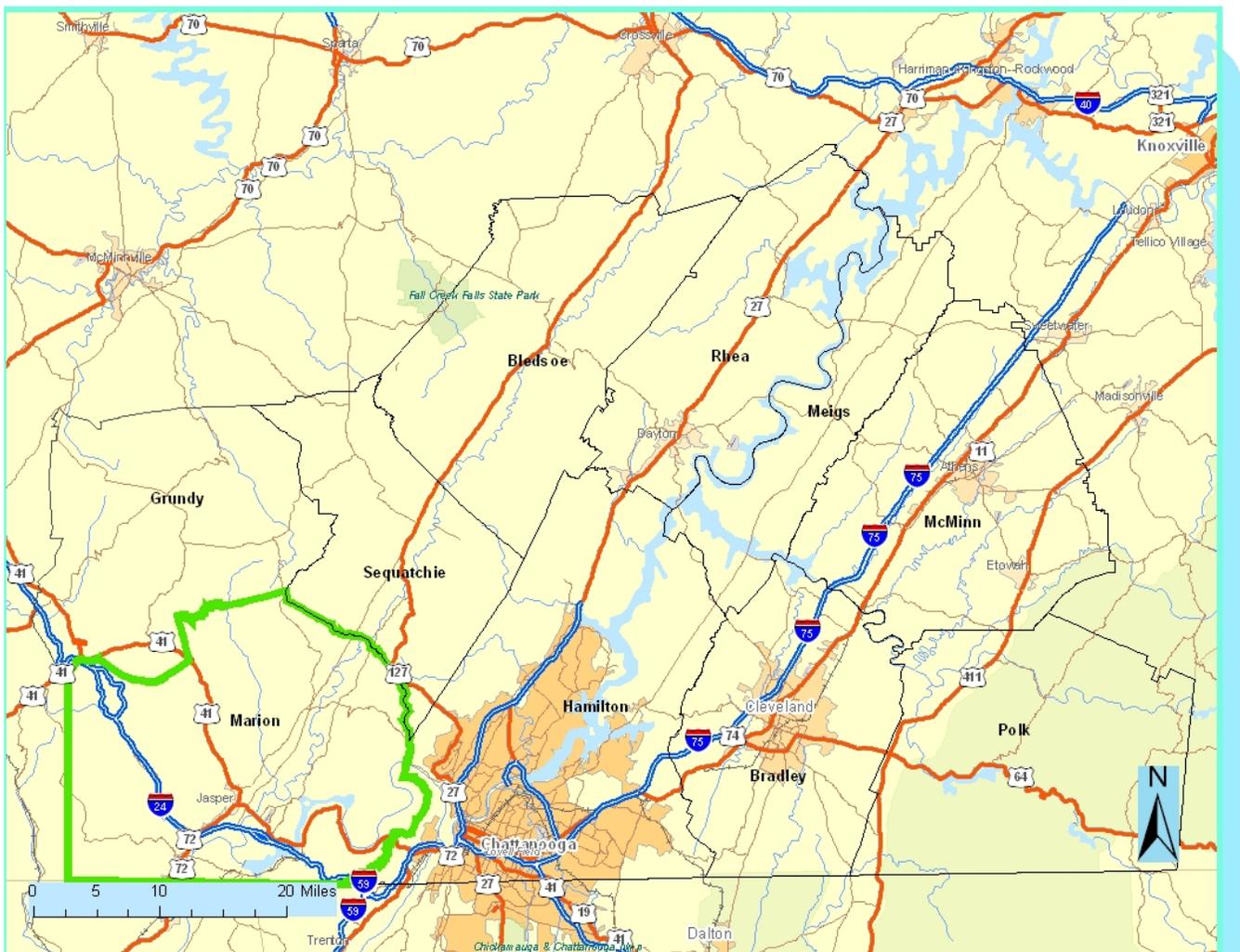


SOUTHEAST TENNESSEE MUNICIPAL SOLID WASTE REGION

MARION 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.

