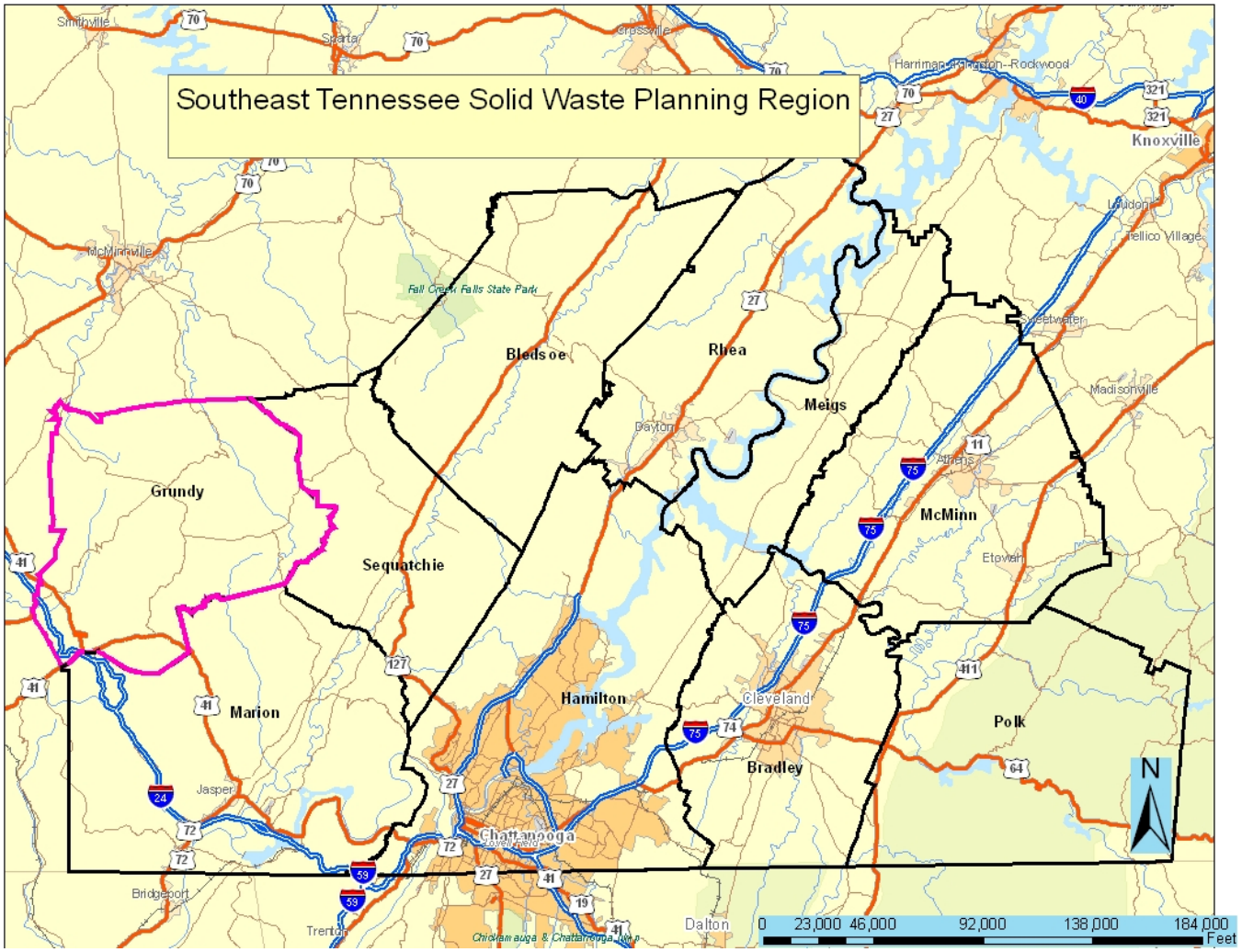
SOUTHEAST TENNESSEE MUNICIPAL SOLID WASTE REGION

GRUNDY COUNTY

SOLID WASTE NEEDS ASSESSMENT



JUNE 2013

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 District[1].

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

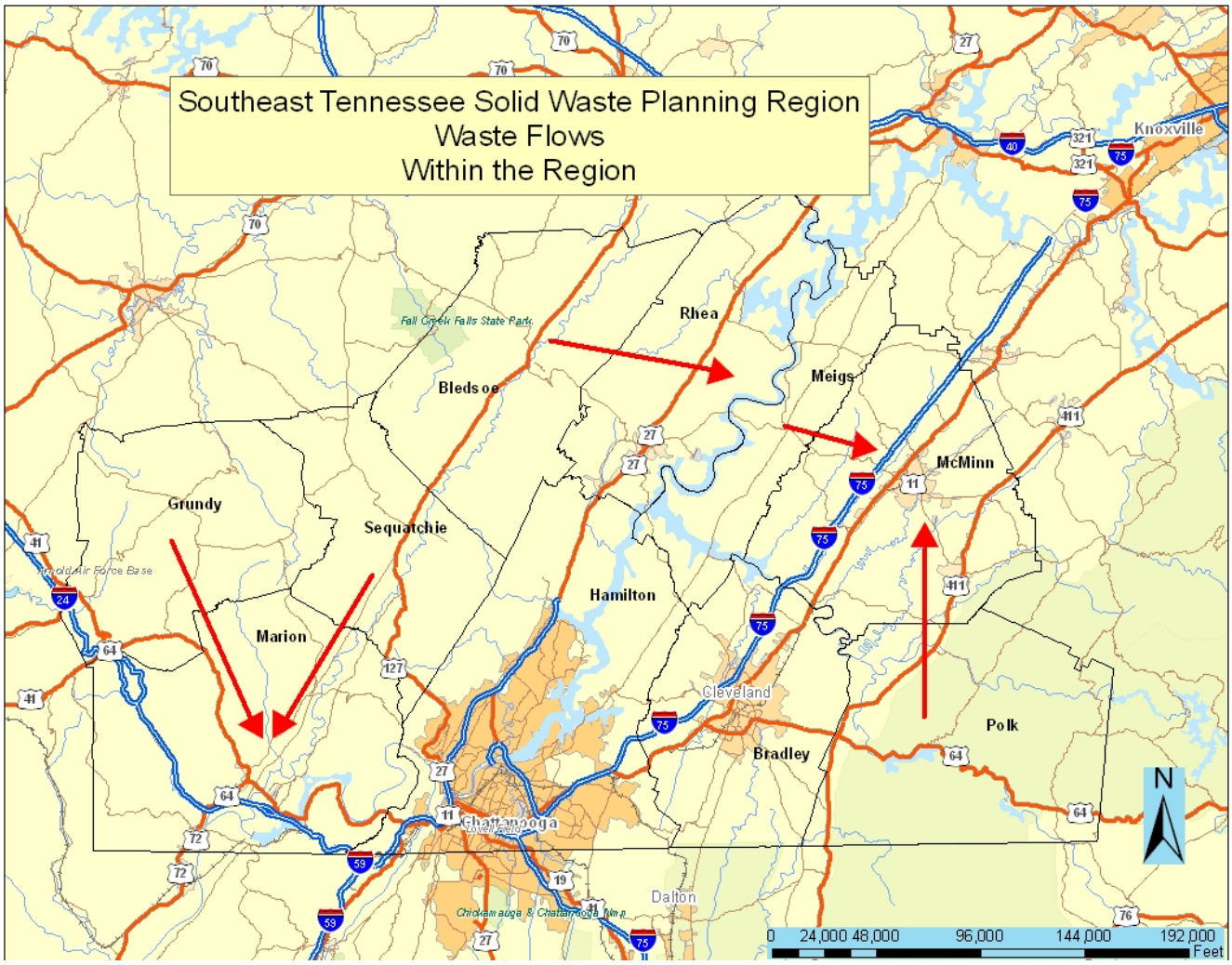
Without the flow control provision, commitments from all counties and cities were vital in bringing this project to fruition.

