: Southeast Tenn. Development District mathematical projection, and Tennessee Dept. of Health, Office of Policy, Planning, and Assessment, Division of Health Statistics cohort method.

Since all of the municipalities provide waste collection service, about half the county's population should have access to curbside collection. If current trends prevail, the non-municipal portion of the county's population will surpass the municipal population. However, annexation could change this scenario. The cities have growth boundaries developed under

Tennessee Code, Public Chapter 1101 (Growth Policy, Annexation, and Incorporation) that will allow them add territory to their respective jurisdictions if there is the political will to do so.



SECTION 2: ECONOMIC PROFILE

Provide a table and chart showing the region's economic profile for all county and municipalities for the last ten (10) years with a projection for the next five (5) years. This can be accomplished by using the following economic indicators.

Rhea County's economy is only moderately dependent on surrounding areas for employment opportunities because there is a significant industrial base within the county. The county is home to several major manufacturing plants, including La-Z-Boy furniture and a Huber particle board plant. It is also home to the Watts Bar Nuclear Plant where Unit 2 is back under construction after it was left incomplete two decades ago.

The county is only 20 minutes from Chattanooga, so workers in the county have ample employment opportunities associated with the development that is occurring in the metropolitan area. Energy related firms such as Alstom Power and Aerisyn (wind tower manufacturing) are expanding operations, and Volkswagen is scheduled to open a new automobile manufacturing facility in 2011. U.S. 27 offers a limited access four-lane highway to workers who will be commuting to these jobs..

Table 2.1 Rhea Workforce

Population 16 years and over	24,264
In labor force	14,123
Civilian labor force	14,109
Employed	12,691
Unemployed	1,418
Armed Forces	14
Not in labor force	10,141

Source: U.S. Census, 2006-2008 American Community Survey

Although the above table indicates that the unemployment rate was around 10 percent in 2008. The latest annual unemployment rate is near 14 percent, not including discouraged and under-employed individuals. The following table provides a progression of the unemployment rate increase, showing a major jump after the acute phase of the current recession in the 2007-2008 period.

Table 2.2 Employment

<u>Year</u>	<u>Civilian Labor Force</u>	<u>Employment</u>	<u>Unemployment</u>	<u>Unemployment Rate (%)</u>
2009	13,190	11,390	1,810	13.7
2008	13,430	12,340	1,090	8.1
2007	13,000	12,210	790	6.1
2006	13,280	12,450	830	6.3
2005	13,310	12,410	900	6.8
2004	13,260	12,410	850	6.4
2003	13,100	12,310	790	6.0
2002	12,880	12,130	750	5.8
2001	12,860	12,120	730	5.7
2000	13,420	12,780	640	4.8

Source: U. S. Dept. of Labor, May1 2010.

Currently, the U.S. economy is still in trouble due to the recent economic meltdown. Should this economic downturn continue over a long period, Rhea County's economy would suffer greater stresses than urban areas that have a more diverse employment base. This situation could be exacerbated (or even the result of) high fuel costs, which had a pronounced negative impact on the large number of commuters that comprise the Rhea County workforce. Under

the current state of affairs, there is no reason to assume any great increase or decrease in the workforce.

Over the past several years, many retired people have found that southeast Tennessee is a great retirement area. Those who moved from northern states to Florida have become increasingly concerned about high insurance rates associated with Florida's location in the tropical storm belt, and they miss the change of seasons. This area is ideal because the climate is temperate, taxes are low, and people moving into the area can get much more for their housing dollar. All southeast Tennessee counties have benefited from the so called "half-back" immigrants: People who move from northern, snow-belt states to Florida and then move half way back.

Problems in the housing market are likely to change this trend significantly. People who own homes are finding it difficult to sell because there are so many houses on the market. As the South Florida Sun-Sentinel reported on April 3, 2008, "*Florida foreclosure activity grew by more than 63 percent in February from the previous month, giving it the nation's third-highest state foreclosure rate with one foreclosure filing for every 382 households*". With this many homes on the market, anyone wishing to sell and move to a different locality will probably be unable to do so. The foreclosure rate has continued to increase, and the market has not reached the bottom. Until then, a large proportion of "half-backs" will not be financially able to relocate, and there is little likelihood that this particular population will impact growth in the region. As RealtyTrac[®] recently reported: *Florida ended 2009 tallying 516,711 properties with foreclosure filings, a 34 percent increase from the total reported for 2008 and 213 percent higher than the level reported for all of 2007. With one in every 17 housing units receiving a foreclosure filing, Florida's foreclosure rate ranked third highest in the nation for the year.*

Due to the foregoing factors, we can assume that the population projections are reasonable for the mid-term. In a stressed economy, significant migration could occur in or out of the region based on economic factors.

Table 2.3 Economic Profile

Year	Total	Employment	Unemployed		Per Capita Income	Retail Sales (\$1,000's)
			Total	Percent		
2000	13,420	12,779	641	4.8%	19,646	193,712
2001	12,856	12,124	732	5.7%	19,454	184,226
2002	12,882	12,129	753	5.8%	20,355	184,258
2003	13,154	12,361	793	6.0%	21,590	207,353
2004	13,320	12,466	854	6.4%	21,928	232,137
2005	13,312	12,410	902	6.8%	22,324	241,466
2006	13,283	12,449	834	6.3%	23,385	259,240
2007	13,002	12,212	790	6.1%	24,534	271,771
2008	13,429	12,340	1,089	8.1%	25,205	289,085
2009	13,194	11,389	1,805	13.7%	26,071	254,962
2010	13,205	12,258	1,800	13.6%	26,790	289,382
2011	13,213	12,242	1,755	13.3%	27,510	305,294
2012	13,221	12,225	1,710	12.9%	28,229	321,205
2013	13,229	12,208	1,325	10.0%	28,948	337,117
2014	13,237	12,192	1,220	9.2%	29,667	353,028
2015	13,245	12,175	1,100	8.3%	30,386	368,940

Sources: Historic employment data, U. S. Dept. of Labor; Per capita income data, U.S. Bureau of Economic Analysis; Retail data, Tenn. Dept. of Revenue; Bank deposits, FDIC.