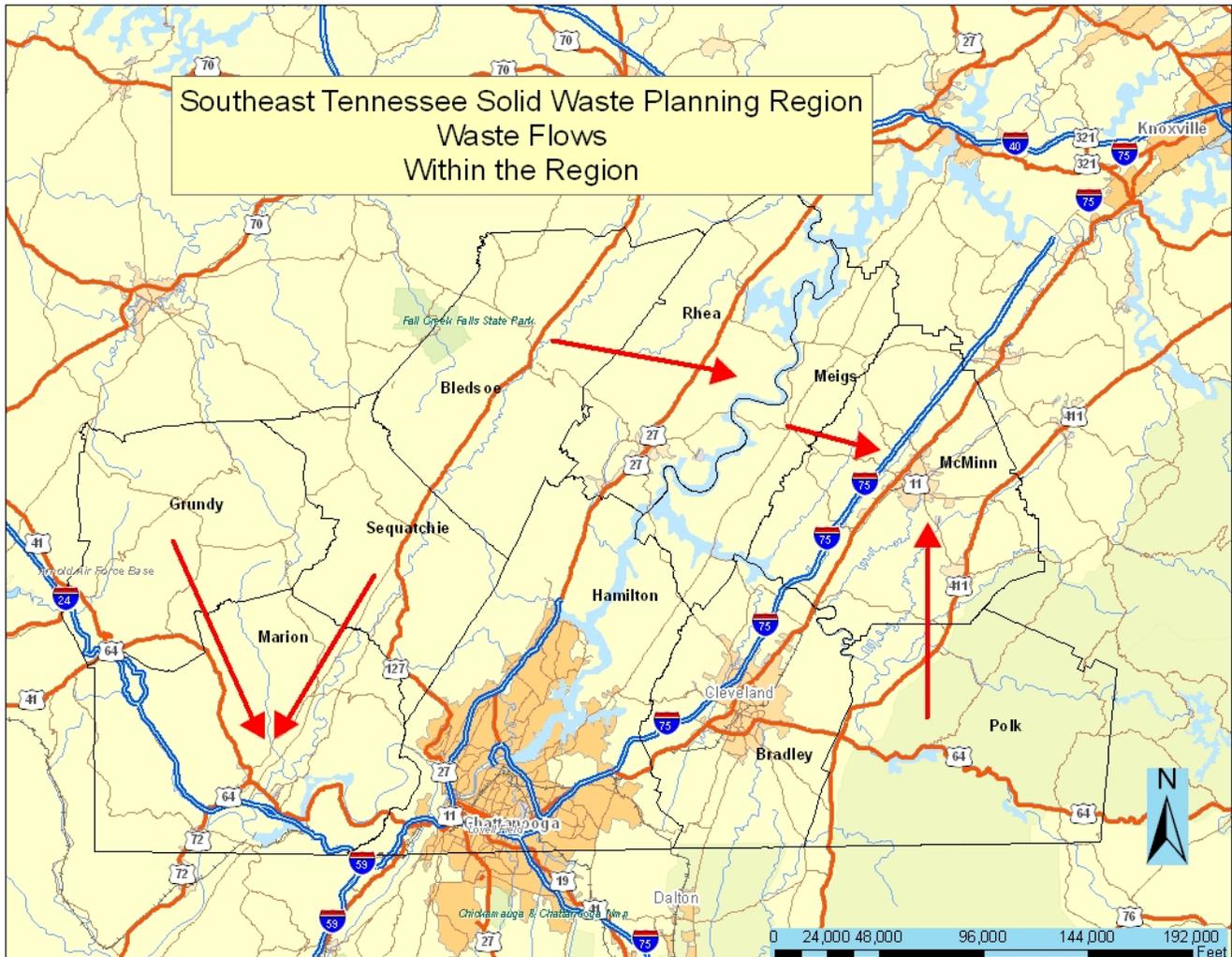
The failure to implement the waste-to-energy project did not deter the Board from remaining a regional planning entity. Board members were comfortable with the situation and wished to remain together in the event that other regional opportunities arose.

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

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

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.

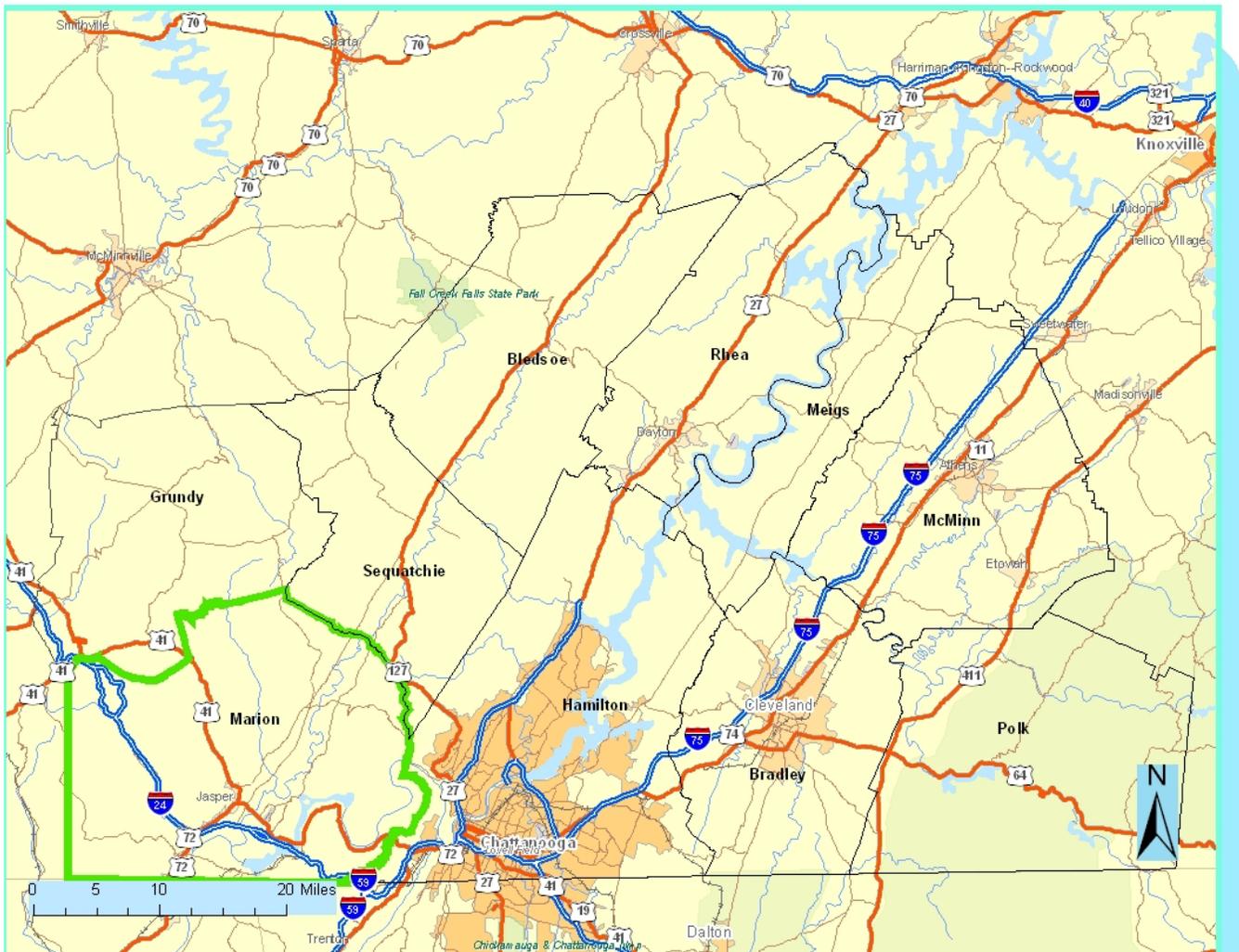
Marion County's landfill is operated by an Authority. Like the other landfills, waste is accepted from any source. In the past, landfill operators have received waste from Dade County, Georgia, Jackson County, Alabama, and both Hamilton and Franklin Counties in Tennessee. The landfill routinely accepts 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 Marion 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 half of the 20th century, Marion County's population increased at a slow but steady rate. The population increased by 26 percent, but the total gain was only 7,256 people over five decades. In 2009, the population is estimated at 28,068, an increase of 292 individuals over the 2000 totals.