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.

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.



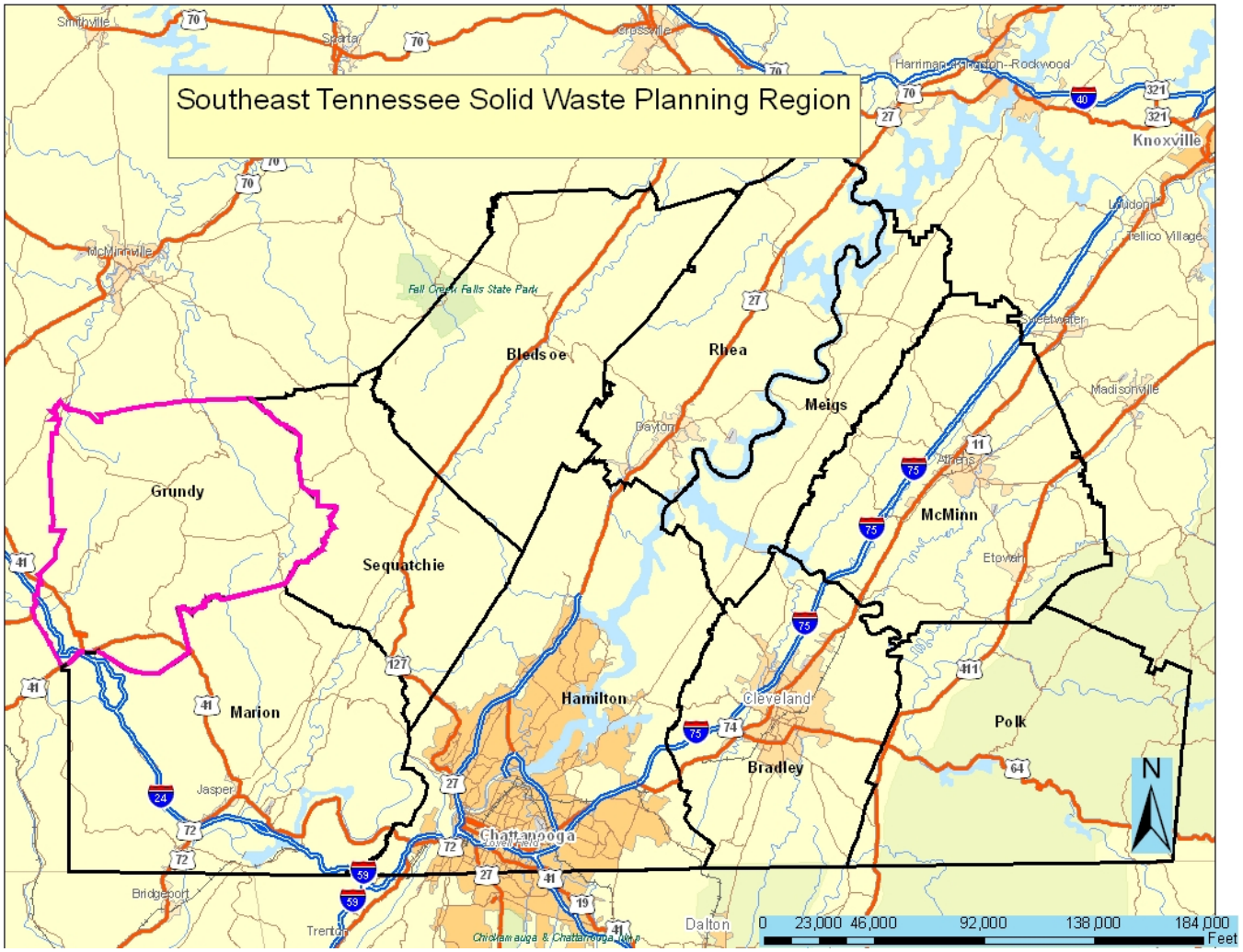
Meadow Branch, a private landfill located in McMinn County, provides disposal for several counties in East Tennessee, including several outside of the region. McMinn County receives a host fee for Meadow Branch, and operates its own landfill, which also accepts waste from outside the region.

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: Grundy-Rhea; Meigs-McMinn-Polk; Bradley County; Hamilton County; and Marion-Grundy-Sequatchie.

The following is a detailed description of Grundy 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.

Over the last decade, Grundy County's population has increased at a relatively high rate compared to previous years. From 1950 until the 1970s, the county population actually decreased by 15.3%. This was primarily due to the decline of the coal mining industry, which was the county's primary economic engine through the mid part of the century.

Table 1.1 Historic Population

Year	Population
1950	12,558
1960	11,512
1970	10,631
1980	13,787
1990	13,362
2000	14,332
2010	13,703

Source: U.S. Census Bureau

The county does not have the industrial, commercial, or institutional resources to support additional population growth, so a large proportion of the workforce commutes to Chattanooga, Tullahoma, and other areas where employment is available. As the following table indicates, more than 51% of Grundy County's workforce traveled outside the county for employment opportunities. About 30 percent spend 45 minutes or more in travel time to work.

Table 1.2 Grundy Workforce

Total	5,298
Worked in state	5,225
Worked in county	2,628
Worked outside county	2,597
Worked outside state	73

Travel time to work: Total	5,057
Less than 30 minutes	2,518
30 to 44 minutes	1,047
45 to 59 minutes	700
60 or more minutes	792

Source: 2010 U.S. Census

No updates to population counts have occurred since the 2010 Census. There are no data sources to provide information on the number of houses demolished, burned or otherwise compromised as human habitations, but one can assume that at least 450 owner occupied houses were added to the county's inventory (providing for undocumented homes). This also assumes that rental properties remain relatively constant, which is consistent with a rural population base. At 2.5 persons per household (the accepted average) that amounts to a population increase of 1,125 persons or 15,457 persons in 2008. This, of course, does not account for births, deaths, and migration.

Table 1.3 Population Projections

Year	County	Municipal	Non-Municipal	% Municipal
1997	13,792	8,187	5,605	40.6%
1998	13,877	8,290	5,587	40.3%
1999	14,301	8,394	5,907	41.3%
2000	14,332	8,147	6,185	43.2%
2001	14,426	8,600	5,826	40.4%
2002	14,519	8,704	5,815	40.1%
2003	14,613	8,807	5,806	39.7%
2004	14,706	8,911	5,795	39.4%
2005	14,800	9,014	5,786	39.1%
2006	14,894	9,118	5,776	38.8%
2007	14,987	9,221	5,766	38.5%
2008	15,081	9,325	5,756	38.2%
2009	15,174	9,428	5,746	37.9%
2010	15,268	9,532	5,736	37.6%
2011	15,362	9,635	5,727	37.3%
2012	15,455	9,738	5,717	37.0%
2013	15,549	9,842	5,707	36.7%
2014	15,642	9,945	5,697	36.4%
2015	15,736	10,049	5,687	36.1%

Sources: **Historic statistics are derived from U.S. Census Bureau data.**
Projections are derived from a least squares model of population growth.