All state and local area dollar estimates are in current dollars (not adjusted for inflation). Projections: SETDD staff.

Projections of employment from 2010 to 2015 assume a slowly recovering economic situation. In that case, the unemployment rate is likely to continue on a slow downward trend if the available workforce expands. New industry moving into the region should ameliorate some of the existing momentum for downsizing that has reduced the available employment. Much of this has been in the furniture manufacturing and construction related industries, such as the Huber particle board manufacturing plant in the northern end of the county.

Much of the expansion in the workforce will depend on the number of retirement-aged workers who opt to continue working rather than retire to a fixed income that may not support their families. One of the biggest issues facing potential retirees is health care: Can they afford to pay premiums on health insurance if they do not have assistance through an employer? In many cases, the answer is no, and the worker remains on the job simply to obtain necessary health coverage. As the following chart indicates, the retirement-aged population will be significant as the 45-54 age group moves from the year 2000 to 2010. Should this age group choose to retire, the unemployment rate may moderate, all other things being equal.

Rhea County did not suffer a severe decline in retail sales due to the recession, a fact attributed to the momentum from previous economic gains. It is possible that the local economy may recover as future prospects for industrial development improve due to the construction of a Volkswagen AG manufacturing facility nearby in Chattanooga. Some space is available in the local Industrial parks for any company that is looking for a location to provide parts and services to the Volkswagen plant.

Another development that will provide an economic stimulus to Rhea County is the location of Wacker Chemical, a photovoltaics manufacturer, to the north Bradley County area. This is near enough to attract workers from Rhea County, and there is the possibility of new industrial locations in the county to supply the solar energy industry.

Table 2.4 Employment by Occupation

	2002	2003	2004	2005	2006	2007	2008	%Change
All Industries	10,277	10,689	10,865	10,786	10,775	10,556	10,391	1%
Agriculture, Forestry, Fishing, & Hunting	99	83	25	28	24	14	13	-662%
Mining	30	33	31	33	32	35	39	23%
Utilities	729	710	689	656	669	651	734	1%
Construction	318	334	305	284	301	336	366	13%
Manufacturing	4,734	4,779	4,679	4,593	4,337	4,263	4,126	-15%
Wholesale Trade	57	90	89	98	111	123	102	44%
Retail Trade	818	917	964	976	974	970	1,079	24%
Transportation/Warehousing	198	212	239	256	261	47	49	-304%
Finance & Insurance	177	175	192	197	171	162	157	-13%
Information	32	43	43	56	69	71	65	51%
Real Estate	46	46	65	82	85	90	43	-7%
Professional & Technical Services	120	118	1	1	1	1	1	n/a
Administration & Waste Services	60	n/a	165	165	436	465	283	79%
Educational Services	680	726	736	752	699	700	712	4%
Health Care & Social Services	227	232	244	249	255	268	285	20%
Arts, Entertainments, and Recreation	56	31	32	44	61	50	52	-8%
Accommodations & Food Services	674	786	920	875	859	697	696	3%
Other Services	108	118	124	111	103	101	104	-4%
Public Administration	439	446	472	464	449	454	455	4%

Source: U.S. Dept. of Labor, Bureau of Labor Statistics, April 2010.

Since 2002, Rhea County lost 15 percent of its manufacturing jobs while construction jobs increased by 13 percent. With a reduction in the housing market and lower home starts, statistics for construction jobs will probably show a reduction in that sector as well. The largest increase in jobs came in the health care sector, which is up 20 percent over 2002 figures.

Rhea County residents have not fared as well as the average state resident. As the following table indicates, incomes range from a high of around 27 percent to a low of 20 percent less than the state as a whole. These are significant differences that illustrate the extent of the disadvantages that must be overcome in providing services to a population that has less capacity for funding non-vital services than the majority of other non-metropolitan areas.

Table 2.5 Per Capita Income Comparison

Per Capita Income Comparison

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008
United States	29,845	30,582	30,838	31,530	33,157	34,690	36,794	38,615	40,166
Tennessee	26,095	26,839	27,448	28,276	29,565	30,705	32,167	33,395	34,089
Rhea	19,646	19,454	20,355	21,590	21,928	22,324	23,385	24,534	25,205
Difference, Rhea vs Tennessee	6,449	7,385	7,093	6,686	7,637	8,381	8,782	8,861	7,093
Percent Difference	24.71%	27.52%	25.84%	23.65%	25.83%	27.30%	27.30%	26.53%	20.81%

Source: Tennessee Dept. of Labor and Workforce Development, *The Source*, May1 2010.

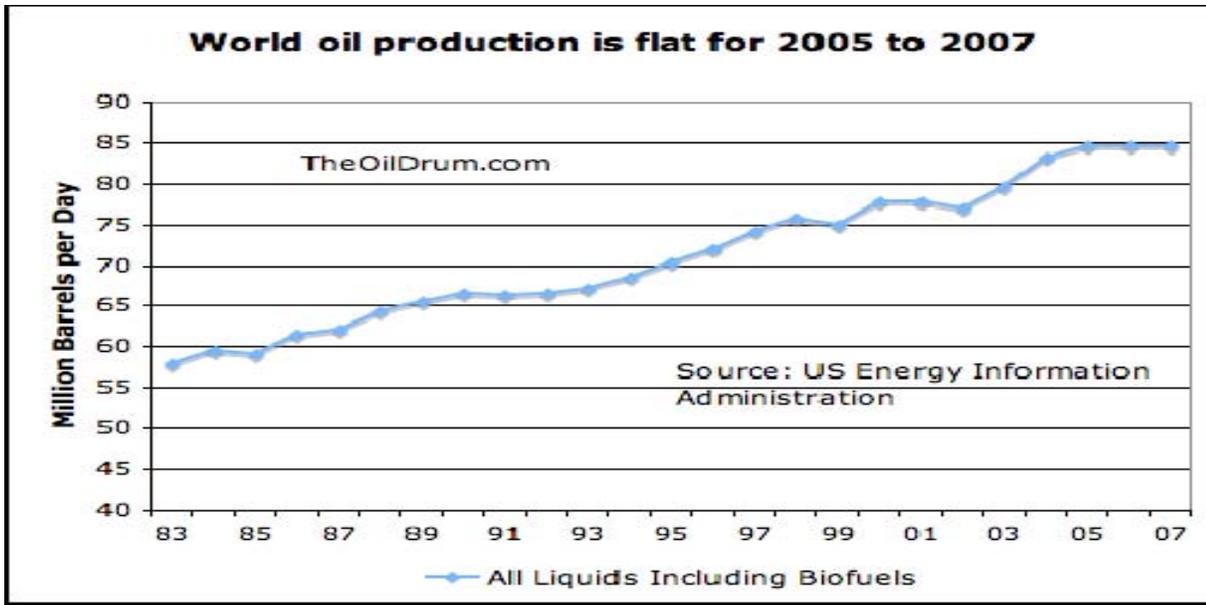
The primary economic problems on the horizon are disruptions in the home mortgage markets and energy supplies. As previously discussed, the home mortgage problems will likely curtail near-term investment in new homes, especially by retirees moving into the region. More problematic (and at a basic level, related) is the increasing cost of energy. It is becoming more apparent that liquid fuels production is not keeping pace with world-wide demand.