Table 1.1 Historic County Population

Year	Population
1950	20,520
1960	21,036
1970	20,577
1980	24,416
1990	24,860
2000	27,776

Source: U.S. Census Bureau

The Census Bureau estimates that the 2008 population was 28,112, an increase of 336 individuals or 1.1 percent over the 2000 population of 27,776. The population density in the non-municipal portion of the county is 56 people per square mile (24 households), a very dispersed population. By way of comparison, the U.S. population density is 86.2 persons/square mile and Tennessee's is 149.4 (2007 U.S. Census American Community Survey). The reason for this is fairly straightforward: There is plenty of low-cost land available for development, there are few development restrictions, and manufactured homes can be easily acquired for placement on these properties, even by low-income residents. There are few incentives for locating in municipalities.

Table 1.2 Population Projections

Year	Total Population	Municipal Portion
2000	27,776	13,332
2001	27,778	13,333
2002	27,811	13,349
2003	27,814	13,351
2004	27,718	13,305
2005	27,732	13,311
2006	27,953	13,417
2007	28,023	13,451
2008	28,112	13,494
2009	28,208	13,540
2010	28,332	13,599
2011	28,383	13,624
2012	28,455	13,658
2013	28,538	13,698
2014	28,641	13,748
2015	28,756	13,803
2016	28,787	13,818
2017	28,836	13,841
2018	28,901	13,872
2019	28,976	13,908
2020	29,069	13,953

Sources: Historic statistics are derived from U.S. Census Bureau data.

Projections were provided by the Tennessee Dept. of Health, Office of Policy, Planning, and Assessment, Division of Health Statistics.

Due to the relative stability of the County's population over time, Tennessee Department of Health projections were used to determine the future population. Projections using mathematical and step-down methods are reasonably accurate, but the Dept. of Health statistics are derived from the cohort method (birth rate minus death rate plus or minus migration), which is much more accurate in stable populations where there is a low migration pattern. All methods employed resulted in very similar growth scenarios.

The county and its municipalities have the industrial, commercial, or institutional resources to support additional population growth. As part of the Chattanooga-Hamilton County Metropolitan Statistical Area, the county benefits from its proximity to the metropolitan economic center.

The County's municipal population gradually increased to about half of the total population from 1960 to 2000, but without the incorporation of New Hope and Powell's Crossroads in the 1980s, the municipal percentage would still only amount to 38.6 percent. Neither of those municipalities have well defined central business districts with significant commercial

establishments, and neither provide waste collection services; they are primarily residential communities.

Table 1.3 Municipal Characteristics

	1960	1970	1980	1990	2000	Square Miles
Jasper	1,450	2,009	2,633	2,780	3,214	7.6
Kimball	-	807	1,220	1,243	1,312	4.8
Monteagle	-	934	1,126	1,138	1,238	4.3
New Hope	-	-	681	854	1,043	10.3
Orme	171	122	181	150	124	4.2
Powells Crossroads	-	-	918	1,098	1,286	4.1
South Pittsburg	4,130	3,613	3,636	3,295	3,295	5.7
Whitwell	1,857	1,669	1,783	1,622	1,660	2.2
Total:	7,608	9,154	12,178	12,180	13,172	43.2
County	21,036	20,577	24,416	24,860	27,776	512.0
Municipal Percent of County	36.2%	44.5%	49.9%	49.0%	47.4%	8.4%

Source: U. S. Census Bureau and the Tennessee Statistical Abstract, 2000.