Of the 60 built last year, the median property assessment was $106,500. The average assessment for the top 50 percent of these homes was $188,858, and the 4th quartile mean was $230,845. As will be evident from subsequent sections of this report, Grundy County is located in a relatively poor area, and it is on the Appalachian Regional Commission's list of distressed counties. As such, it is obvious that people from Grundy County are not building large, expensive houses. These are retirement homes for people moving into the county, primarily in the Monteagle area where "brow" lots (properties on the edge of the Cumberland Escarpment) bring premium prices for the incomparable views they afford.

Currently, the U.S. economy has very weak growth rates. Should this economic downturn continue over a long period, Grundy 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 Grundy County workforce. Should this situation continue, the county's population will likely stagnate by 2018. During the Depression era, Grundy County was one of 11 counties in the U.S. that were under study because 72 percent of the workforce was on relief. This county is therefore very susceptible to changes in the economic environment.

Much of the population growth has occurred in Grundy's municipal areas. However, some of the county's municipalities contain large amounts of agricultural property and woodlands. This amounts to about 0.34 acres per capita. The City of Dayton's per capita acres is 0.6, and Dunlap's is about 1.3. It is therefore obvious that the physical size of some municipalities captures a large volume of growth that would normally occur in the county.

The largest increase in the county's municipal population occurred between 1970 and 1980 with the addition of Gruetli-Laager as a city. Without that city, the population increased by only 2,047 over the forty-year period from 1960 – 2000. In 2010, municipal populations accounted for 55% of the population.

Table 1.4 Municipal Population Characteristics

Municipal Population Characteristics

	2010	2000	1990	1980	1970	1960	Sq. Miles	Acres
Altamont	1,045	1,136	679	679	546	552	10.8	6,912
Beersheba Springs	477	553	596	643	560	577	4.8	3,072
Coalmont	841	948	813	625	518	458	5.1	3,264
Gruetli-Laager	1,813	1,867	1,810	2,021	-	-	12.5	8,000
Monteagle	1,192	1,238	1,138	1,126	934	-	4.3	2,752
Palmer	672	726	769	1,027	898	1,069	5.3	3,392
Tracy City	1,481	1,679	1,556	1,434	1,388	1,577	3.9	2,496
Total:	**7,521**	**8,147**	**7,361**	**7,555**	**4,844**	**4,233**	**46.7**	**29,888**
County	13,650	14,332	13,362	13,787	10,631	11512	360.6	230,784
Municipal Percent	55%	57%	55%	55%	46%	37%		

Source: Current data was taken from the U.S. Census Bureau website (www.census.gov), and historical data from *The Tenn. Statistical Abstract*, Center for Business and Economic Research, The University of Tennessee.

None of the municipalities provide any waste collection or recycling; these are services provided exclusively by the county. Monteagle, which is partially in Marion County, and Tracy City provide water and sewer their residents. In addition they have land use control codes in place, provide fire and police protection, and other general municipal services. The other municipalities provide few services yet they comprise over half of the county by population and 13 percent by land area. Virtually all of the substantial commercial establishments are in municipalities.

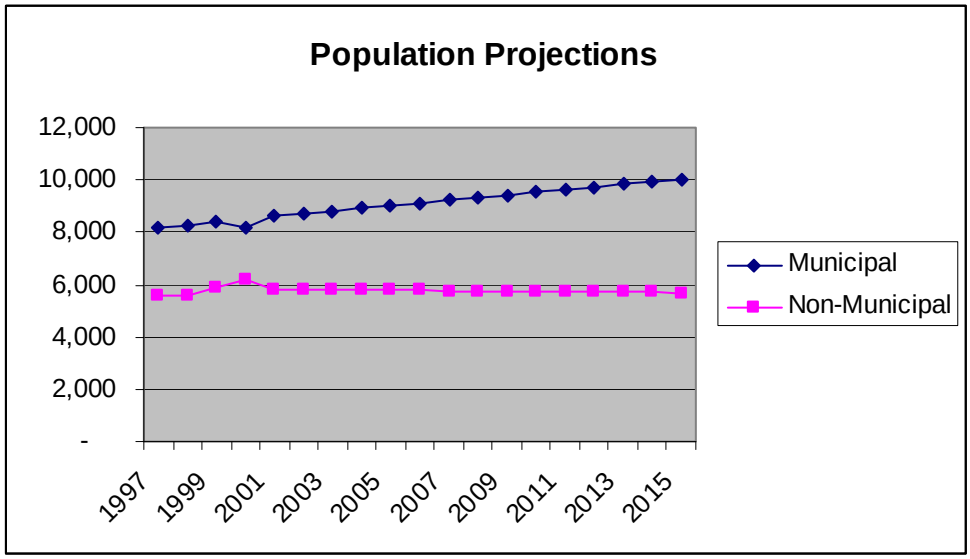
Over the past several years, many retired people have found that southeast Tennessee is a great retirement area. Those who moved from northern states to Florida have become increasingly concerned about high insurance rates associated with Florida's location in the tropical storm belt, and they miss the 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.

Due to the foregoing factors, we can assume that the population projections using the mathematical model are likely low for the mid-term, but smoothing of the growth curve will occur as in-migration slows. In a stressed economy, significant migration could occur in or out of the region based on economic factors.

Figure 1.1



Source: U.S. Census Bureau; SETDD staff projections

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.

Grundy County's economy is heavily dependent on surrounding areas since a majority of the workforce is employed outside the county. The County is situated between two grand divisions of the State, East and Middle. With this location, Grundy workers can take advantage of job opportunities in the Nashville region as well as the Chattanooga area. A major drawback is the long drive necessary to access either of these job markets. When the price of fuel increases, Grundy County's workers suffer economic distress to a greater degree than any other county in the region, and so far, finding companies willing to locate in the county has been difficult because most of the county does not have access to primary transportation routes.

The exception to this is the Monteagle and Pelham area where I-24 cuts through the southern tip of the county. An industrial park in Pelham has had some success in attracting industry, and there is considerable commercial capacity in Monteagle. Other areas of the county have

been less successful and have never recovered economically from the closure of the coal mines that previously provided long-term employment.