Oil depletion is the primary culprit as some of the largest oil fields in the world begin to decline. Statistics published by the International Energy Agency (EU), the Energy Information Agency (US), and the BP Statistical Abstract indicate that crude oil production has not increased above mid-2005 levels. This reflects decline rates in several oil provinces such as the North Sea oil fields (UK and Norway) which are experiencing a 15-18% loss in production annually. Larger declines of more than 30 percent annually are occurring at the giant Cantarell oil field in Mexico. This was the second largest oil field in the world and a primary source of supply for the U.S., but oil volumes are falling fast and the Mexican oil company PEMEX estimates that exports of oil could cease within five years.

Even OPEC, previously the final arbiter of world oil prices, has lost production capacity in the last few years. Although large volumes of oil will remain available on the world market, there does not seem to be enough to maintain current production levels.² This will result in significant dislocations and have pronounced impact on waste generation levels.

² Hirsch, R.L., Bezdek, R.H, Wendling, R.M. *Peaking of World Oil Production: Impacts, Mitigation and Risk Management*. DOE NETL. February 2005.

Figure 2.1



As the previous graph illustrates, the current production is at a plateau, which may become permanent. No large oil fields have been discovered since the 1970's, and promising geological structures are in areas that present significant difficulties for recovery. For example, Chevron Oil's last major attempt at adding reserves – the “Jack” well – is located 27,000 feet below the surface of the Gulf of Mexico. Bringing oil to production at such depths has never been attempted and will require new technology to deal with extreme pressures and heat. This project will also require investments in the billions of dollars.

Figure 2.2

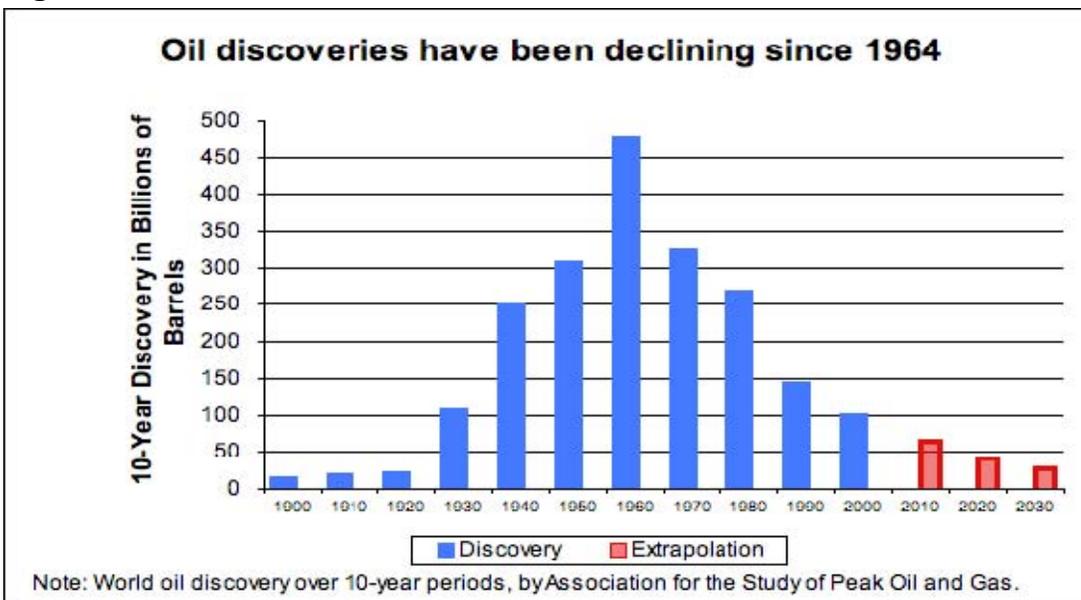
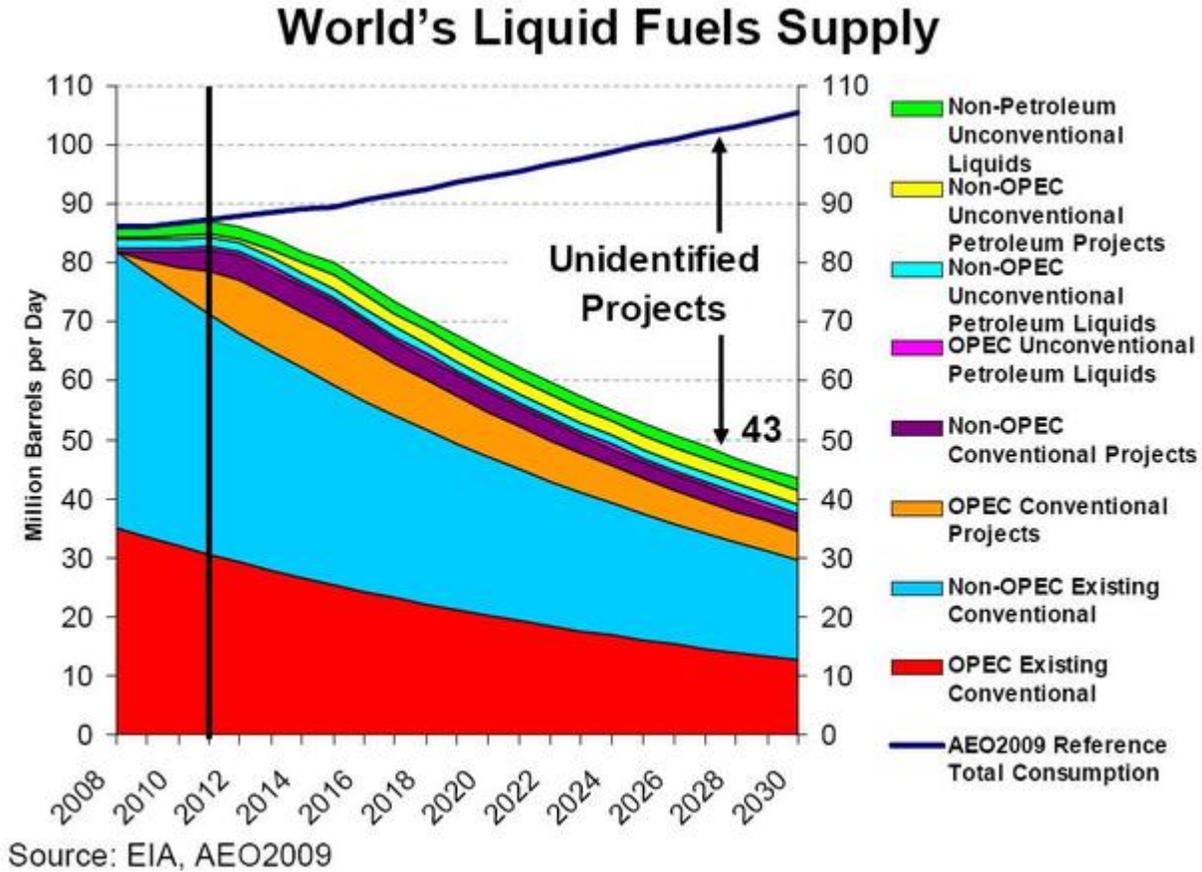