Table 1.4 Marion Workforce

Population 16 years and over	22,555
In labor force	13,561
Civilian labor force	13,556
Employed	12,587
Unemployed	969
Armed Forces	5
Not in labor force	8,994

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

Although the above table indicates that the unemployment rate is around 4.3 percent, economic conditions have changed dramatically since these data were collected. The current unemployment rate is over 12 percent, not including discouraged and under-employed individuals. The following table provides a progression of the unemployment rate increase.

Table 1.5 Employment

<u>Year</u>	<u>Civilian Labor Force</u>	<u>Employment</u>	<u>Unemployment</u>	<u>Unemployment Rate (%)</u>
2009	12,770	11,200	1,570	12.3
2008	13,020	12,010	1,020	7.8
2007	12,980	12,180	800	6.2
2006	13,170	12,420	750	5.7
2005	12,880	12,090	800	6.2

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

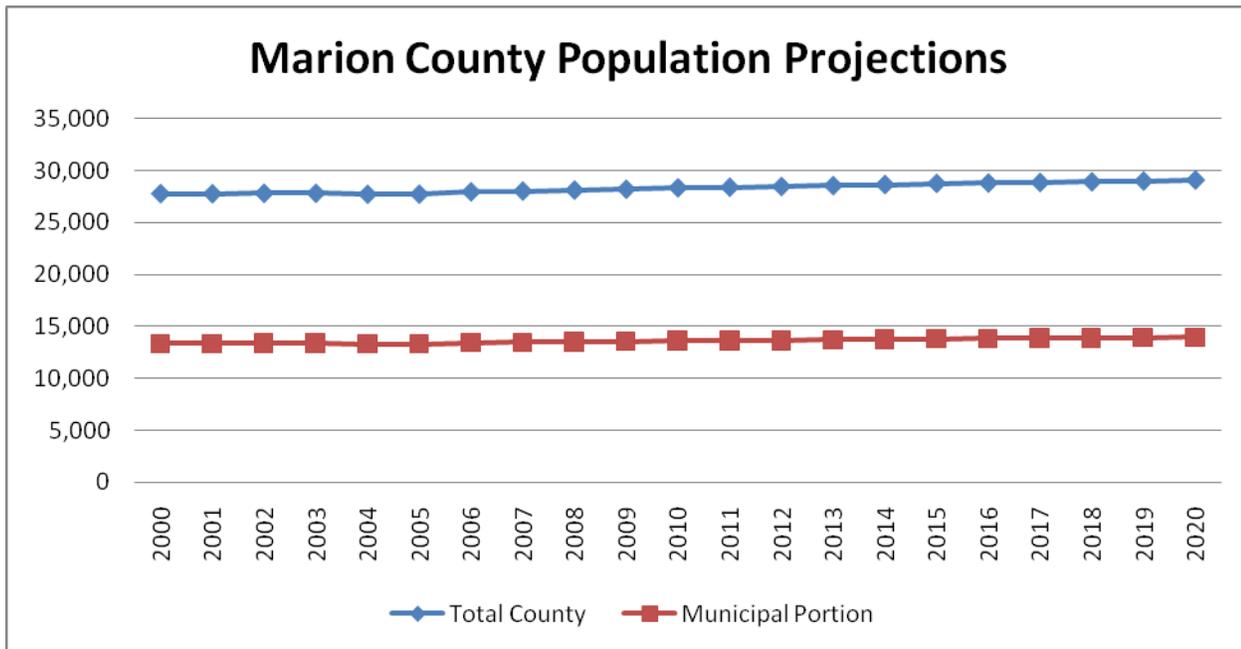
Currently, the U.S. economy is still in trouble due to the recent economic meltdown. Should this economic downturn continue over a long period, Marion County's economy would suffer greater stresses than urban areas that have a more diverse employment base. This situation could be exacerbated (or even the result of) high fuel costs, which had a pronounced negative impact on the large number of commuters that comprise the Marion County workforce. Under the current state of affairs, there is no reason to assume any great increase or decrease in the population.

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. However, 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; Tenn. Dept. of Health, 2010.

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.

Marion County’s economy is moderately dependent on surrounding areas. About 52 percent of the workforce is employed outside the county (2000 U.S. Census). The County is located just north of the Bridgeport/Stevenson area of Alabama, which has some significant industrial capacity as well as TVA’s Widow’s Creek Steam Plant. With this location, Marion workers can take advantage of these job opportunities as well as opportunities in the Chattanooga area. Access to these job markets is relatively easy because 4-lane or interstate roads are available.

Marion County is home to several major manufacturing plants, including Rock-Tenn, Lodge Manufacturing, and Colonial Chemical. Most of the industrial capacity is located in the southern section of the county within the contiguous municipal boundaries of Jasper, Kimball, New Hope, and South Pittsburg. Access to the interstate system, rail, and barge facilities make the county an ideal location for future industrial locations.