Table 2.1 Economic Profile

Year	Total	Employment	Unemployed		Per Capita Income	Retail Sales ($1,000's)	Total Bank Deposits (millions $)
			Total	Percent			
1997	5,950	5,590	360	6.1%	15,559	49,022	69
1998	5,890	5,420	470	8.0%	15,908	51,706	73
1999	5,790	5,350	440	7.6%	16,839	58,144	79
2000	5,750	5,400	360	6.3%	17,585	62,605	77
2001	5,780	5,420	360	6.2%	19,456	61,707	84
2002	5,690	5,310	380	6.7%	18,942	66,107	90
2003	5,550	5,230	320	5.8%	19,894	70,772	91
2004	5,710	5,420	290	5.1%	20,789	76,434	92
2005	5,580	5,250	330	5.9%	21,498	79,043	95
2006	5,600	5,240	360	6.4%	22,208	78,617	87
2007	5,760	5,250	510	8.9%	22,515	74,045	88
2008	6,150	5,640	510	8.3%	22,522	75,200	89
2009	6,159	5,635	524	8.5%	22,525	74,000	84
2010	6,170	5,620	550	8.9%	22,540	73,000	82
2011	6,172	5,605	567	9.2%	22,551	74,000	80
2012	6,175	5,600	575	9.3%	22,560	75,000	81
2013	6,178	5,595	583	9.4%	22,569	76,000	82
2014	6,181	5,590	591	9.6%	22,578	77,000	83
2015	6,184	5,585	599	9.70%	22,587	78,000	84
2016	6,187	5,580	607	9.80%	22,596	79,000	85
2017	6,190	5,575	615	9.90%	22,605	80,000	86
2018	6,193	5,570	623	10%	22,614	81,000	87

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 2013-2018 assume a “business as usual” situation. In that case, the unemployment rate is likely to continue an upward trend if the available workforce expands. Much of this expansion 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.

Table 2.2

Retail Sales: Percent Change

	Grundy	Tennessee
1999	11%	12%
2000	7%	4%
2001	-1%	2%
2002	7%	2%
2003	7%	5%
2004	7%	9%
2005	3%	5%
2006	-1%	7%
2007	-6%	4%

Source: Tenn. Dept. of Revenue, Oct. 2008

Growth in retail sales was robust over the last decade with the exception of the 2006-2007 period. A slowdown in the economy associated with the 2001 terrorist attacks probably had some bearing on the poor retail sales figures for that year. From 2006 onward, a regional drought situation also had a depressing effect on the economy due to large losses in agriculture. In 2007, the Tennessee Department of Transportation erected temporary signs on I-24 stating that there was no water at the Monteagle exit, a primary retail center for the county. TDOT was referring to the fact that their *rest area* had no water, not the Town of Monteagle as a whole. Nonetheless, travelers stayed away and retail sales slumped throughout the summer before TDOT could be convinced to change its signs.

Future prospects for industrial development are somewhat better due to the location of Volkswagen AG with a manufacturing facility in Chattanooga. Some space is available in the Pelham Industrial park for any company that is looking for a location to provide parts and services to the Volkswagen plant. Prospects for such a location are relatively good, but the Volkswagen plant will not be in operation for at least three years.

As the following table indicates, the total number of jobs has not rebounded from the high experienced in 2002. New jobs are generally in the service industry, which does not provide the level of pay or the benefits that manufacturing employees are accustomed to. This may change, but projections are based on the previous performance of the local economy.

Table 2.3 Employment by Occupation

Number of Jobs by Secton 2007 - 2012

Sector	2012	2011	2010	2009	2008	2007
Utilities	22	21	22	20	18	17
Construction	130	114	77	103	77	91
Manufacturing	280	280	434	378	371	306
Wholesale Trade	-	16	22	27	33	33
Retail Trade	253	258	258	265	237	236
Transportation/Warehousing	56	54	51	69	71	87
Information	34	32	30	32	32	36
Finance & Insurance	-	-	-	-	-	45
Real Estate & Leasing	-	-	-	-	-	11
Professional & Tech. Services	-	-	-	-	-	6
Administrative & Waste Services	26	29	18	20	17	-
Education	465	477	508	441	443	480
Health Care/Social Assistance	267	265	229	227	203	12
Other Services	19	19	21	18	10	10
Public Administration	169	157	147	142	142	146
Total:	1,721	1,722	1,817	1,742	1,654	1,516

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

Since 2007, Grundy County has lost 8 percent of its manufacturing jobs while construction jobs increased by 30 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 24 percent over 2008 figures.

Grundy County residents have not fared as well as other non-metropolitan areas in the State. As the following table indicates, incomes range from a high of 15 percent to a low of 11.5 percent lower than the combined non-metro areas in the State. These are significant differences that illustrate the extent of the disadvantages that must be overcome in providing services to a population that a lower capacity for funding non-vital services than the majority of other non-metropolitan areas.

Table 2.4 Per Capita Income Comparison

Year	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
Tennessee	22,676	23,989	24,898	26,095	26,833	27,435	28,257	29,539	30,827	32,172
Grundy	15,559	15,908	16,839	17,585	19,456	18,942	19,894	20,789	21,498	22,208
Tennessee Nonmetropolitan Portion	18,521	19,265	19,961	20,886	21,385	21,868	22,833	23,639	24,649	25,422
Difference, Grundy//Nonmetro.	2,962	3,357	3,122	3,301	1,929	2,926	2,939	2,850	3,151	3,214
Percent Difference	15.99%	17.43%	15.64%	15.80%	9.02%	13.38%	12.87%	12.06%	12.78%	12.64%

Source: Tennessee Dept. of Labor and Workforce Development

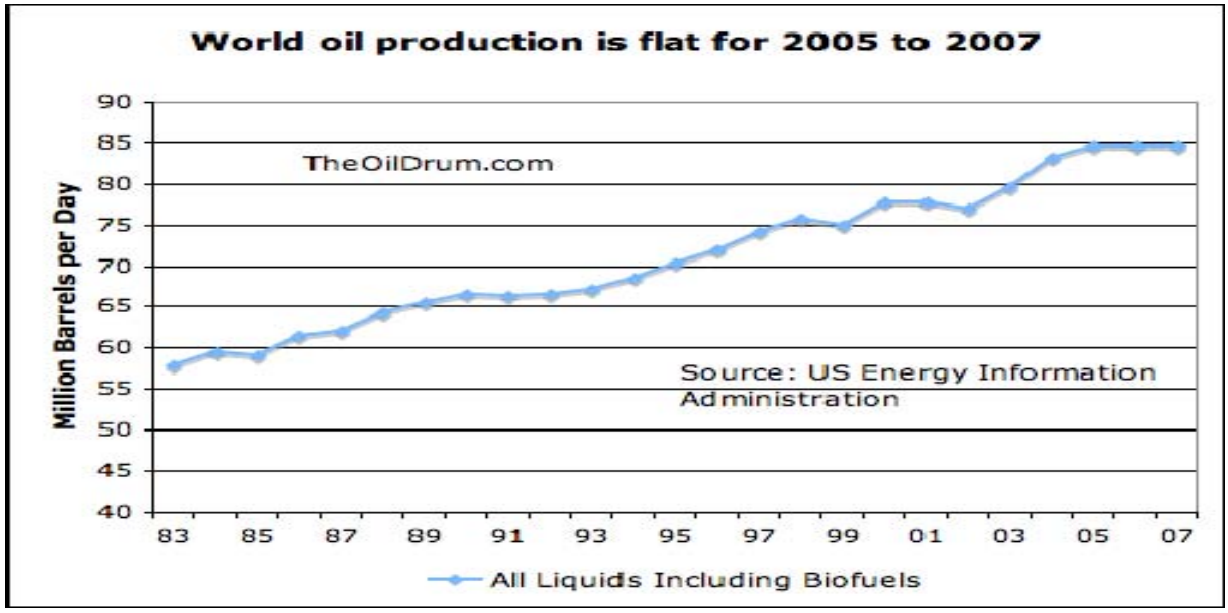
The primary economic problems on the horizon are disruptions in the home mortgage markets and energy supplies. As previously discussed, the home mortgage problems will likely curtail near-term investment in new homes, especially by retirees moving into the region. More

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.