Figure 2.3



The International Energy Agency's 2008 World Energy Outlook (published 12 November 2008) assessed 800 oil fields. That analysis showed a 6.7 percent decline rate in production, which will rise to 8.6 percent by 2030. Additional oil needs will be the equivalent of finding four more Saudi Arabias. It is obvious that any economic recovery will result in an increase in oil prices, which in turn will result in further recessionary conditions. The outlook for future economic growth is therefore bleak and solid waste production will likely remain flat or decline following lower consumption.

SECTION 3: SOLID WASTE STREAM

Elaborate on the entire region's solid waste stream. Compare today's waste stream with anticipated waste stream over the next five (5) years. How will the total waste stream be handled in the next five (5) years? Include in this discussion how problem wastes like waste tires, used oil, latex paint, electronics and other problem wastes are currently handled and are projected to be handled in the next five (5) years. What other waste types generated in this region require special attention? Discuss disposal options and management of these waste streams as well as how these waste streams will be handled in the future. Include in this discussion how commercial or industrial wastes are managed. Also provide an analysis noting source and amounts of any wastes entering or leaving out of the region.

Several waste characterization studies conducted in various parts of the country may be used to estimate waste stream components in the southeast Tennessee region. There are no known contemporary studies that were performed in Tennessee but studies from other states should provide a reasonable source for extrapolating waste generation attributes to local populations. The following table provides a comparison of some studies in relatively comparable states as well as the nationwide EPA estimate.

Table 3.1

Waste Characterization Studies

Material	Georgia 2004	Iowa 2005	Ohio 2005	EPA 2006
Paper	38.7	33	41	33.9
Plastics	15.8	14.9	16	11.7
Metals	5.3	4.7	4	7.6
Glass	3.7	1.7	5	5.3
Yard Waste		1.6	9	12.9
Food Waste		10.6	15	12.4
Wood		8		5.5
C & D	5.9	5.5		
Durable		5.1		
Textiles & Leathers		4.9	6	7.3
Diapers		2.4	4	
Rubber		0.5		
HHMS		0.4		
Other		6.8		3.3
Organics	27.2			
Inorganic	3.4			
Total:	100	100.1	100	99.9

As is obvious from the table, different states use different definitions for the material types. From observation of the Rhea County waste stream, the Iowa percentages appear to be more representative because they mirror a predominately rural landscape. The Environmental Protection Agency's numbers are generally accepted for most areas in the U.S., but they tend to be heavily weighted toward large metropolitan areas because that is where most of the population lives and where most of the waste is produced. As the following table illustrates, Iowa and Tennessee have a similar urban/rural mix, which is considerably different from U.S., Georgia, and Ohio percentages.