The Town of Kimball has been particularly blessed with extensive growth in the commercial sector due to its location at the intersection of U.S. 72, a primary route to Huntsville, Alabama, and I-24.

Table 2.1 Economic Profile

Year	Total	Employment	Unemployed		Per Capita Income	Retail Sales (\$1,000's)	Total Bank Deposits (millions \$)
			Total	Percent			
2000	13,140	12,540	600	4.6%	21,855	262,767	220
2001	13,060	12,360	700	5.4%	21,737	262,700	238
2002	12,990	12,160	830	6.4%	21,896	265,936	234
2003	12,790	12,050	740	5.8%	22,336	275,476	249
2004	12,770	11,960	810	6.3%	24,217	289,474	252
2005	12,880	12,090	790	6.1%	25,553	313,586	267
2006	13,170	12,420	750	5.7%	27,257	329,050	293
2007	12,980	12,180	800	6.2%	28,590	336,742	298
2008	13,020	12,010	1,010	7.8%	30,050	346,073	301
2009	12,770	11,200	1,570	12.3%	28,335	312,351	307
2010	12,891	11,400	1,491	11.6%	29,493	280,090	312
2011	12,877	11,658	1,219	9.5%	30,650	292,362	322
2012	12,862	11,700	1,162	9.0%	30,808	298,001	333
2013	12,847	11,800	1,047	8.2%	30,965	310,650	343
2014	12,833	11,900	933	7.3%	31,123	315,700	353
2015	12,818	11,900	918	7.2%	31,280	318,000	363

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 “business as usual” 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 carpet manufacturing and construction related industries, but expansions in other sectors are likely to make up for los jobs. As an example, Chicago Bridge & Iron (CBI) has purchased a site on Nickajack Lake to service the nuclear reactor industry. Should these expansions occur, Marion County residents could benefit significantly.

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.

Until 2008 growth in retail sales was robust over the previous decade, but there was a precipitous decline in the 2009-2010 period. The other anomaly in the data is a slowdown in growth during the early part of the decade, which can probably be attributed to the 2001 terrorist attacks on the World Trade Center in New York. 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 secondary retail center for the county but an important stopping point for tourists. 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. There were significant business losses, but the commercial sector has rebounded after water restrictions were eased.

Future prospects for industrial development are somewhat better 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.

Table 2.3 Employment by Occupation

	2002	2003	2004	2005	2006	2007	2008
Total, All Industries	6,713	6,661	6,820	6,794	7,110	7,019	7,217
Utilities	30	32	61	53	51	49	54
Construction	207	179	188	191	215	249	238
Manufacturing	1,697	1,560	1,660	1,368	1,580	1,465	1,504
Retail Trade	1,142	1,130	1,132	1,204	1,114	1,144	1,144
Transportation/Warehousing	243	262	313	352	366	374	401
Information	45	68	58	62	54	47	40
Finance & Insurance	227	247	238	236	235	247	229
Real Estate & Leasing	51	65	57	54	32	35	37
Professional & Tech. Services	8	9	9	9	9	8	9
Administrative & Waste Services	224	161	181	178	220	216	210
Education	600	604	622	626	245	647	669
Arts, Entertainment & Recreation	6	9	17	18	18	19	17
Accommodation & Food Services	841	927	872	975	969	854	868
Other Servicesq	141	151	143	177	255	268	349
Public Administration	311	316	281	284	295	295	314

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

Since 2002, Marion County lost 11.4 percent of its manufacturing jobs while construction jobs increased by 15 percent. With a reduction in the housing market and fewer home starts, statistics for construction jobs will probably show a reduction in that sector as well. No particular sector of the economy has shown significant growth in the current decade.

Marion County residents have not fared as well financially as the metropolitan area. As the following table indicates, incomes range from a high of about 21 percent to a low of ~14 percent less than the metro area. These are significant differences that illustrate the extent of the disadvantages that must be overcome in providing services to a population that has a lower capacity for funding non-vital services.

Table 2.4 Per Capita Income Comparison

Year	2000	2001	2002	2003	2004	2005	2006	2007	2008
Tennessee	26,095	26,839	27,448	28,276	29,565	30,705	32,167	33,395	34,833
Marion	21,855	21,737	21,896	22,336	24,217	25,553	27,257	28,590	30,050
Chattanooga MSA	26,955	27,078	27,490	28,116	29,097	30,287	31,874	33,303	34,784
Difference, Marion/Non-MSA	5,100	5,341	5,594	5,780	4,880	4,734	4,617	4,713	4,734
Percent Difference	18.92%	19.72%	20.35%	20.56%	16.77%	15.63%	14.49%	14.15%	13.61%