Figure 2.5

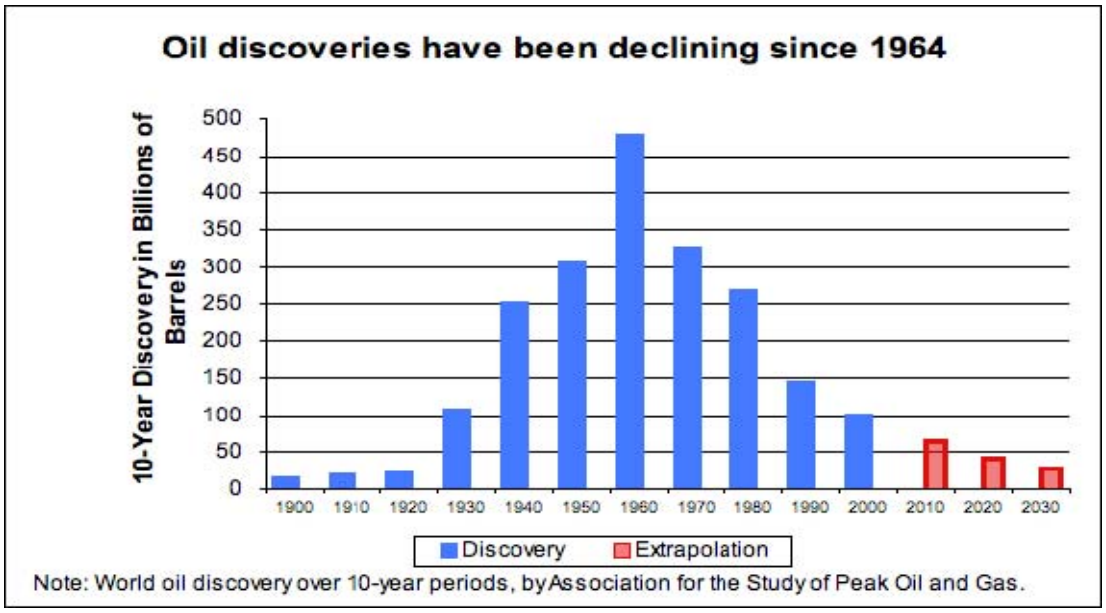


As the previous graph illustrates, the current production is at a plateau, which may become permanent. No large oil fields have been discovered since the 1970's, and promising geological structures are in areas that present significant difficulties for recovery. For example, Chevron Oil's last major attempt at adding reserves – the "Jack" well – is located 27,000 feet

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

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 2.6



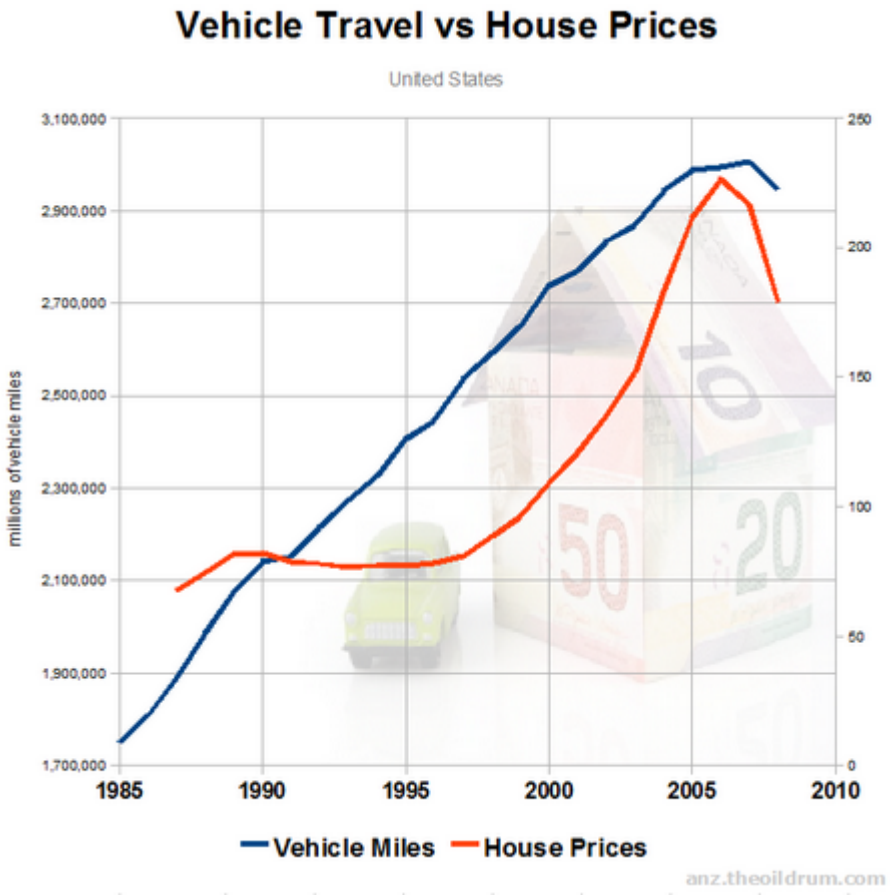
A good explanation of what has happened in the past year in the economy is as follows:

So the housing bubble was being used to create securities which could be sold overseas to finance the oil import bill to keep building more houses. On the back of this, credit was expanding everywhere. The private equity boom pushing sharemarket prices further up was just another side effect of cheap credit. The risks were seen as low and just to be sure the losses were insured as well (with 'good as gold' AAA ratings to prove it).

As oil prices started to bite, the new housing being built in distant suburbs and even more remote 'exurbs' became less viable for commuters. Once house prices started to unwind (who would have thought it could happen everywhere at once?) the game was up, but it was always only a matter of time. The United States (and now the rest of the world) could no longer find willing buyers for their 'assets' and so the global financial system could no longer expand credit to the world's consumers.

Global oil supplies have been all but flat for the last three years. With China and the oil producing countries still increasing their share of the pie, first the poorest and then even OECD nations were forced to reduce their consumption the only way the market knows - higher prices.

Figure 2.7



By: Phil Hart, The Oil Drum, October 2008.

So consumers started driving less because global oil supply simply could not meet everyone's expectations. Next the value of their house fell. Finally they found the bank wouldn't (couldn't) lend them anymore money, so they stopped shopping as well. That was the last straw, as there is nothing that strikes fear into the heart of an economist more than the sight of a consumer who has stopped shopping.

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.