Table 3.2

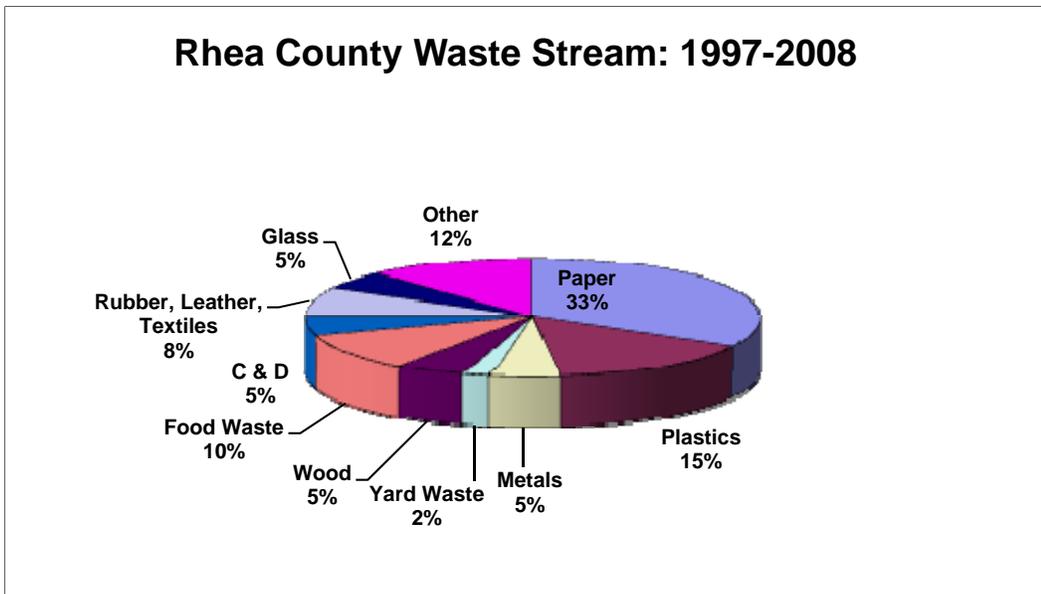
Population Comparison

	Georgia	Iowa	Ohio	Tennessee	United States
Total:	8,186,453	2,926,324	11,353,140	5,689,283	281,421,906
Urban:	5,864,163	1,787,432	8,782,329	3,620,018	222,360,539
Rural	2,322,290	1,138,892	2,570,811	2,069,265	59,061,367
Urban Percent	72%	61%	77%	64%	79%
Rural Percent	28%	39%	23%	36%	21%

U.S. Census Bureau 2000

Using composite percentages based on random observation of the waste stream, the following chart provides a rough illustration of waste volumes by type of material. Waste generation does not necessarily mean that these materials enter the waste collection system. In rural counties like Rhea, much of the wood waste, construction and demolition (C & D), and food wastes are disposed of on private property. Very little change is expected in waste stream composition over the next five (5) years.

Figure 3.1



The remote locations of convenience centers that serve very small population means that fuel costs are high for collection and transport of materials while volumes are low because there are few if any commercial or industrial customers that provide a concentrated stream of recyclable material that can offset the cost of access small volumes produced by residential customers alone.

Table 3.3

Jurisdiction/ Sector	Collection	Disposal Options	Current Problem Waste Handling	Future Problem Waste Handling	Other Problem Waste
Rhea County	Seven (7) county convenience centers. Available to all residents, including those within municipalities	All waste collected at convenience centers is taken to the Rhea County Class I landfill in the Evensville community of Rhea County, TN.	Waste Tires: Mac Tire, Inc. contract Automotive Fluids: Local commercial lube operations Used Oil: Latex Paint: None Electronics: None	Waste Tires: Collected at the landfill; hauled by a contractor Develop collection method at convenience centers Assistance from RMCET to collect and market	HHW collected at mobile collection event.
City of Dayton	Curbside	Rhea County Landfill	Residential only		
Town of Graysville	Curbside	Rhea County Landfill	Residential only		
Town of Spring City	Curbside	Rhea County Landfill	Residential only		
Business	Contracts with private haulers and self-service by business/industry.		In-house programs and contractors	In-house programs and contractors.	Commercial generation of hazardous waste is regulated by TDEC.

Currently, there are no programs available to handle electronics.

SECTION 4: REGIONAL COLLECTION SYSTEMS

Describe in detail the waste collection system of the region and every county and municipality. Provide a narrative of the life cycle of solid waste from the moment it becomes waste (loses value) until it ceases to be a waste by becoming a useful product, residual landfill material or an emission to air or water. Label all major steps in this cycle noting all locations where wastes are collected, stored or processed along with the name of operators and transporters for these sites.

Convenience centers are the primary waste collection method available to Rhea County residents. Recycling available at convenience centers includes mixed metals that are collected in roll-off containers. Tires are collected at the landfill and hauled by a contractor

under the State grant program. Virtually all of the waste is taken to the Rhea County Class I landfill for disposal.

Rhea County has seven (7) convenience centers strategically located to maximize access to all residents (see attached map). The centers are located as follows:

- | | |
|-------------|------------|
| Morgantown | St. Clair |
| Rattan | Grandview |
| Back Valley | Graysville |
| Wolf Creek | |

Convenience centers are open from 7 am to 7 pm, Monday, Wednesday, Friday and Saturday, and they are open on Sunday from 1 pm to 6pm

The minimum number of convenience centers required is calculated using the formula that determines a reasonable number by land area rather than population. This method was chosen because population densities are low and the county is relatively large. With a current population of about 31,516 (Source:http://www.stats.indiana.edu/uspr/a/us_profile_frame.html) the minimum required number of centers would be only 2.6 or, rounding up, 3 using the TDEC formula of dividing the population by 12,000. This would not adequately serve the rural population so the following method was deemed more appropriate.

Table 4.1

Minimum Collection Required

	Total Sq. Miles	Non-Service Area*	Difference	Required Centers	Existing Centers
Rhea	336	29.38	306.62	2	7

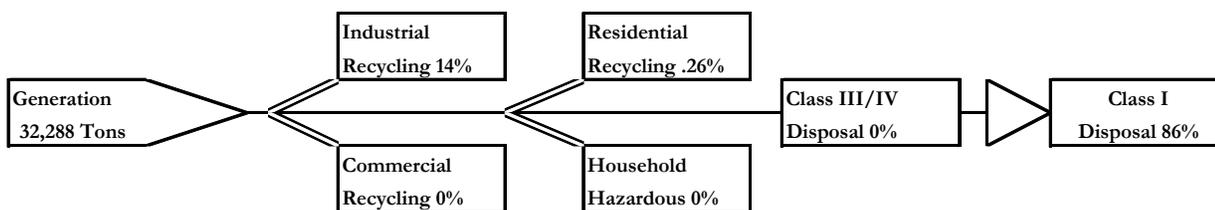
*Includes water cover and municipalities with waste collection service.

The above formula subtracts the area where waste collection service is not appropriate and the resulting figure is divided by 180 square miles (TDEC formula) to arrive at a reasonable waste-shed area. This formula excludes TVA property (Chickamauga Lake) that is not populated and can be deducted from the total square miles of potential service area. Even without accounting for non-service areas, the calculation establishes a maximum required number of just two. Although the formula suggests that two centers are adequate, seven centers were constructed to serve sections of the county that would be cut off from essential services due to topographic barriers and poor transportation facilities.