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

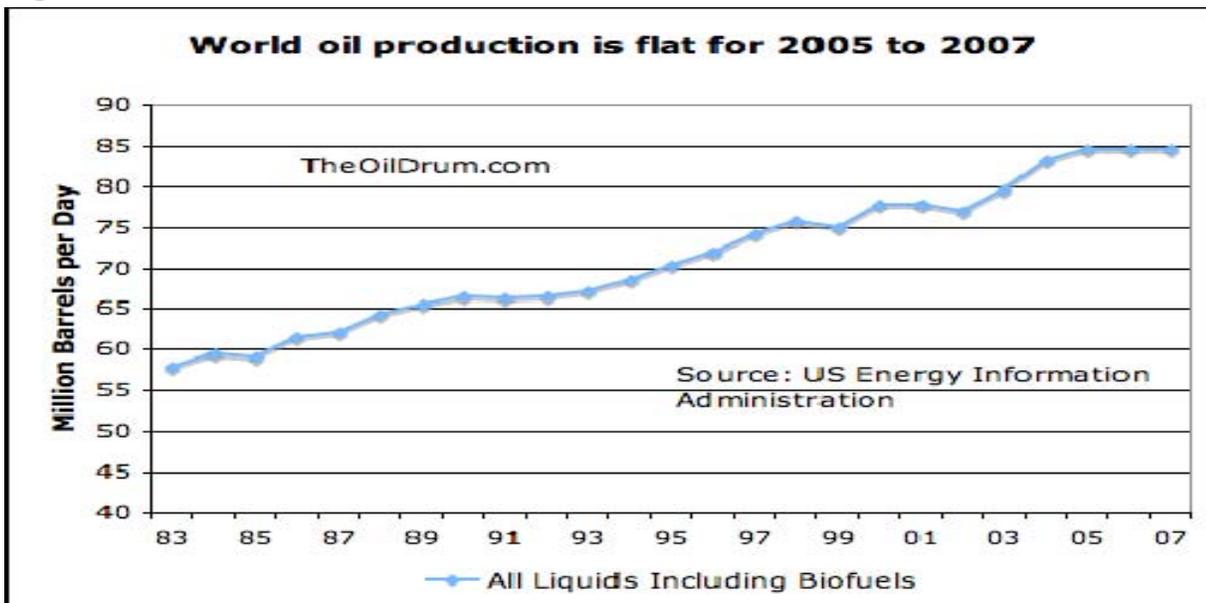
The primary economic problems on the horizon are disruptions in the home mortgage markets and energy supplies. As previously discussed, the home mortgage problems will likely curtail near-term investment in new homes, especially by retirees moving into the region. More problematic (and at a basic level,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

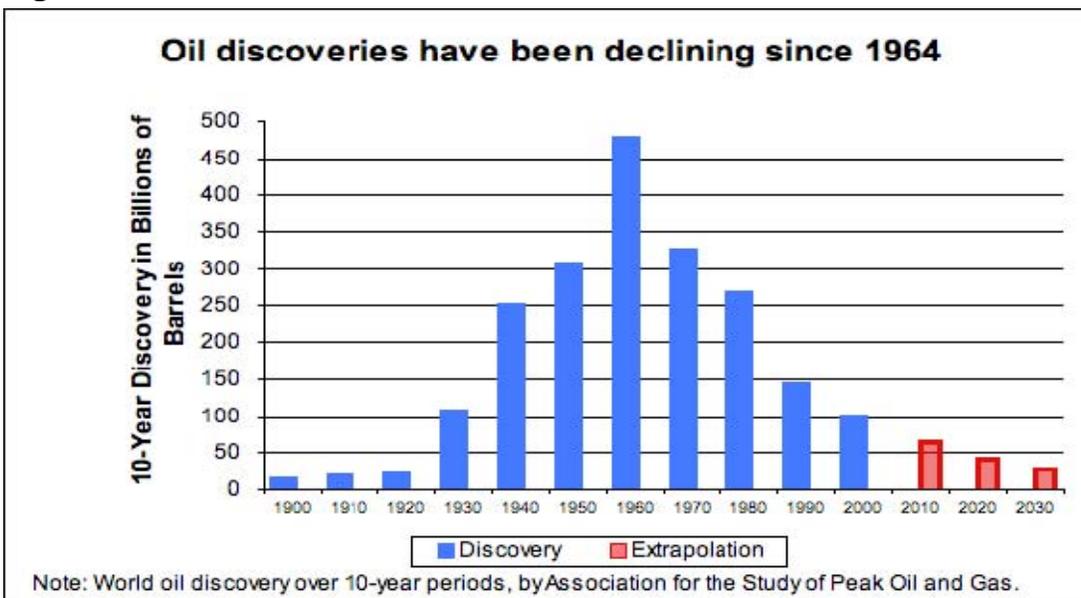
² Hirsch, R.L., Bezdek, R.H, Wendling, R.M. *Peaking of World Oil Production: Impacts, Mitigation and Risk Management*. DOE NETL. February 2005.