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 2010	Iowa 2010	Ohio 2010	EPA 2010
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 Grundy 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

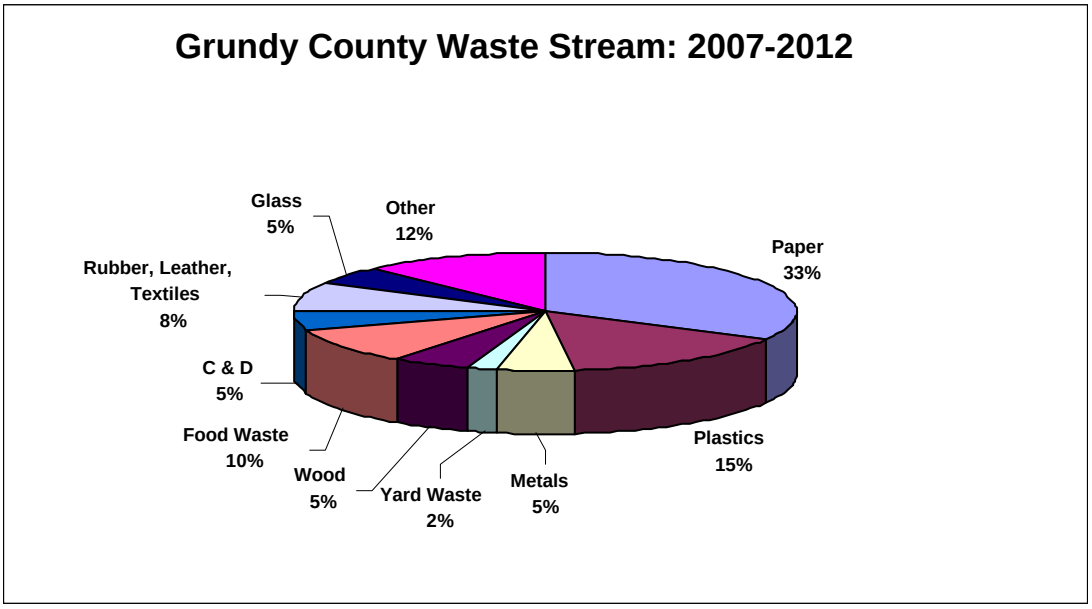
Population Comparison

	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

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 Grundy, 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 3.3



Collecting, processing, and marketing recyclable materials is fairly difficult. 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 3.4

Jurisdiction/ Sector	Collection	Disposal Options	Current Problem Waste Handling	Future Problem Waste Handling	Other Problem Waste
Grundy County	Seven (7) county convenience centers. Available to all residents, including those within municipalities	All waste collected at convenience centers is taken to the Marion County Class I landfill near Jasper, TN.	**Waste Tires**: Mac Tire, Inc. contract **Automotive Fluids**: Monteagle Lube **Used Oil: Latex Paint**: None Electronics: None	**Waste Tires**: Collected at the Coalmont Convenience Center; hauled by a contractor Develop collection method at convenience centers Assistance from RMCET to collect and market	HHW collected at mobile collection event.
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 only waste collection method available to Grundy County residents. There are no curbside programs available.

Recycling available at convenience centers includes mixed metals that are collected in roll-off containers. A private company hauls the metal to end users in the Chattanooga area. In addition, the county collects cardboard, which is also hauled to end-users in the Chattanooga

area. Tires are collected at the Coalmont convenience center and hauled by a contractor under the State grant program. Virtually all of the waste is taken to the Marion County Class I landfill for disposal.

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

Altamont – Just east of the County Courthouse
Beersheba Springs – Highway 56
Coalmont – Highway 56
Gruetli-Laager – Highway 108, near City Hall
Palmer – Highway 108 across from the Miner's Museum
Pelham – Highway 41 near the Elk River Bridge
Tracy City – Off Highway 150 (Old U.S. 41) beside the County Garage

Hours of operation are listed as follows:

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 13,650 (Source: 2010 Census) the minimum required number of centers would be only one (1) 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
Grundy	360.6	58.79	301.81	2	7

***Includes mines, State parks, etc.**

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 area includes State forest areas that are not populated and could 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 2012 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.

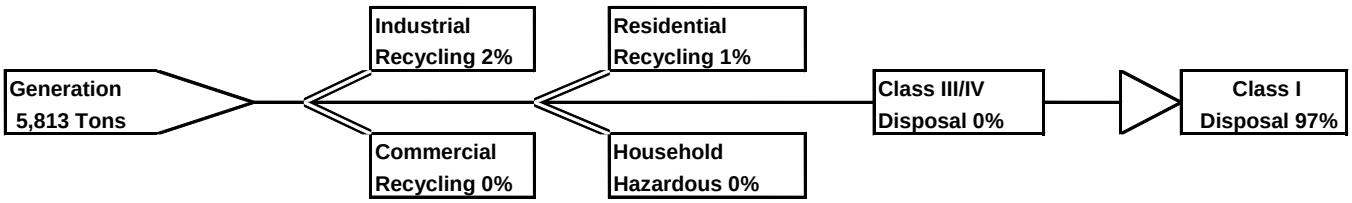
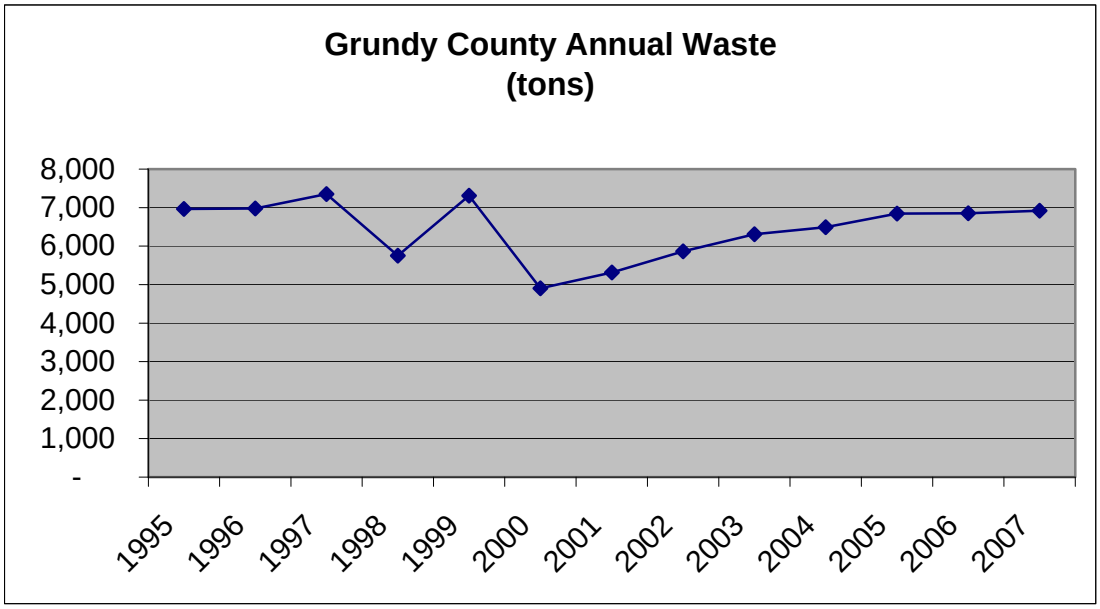


Table 4.2 Waste Generation



As is apparent from the preceding chart, Grundy County's waste stream has remained relatively flat even as the population increased. The significant reduction in volume that occurred in the late 1990s is likely the result of industrial capacity loss while the steady increase to the current plateau (2005-2007) is probably due to increases associated with new construction as people immigrated into the county.