Regional solid Waste Flow and Life-Cycle

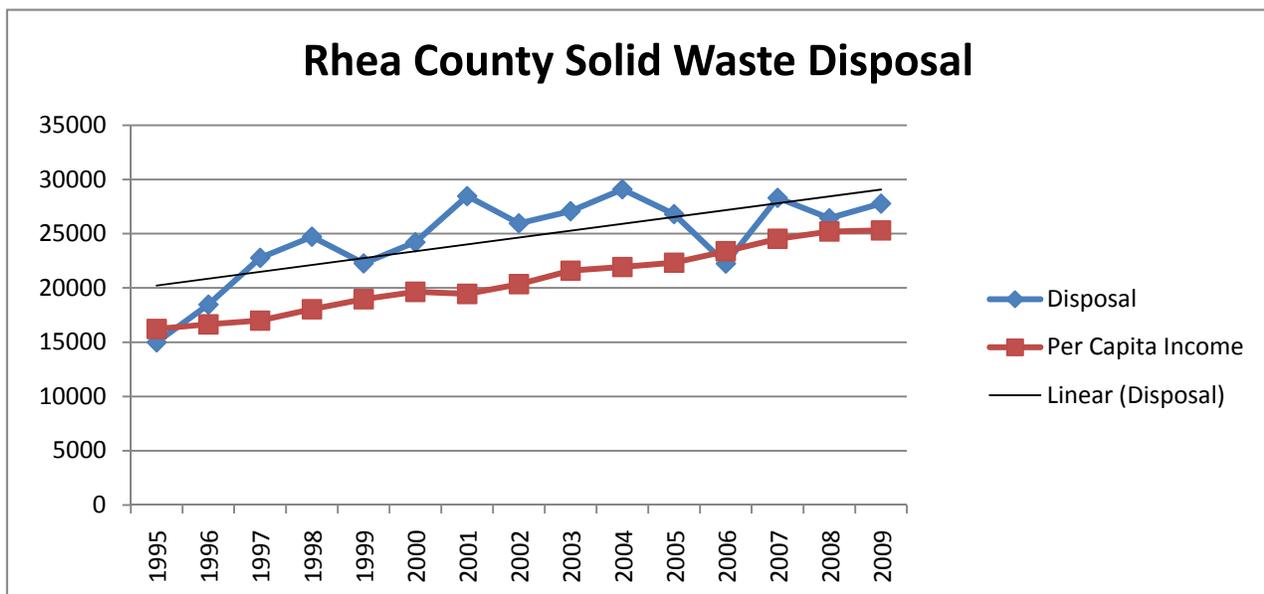
The following chart represents data collected for the 2009 Annual Report for the Southeast Tennessee region. As is apparent, there are no data available on waste reduction or diversion because it is very difficult to document waste diversion in a rural county. Most of the yard waste is disposed on site by burning (a permitted option) or hauled to a remote location. All wood waste from sawmills and other commercial operations is generally used for livestock bedding and/or as a soil additive. In an urban county, this data would likely be captured and counted toward waste reduction/re-use efforts, but most of the local commercial operations are small, family-owned businesses, and collecting sufficient information to make an estimate of waste volumes is extremely difficult.

Figure 4.1 Waste Flow



Recycling rates are very low for county operations. In the last calendar year, industrial recycling was 1,069 tons less due to lower economic activity associated with the current recession.

Table 4.2 Waste Generation



As is apparent from the preceding chart, Rhea County's waste stream is closely linked to economic conditions. As the per capita income increases or decreases, the volume of waste follows suit.

Given the current economic climate, waste generation is likely to be stagnate or decline in the near term. However, waste systems must be maintained. More collection capacity will not be needed, but existing capacity could handle more than is currently produced.

SECTION 5: WASTE REDUCTION

The Solid Waste Management Act of 1991 states that all regions must reduce the amount of waste going into Class I landfills by 25%. Amendments to the Act allow for consideration of economic growth, and a "qualitative" method in which the reduction rate is compared on a yearly basis with the amount of Class I disposal. Provide a table showing reduction rate by each goal calculation methodology. Discuss how the region made the goal by each methodology or why they did not. If the Region did not met the 25% waste reduction goal, what steps or infrastructure improvements should be taken to attain the goal and to sustain this goal into the future.

Table 5.1

MSW % Reduction Compared to Base Year	MSW % Reduction Pop Ratio	MSW % Reduction Using Pop Econ Ratio	MSW % Reduction Real Time Comparison
-14.2	-14.2	-26.4	14.0
-14.2	-14.2	-26.4	14.0

The preceding table was taken from the Re-Trac™ summary report.

Assuming a population of about 30,300 in 2009 and a waste volume of about 32,000 tons (including recycling and diversion) the per capita waste generation rate for Rhea County was 1.6 tons per person. That amounts to about 5,8 lbs/person/day, which is far above the national average of 4.6 lbs. (see <http://www.epa.gov/epawaste/nonhaz/index.htm>). Omitting the industrial contribution to the waste stream, the total amount falls to 27,886 tons, 0.92 tons per person and 5 lbs/person/day, which is near the national average.

SECTION 6: COLLECTION AND DISPOSAL CAPACITY

A. Provide a chart indicating current collection and disposal capacity by facility site and the maximum capacity the current infrastructure can handle at maximum through put. Provide this for both Class I and Class III/IV disposal and recycled materials. Identify and discuss any potential shortfalls in materials management capacity whether these are at the collection or processor level.

Table 6.1: Regional Landfills

Site Name(s)	Annual Tons Rhea County	Permit Number	Current Capacity	Maximum Capacity	Projected Life of Facility
Rhea County Landfill	36,000	SNL72-0269	Capacity not determined	Capacity not determined	20 years

Note: Capacity limits have not been explored. Landfills are capable of handling all local waste plus large volumes of waste hauled from other counties.

All waste collected at Rhea County convenience centers is hauled to the regional landfill in Rhea County, which is operated by SANTEK Environmental, Inc.. There are no Class III/IV landfills within a reasonable haul distance of Rhea County waste collection facilities.

B. Provide a chart or other graphical representation showing public and private collection service provider area coverage within the county and municipalities. Include provider's name, area of service, population served by provider, frequency of collection, yearly tons collected, and the type of service provided.