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



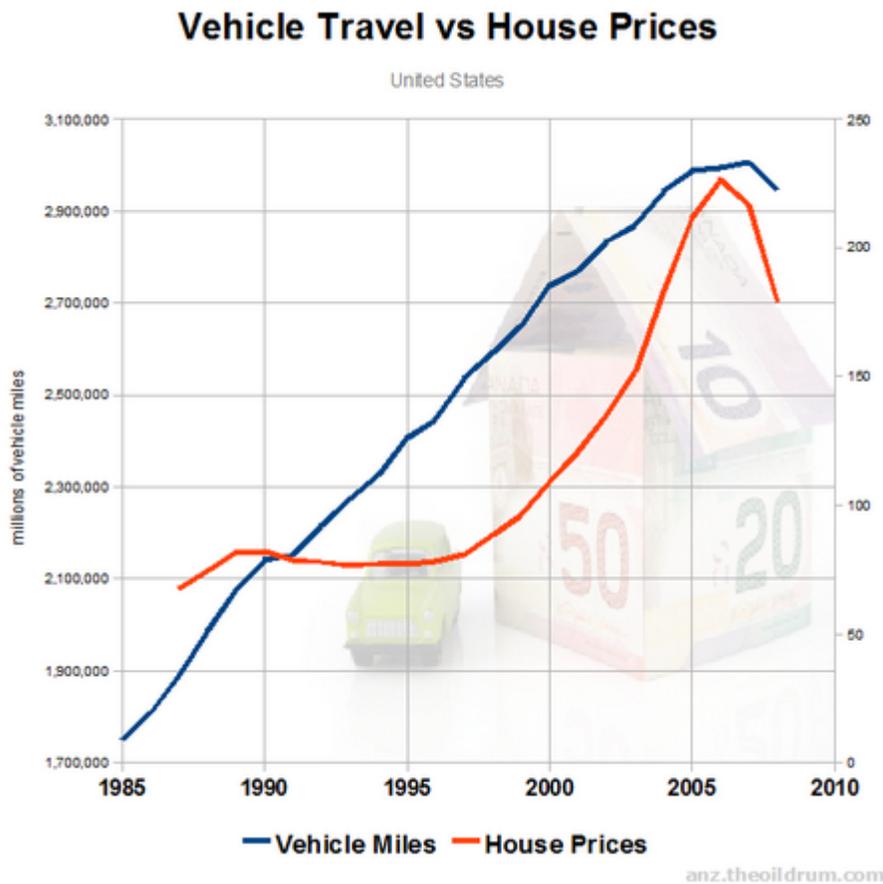
A good explanation of what has happened in the past year in the economy is as follows:

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 2.3



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 Arabia's. 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. However, energy related industrial location may provide Marion County with a better economic base than many other areas of the state.

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 Marion 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

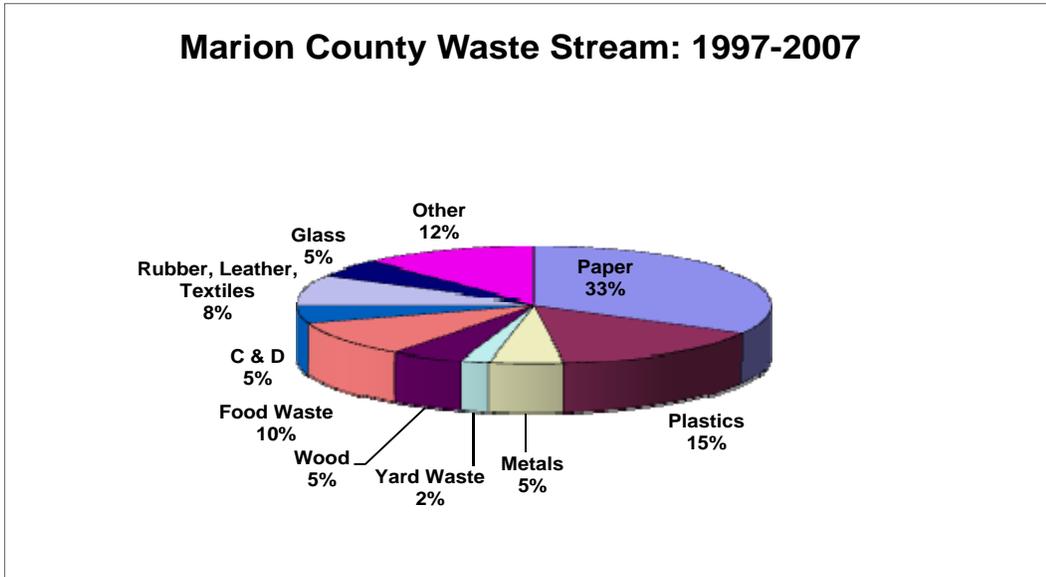
Population Comparison

	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%

Source: 2000 U. S. Census

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 Marion, 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



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 to 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
Marion County	Nine (9) county convenience centers plus a collection point at the landfill 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: Commercial lube establishments Oil collection at the landfill & county garage 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.
Town of Jasper	Curbside	Marion County Landfill	Residential only		

Town of Kimball	Curbside	Marion County Landfill	Residential only		
City of South Pittsburg	Curbside	Marion 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, paint, or antifreeze.

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 Marion County residents. Municipal curbside collection programs are available in Jasper, Kimball, and South Pittsburg, but there are no recycling programs in any of the municipalities.