Given the current economic climate, waste generation is likely to be stagnate or in decline. 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
Grundy	11.2	11.2		6.8
Total:	**11.2**	**11.2**		**6.8**

The preceding table was taken from the Re-Trac™ summary report, which does not calculate the reduction from an economic growth perspective.

Assuming a population of 13,650 in 2012 and a waste volume of 5,813 tons (including recycling and diversion) the per capita waste generation rate for Grundy County was 0.43 tons (860 lbs.) per person. That amounts to 2.35 lbs/person/day, which is far below the national average of 4.6 lbs. Waste volumes are low enough to infer that publicly operated waste collection facilities are only receiving a portion of the waste produced by the population. The county has more collection facilities than are required by the SWMA, and there are few roadside dumping areas. So, the explanation for the anomaly in the waste stream volumes must be one or more of the following:

1. Wood waste, yard trimmings, etc. are not collected as part of the waste stream
2. A large proportion of the population does not have the economic resources to purchase the large volumes of material goods that generate waste through packaging
3. Much of the food waste and other compostable material does not go into the waste stream
4. Many households dispose of waste on their own property and/or use burn barrels to reduce volumes
5. There are very limited numbers of commercial and industrial establishments in the county

In reality, Grundy County only has control of residential waste. Reducing waste volumes by 25 percent out of the mixed waste received at convenience centers is probably a difficult goal to achieve without having markets for a wide variety of materials in close proximity. Grundy County is about as far away from recycling markets as any county in the state, and haul costs make many materials unfeasible to handle. “Real time” waste reduction is really dependent on the efforts of local industries that have a homogenous waste stream that can easily be recycled. Most of Grundy’s waste reduction in that category comes from industrial sources.

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.*

There are no operating landfills in Grundy County.

Table 6.1: Regional Landfills

Site Name(s)	Annual Tons Grundy County	Permit Number	Current Capacity	Maximum Capacity	Projected Life of Facility
Marion County Landfill	7,000 (maximum)	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 Grundy County convenience centers is hauled to the regional landfill in Marion County. There are no Class III/IV landfills within a reasonable haul distance of Grundy 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.

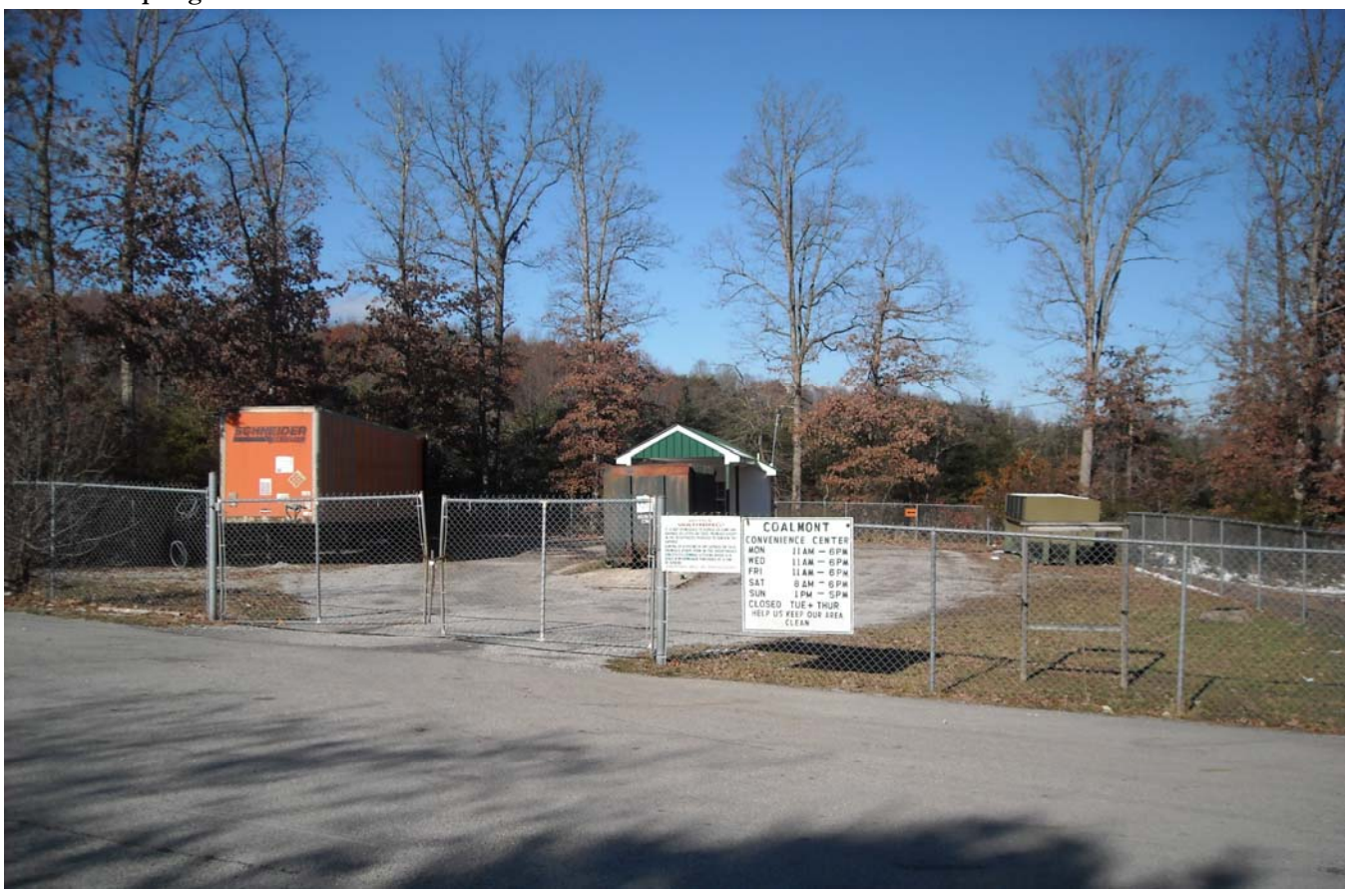
Table 6.2: Regional Collection Systems

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)
Grundy County	County-wide drop-off	14,500	As Needed	6,000	Convenience Center

The county's convenience centers provide a full range of service. Each is equipped with a 4 yd^3 compactor feeding into a 40 yd^3 receiving container; a 40 yd^3 open top roll-off container for bulky items; and a 40 yd^3 container for metals.

Altamont Convenience Center

Beersheba Springs Convenience Center



Coalmont Convenience Center

Gruetli-Laager Convenience Center

Palmer Convenience Center

Pelham Convenience Center

Tracy City 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

ANNUAL EXPENDITURE & REVENUE NEEDS

EXPENDITURES				
Description	**Current Need**	**Unmet Needs**	**Total**	**Explanation**
Convenience Centers	$542,189	$100,000	$642,189	Solid Waste Director Position, Facility Upgrades
Waste Pickup	38,981	-	38,981	
Collection & Disposal Systems				
Equipment				
Transfer Station	-	-	-	
Recycling Center	-	-	-	
Landfill Post-Closure	$11,070	-	$11,070	
Landfill Disposal Fees				
Administration	-		-	
Education	-			
Capital Projects	-	-	-	
Other Waste Disposal	$11,702		$11,702	
Total:	$603,942	$100,000	$703,942	

REVENUE				
Local Taxes	$581,270		#581,270	
County Property Taxes	$9,543	-	$9,543	
Disposal Fees	-	-	-	
Collection Charges	-	-	-	
Industrial or Commercial Charges	-	-	-	
Convenience Center Charges	-	-	-	
Transfer Station Charges	-	-	-	
State Revenue Sharing	$39,914		$39,914	
Total:	$630,727		$630,727	

As the previous table indicates, one of the primary unmet needs is a solid waste director 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.