Table 6.2: Regional Collection Systems

Provider of Service	Service Area	Population Total Under This Service	Frequency of Service (Weekly, Bi-weekly, on call, etc.)	Annual Tonnage Capacity	Type Service (Curbside, Convenience Center, Green Box)
Rhea County	County-wide drop-off	28,000	As Needed	22,000	Convenience Center
Town of Graysville	Municipal Limits	488	Weekly	300	Curbside
City of Dayton	Municipal Limits	12,999	Weekly	8,300	Curbside
Town of Spring City	Municipal Limits	1,628	Weekly	1,050	Curbside

The county's convenience centers provide a full range of service. Each is equipped with a 4 yd³ compactor feeding into a 40 yd³ receiving container; and at least one 40 yd³ open top roll-off container for bulky items.



Graysville Convenience Center



Morgantown Convenience Center



Rattan Convenience Center



Back Valley Convenience Center



Wolf Creek Convenience Center



St. Clair Convenience Center



Grand View Convenience Center

SECTION 7: FINANCIAL NEEDS

Complete the chart below and discuss unmet financial needs to maintain current level of service. Provide a cost summary for current year expenditures and projected increased costs for unmet needs.

Table 7.1 Expenditures & Revenues

Description	Present Need	Unmet Needs	Total Needs	Explanation
EXPENDITURES	(\$/year)			
Salary and Benefits	\$ 267,939	\$ 50,000	\$ 317,939	\$50,000 salary/benefits for solid waste director
Transportation/Hauling	63,430	-	63,430	Includes in collection & disposal systems
Collection and Disposal Systems (includes salaries & benefits)	77,405	-	77,405	Contracted services
Equipment	7,485	32,504	39,989	\$27,504 in annual payments for a new roll-off truck plus \$5,000 in new roll-off containers (1 purchase annually)
Sites	1,888	-	1,888	
Convenience Center	-	-	-	
Transfer Station	-	-	-	
Recycling Center	-	-	-	
MRF	-	-	-	
Landfills	30,400	-	30,400	Disposal fee
Site	-	-	-	
Operation	250,000	-	250,000	
Closure	-	-	-	
Post Closure Care	-	-	-	
Administration (supplies, communication costs, etc.)	36,083	6,000	42,083	Website construction
Education	-	-	-	
Public	6,400	2,000	8,400	Ed. Materials and website maintenance
Continuing Ed.	-	-	-	
Capital Projects	-	-	-	
Other	36,140	-	-	
Total:	\$ 777,170	\$ 90,504	\$ 867,674	

As the previous table indicates, one of the primary unmet needs is a recycling coordinator to handle the day-to-day operations of the county system. The county also needs additional containers to handle recycling, including paint containers, and a new roll-off truck to handle the continuous work-load of hauling waste to the landfill and recycling to end users.

Additional funding for website development is needed because this is a primary medium for disseminating information about the waste collection and recycling program. Funding is also needed for manpower and printed materials to augment those already in circulation.

SECTION 8: ORGANIZATION, STAFFING AND FACILITIES

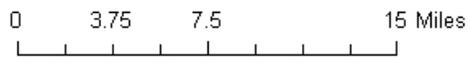
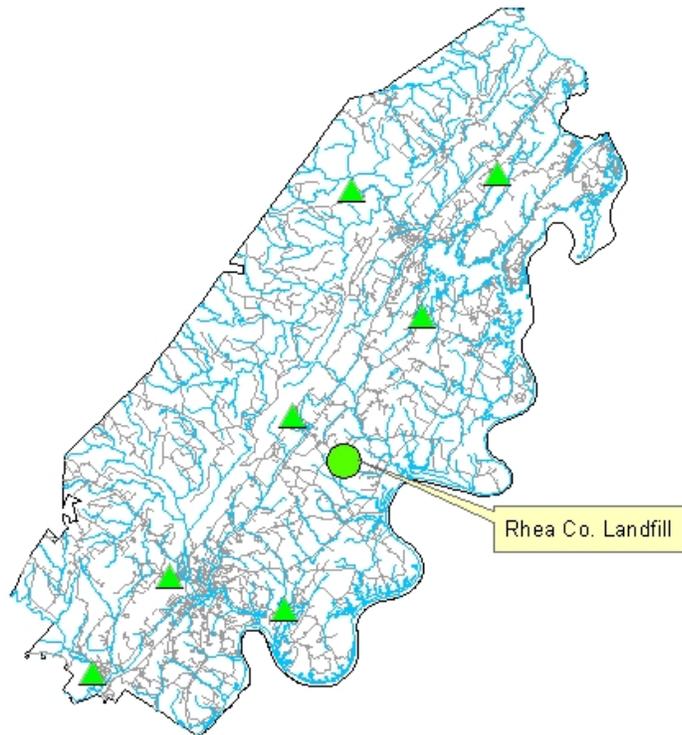
Provide organizational charts of each county and municipality's solid waste program and staff arrangement. Identify needed positions, facilities, and equipment that a fully integrated solid waste system would have to provide at a full level of service. Provide a scale county level map indicating location of all facilities including convenience centers, transfer stations, recycling centers, waste tire drop-off sites, used oil collection sites, paint recycling centers, all landfills, etc. Identify any short comings in service and note what might be needed to fill this need.

Solid Waste Staffing

Dayton, Graysville, and Spring City provide curbside waste collection service to their residents using 20 cubic yard rear loader trucks. Generally, the cities have a truck driver and 1-2 collection workers who work on waste collection 1-2 times per week. These workers have other duties outside of solid waste collection. There are no municipal recycling programs in the county.

Like many rural counties, Rhea provides a full service waste collection program. All waste hauling and disposal from convenience centers is provided by the county. There are seven (7) convenience centers with operators and a truck driver to haul waste to the landfill. All other solid waste services are provided by the landfill operator, Santek Environmental.

Rhea County Solid Waste Facilities



 = Convenience Centers

As the above map indicates, Rhea County has collection facilities in every community. Used tires are collected at the landfill, which is located in the Evensville Community.

SECTION 9: REVENUE

Identify all current revenue sources by county and municipality that are used for materials and solid waste management. Project future revenue needs from these categories and discuss how this need will be met in the future.