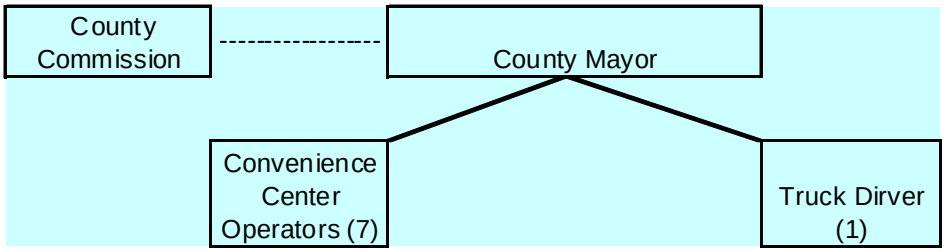
Additional funding for website development is needed because this is a primary medium for disseminating information about the waste collection and recycling program. Funding is also needed for manpower and printed materials to augment those already in circulation.

SECTION 8: ORGANIZATION, STAFFING AND FACILITIES

Provide organizational charts of each county and municipality's solid waste program and staff arrangement. Indentify 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.

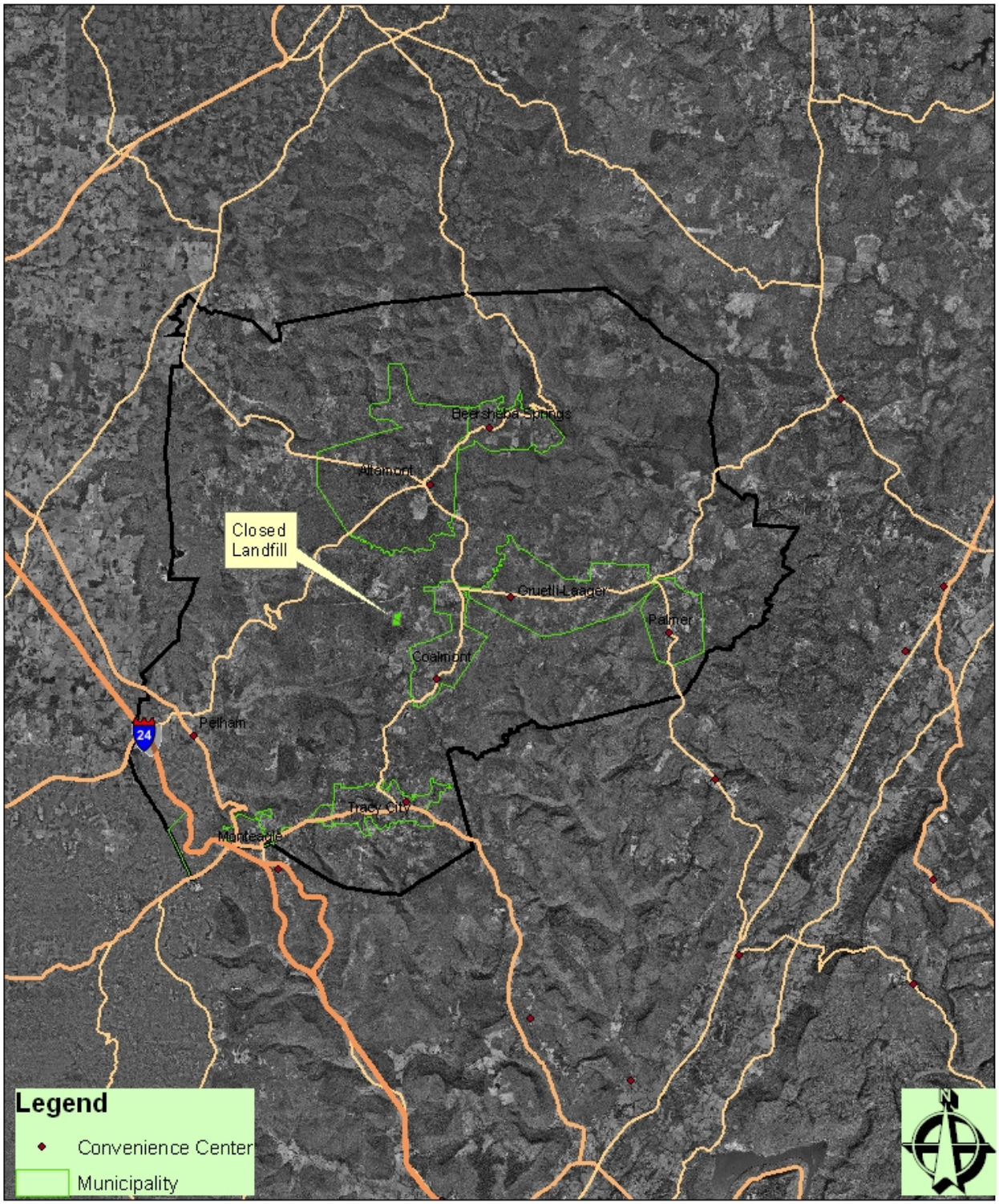
Solid Waste Staffing

There are no municipal governments in the county that provide waste collection, recycling, or waste reduction programs. The organization chart for Grundy County's waste collection and disposal system is as follows:



Like many small counties, Grundy provides a full service waste collection program, including recycling, as efficiently as possible. Funding for new positions is in short supply, but the county would benefit from having a full-time director to handle solid waste. Currently, the County Mayor is in charge of waste collection and recycling operations. It is a very lean operation due to the lack of revenue to fund extensive operations.

GRUNDY COUNTY FACILITIES



As the above map indicates, Grundy County has collection facilities in every community. Used tires are collected at the Coalmont convenience center near the geographic center of the county.

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 $603,942 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.

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 Grundy 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 Marion County landfill where all of Grundy County waste is currently disposed. The recycling program is operated in an efficient manner, but none of the seven municipalities participate in any waste program.

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 a website.

Facilities and Programs

Recommendation 1: All convenience centers need used oil collection containers.

Action Item: Apply for grant funds to purchase collection containers, containment systems and covers.

Funding Source: Grant

Recommendation 2: All convenience centers need waste paint collection containers.

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

Funding Source: Solid Waste Management Fund

Recommendation 3: Compactors and receiving boxes purchased in the mid-1990s need replacement, especially those that are heavily used in Gruetli-Laager and Tracy City.

Action Item: Purchase new compactors

Funding Source: County Solid Waste Fund

Recommendation 4: Collect more 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 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 5: Encourage the development of recycling programs in municipalities.

Action Item: Meetings between county and municipal officials.

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

Conclusion

In general, Grundy 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 and recycling options using the most cost-effective methods available. A long-term relationship has been established with the solid waste authority that operates the Marion County Landfill to assure a waste disposal option for at least the next ten years.

The County does not have access to alternate disposal options either for demolition materials or sanitary waste. Markets for recyclables are also a minimum of 40 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.