Most of the revenue for solid waste operations is transferred from the county's general fund (see Table 7.1 Expenditures/Revenues) to the Solid Waste fund. The county also receives an annual waste tire grant, an occasional recycling grant, and another annual grant from the Department of Transportation for litter control and education. Like most rural counties, there are no waste collection fees levied at convenience centers.

Tax revenues are not expected to increase substantially over the next five years. Current year sales state-wide have decreased enough to have a substantial negative impact on the state budget. This situation shows no signs of reversing in the five year planning period.

The county's last audit indicates that the solid waste budget was \$590,366 and the majority of those funds were taken from property taxes. At this time, there are no plans to increase property taxes, and no plans to institute fees at convenience centers.

REVENUE	Last Fiscal Year Budget	Unmet Need	Total	
Host Agreement Fee	-	-	-	
Tipping Fees	-	-	-	
Property Taxes	296,422	90,504	386,926	
Sales Taxes			-	
Surcharges	160,512	-	160,512	
Disposal Fees	-	-	-	
Collection Charges	-	-	-	
Industrial or Commercial Charges	-	-	-	
Residential Charges	-	-	-	
Convenience Center Charges	-	-	-	
Transfer Station Charges	-	-	-	
Sale of Methane Gas	-	-	-	
Other Sources (Grants, Bonds, Interest, Sales, etc.)	44,631	-	44,631	
Transfer from Fund Balance	247,830			
Other	21,375		21,375	
Total:	\$ 770,770	\$ 90,504	613,444	

SECTION 10: EDUCATION

Describe current attitudes of the region and its citizens towards recycling, waste diversion, and waste disposal in general. Where recycling is provided, discuss participation within the region. Indicate current and on going education measures to curb apathy or negative attitude towards waste reduction. Are additional measures needed to change citizen's behaviors? If so, what specific behaviors need to be targeted and by what means?

Over the last 15 years, waste disposal in Rhea County has been transformed from unattended, burned-out green boxes surrounded by blowing litter to clean, well-maintained convenience centers. Illegal garbage dumps were common as was roadside litter. Today, roadside litter is still a constant problem, but the illegal dumps have diminished to the point that they are rarely noticed. This transformation is a cultural shift that is probably the result of concerted efforts to influence the behavior of school-age children who have now become adults.

Unfortunately, we do not have studies to determine how this change in behavior came about. It is perhaps as likely that "Information Age" technology has exposed large numbers of residents to more environmental messages. Even though there is wide-spread support for the county's recycling program, more could be done to improve the knowledge base of the local population.

Current education programs focus on brochures to combat littering and promote recycling as well as K-12 educational programs in county schools. Funding for these programs is very limited, and it is difficult for the county commission to fund them when essential services require all of the county's resources.

SECTION 11: PLANNING

Discuss this region's plan for managing their solid waste management system for the next five (5) years. Identify any deficiencies and suggest recommendations to eliminate deficiencies and provide sustainability of the system for the next five (5) years. Show how the region's plan supports the Statewide Solid Waste Management Plan.

A long-term waste disposal option is available at the Rhea County landfill where all of Rhea County waste is currently disposed. The three municipalities in the county provide waste collection, but they do not sponsor recycling or waste reduction programs..

One problem likely to occur in the future is associated with the maintenance of existing facilities and equipment with lower revenues. The loss of sales and property taxes is highly likely, and there are no mechanisms available to Tennessee counties that would ameliorate these conditions.

The second problem is high fuel prices, which are likely to return as the economy recovers: studies should be undertaken in the near future to devise the most cost-effective methods for the collection and transport of waste materials and recycling.

The third problem is educating the public about waste reduction, recycling, litter control, and other waste issues. With a relatively high illiteracy rate, the county cannot rely on the written word for educational purposes. More internet-related advertising should be incorporated into the education program. In addition, radio and television advertisements should be provided while maintaining an educational presence in the K-12 schools.

Recommendations

Education

Recommendation: Much of today's information is disseminated through the internet. Consequently, it is imperative that the county develop and maintain a website that provides all of the basic details of county programs and services, including solid waste and recycling.

Action Item: Request assistance from the County Technical Advisory Service and the Southeast Tennessee Development District in developing and maintaining information on the county's website.

Facilities and Programs

Recommendation 1: The Grandview Convenience Center needs permanent facilities, including attendant shelter and a compactor.

Action Item: Provide service similar to other county centers by building a concrete pad for a compactor and receiver box as well as an attendant shelter and cover for the compactor.

Funding Source: Sanitation/Solid Waste Fund

Recommendation 2: All convenience centers need used oil collection containers.

Action Item: Apply for grant funds to purchase collection containers, containment systems and covers or contract with a private oil collection company that will provide necessary equipment.

Funding Source: Grant or private contractor

Recommendation 3: All convenience centers need waste paint collection containers.

Action Item: Apply for grant funds to purchase waste paint collection containers.

Funding Source: County Sanitation/Solid Waste Management Fund

Recommendation 4: Compactors and receiving boxes purchased in the mid-1990s need replacement.

Action Item: Purchase new compactors

Funding Source: County Solid Waste Fund

Recommendation 5: Collect high value paper products such as cardboard to increase the quantities of material diverted from the Class I waste stream.

Action Item 1: Apply for grant funds to purchase three to six roll-off containers.

Action Item 2: Contact RMCET for assistance with marketing materials, setting up milk runs, etc.

Funding Source: Solid Waste Management Fund

Recommendation 6: Encourage the development of recycling programs in municipalities.

Action Item: Meetings between county and municipal officials and promotions at the Joint Economic & Community Development Board.

Funding Source: Appalachian Regional Commission/USDA Rural Development, Rural Utilities Service

Conclusion

In general, Rhea County has all of the facilities and programs in place to meet statutory requirements. Some improvements are possible, but the county has made a good faith effort to provide its residents with clean, efficient waste collection facilities using the most cost-effective methods available.

The County does not have access to alternate disposal options for demolition materials. Markets for recyclables are also a minimum of 30 miles from the point of generation. Reductions in tax receipts are virtually assured for the next fiscal year, and improvements to the solid waste system will likely be deferred unless some assistance becomes available from federal or state sources.