Marion County has nine (9) convenience centers strategically located to maximize access to all residents (see attached map). The centers are located as follows:

- | | |
|----------------------|-------------------|
| Jasper | South Pittsburg |
| Kimball | Suck Creek |
| Sequatchie Community | Whitwell |
| Sequatchie Mountain | Whitwell Mountain |
| Monteagle | |

Hours of operation as follows:

8 am to 6 pm Monday, Tuesday, Thursday, Friday, and Saturday

1 pm to 6 pm Sunday

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 28,068 (Source: http://www.stats.indiana.edu/uspr/a/us_profile_frame.html) the minimum required number of centers would be only two (2) 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

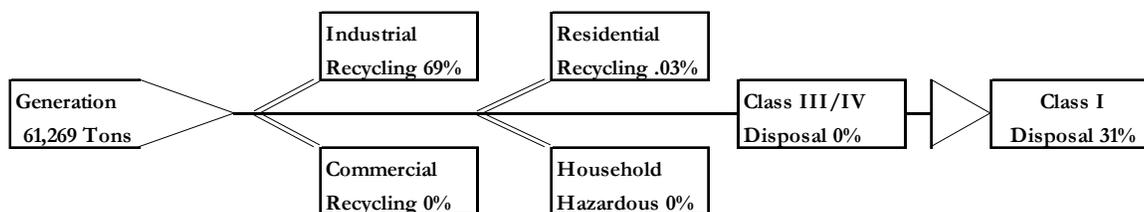
	Total Sq. Miles	Non-Service Area*	Difference	Required Centers	Existing Centers
Marion	512	56	456	3	9

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 the Prentiss Cooper State forest area and TVA lakes that are not populated and were 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 three. Although the formula suggests that three centers are adequate, nine 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

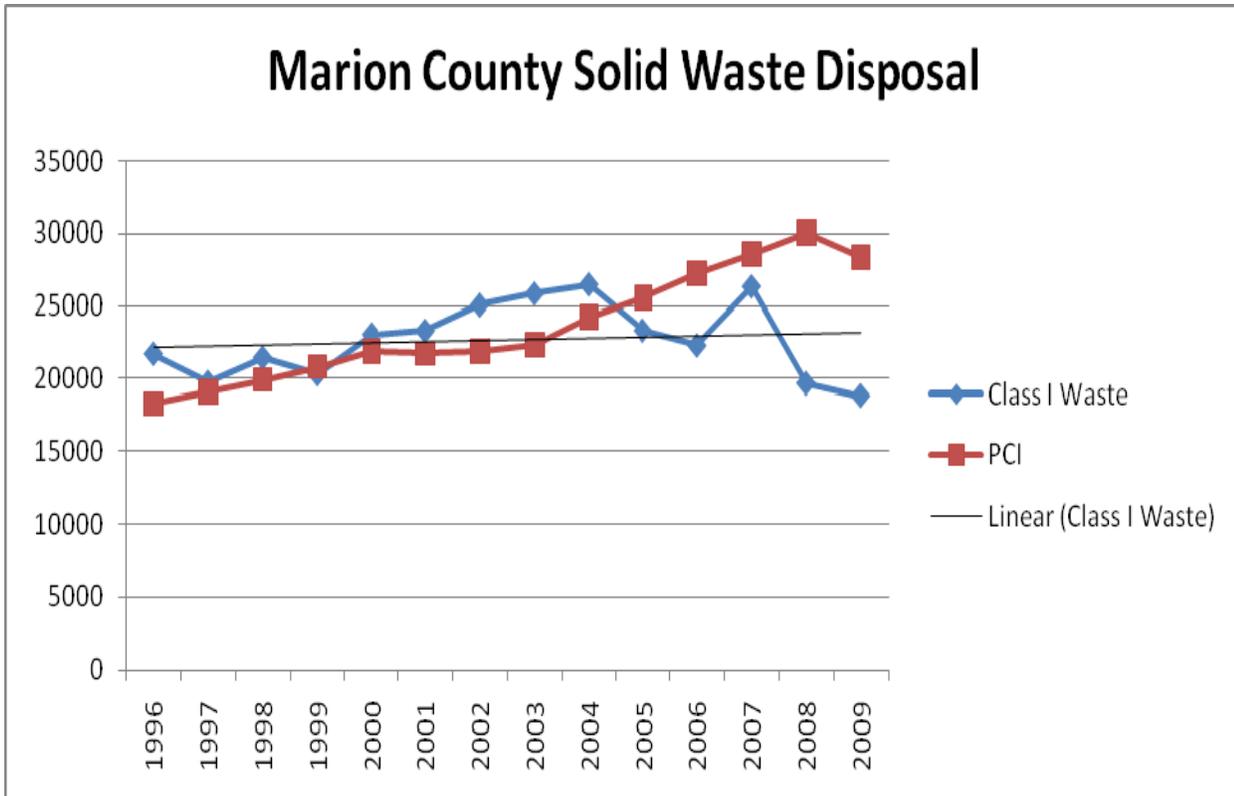
The following chart represents data collected for the 2009 Annual Report for the Southeast Tennessee region. As is apparent, there are no data available on waste reduction or diversion because it is very difficult to document waste diversion in a rural county. Most of the yard waste is disposed on site 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



The high percentage of industrial recycling is primarily due to Lodge Manufacturing’s foundry operations, which produces high volumes of residual materials that are amenable to recycling and re-use. Total residential waste generation trends are in the 20,000 to 25,000 tons/year range over the planning period.

Table 4.2 Waste Generation



As is apparent from the preceding chart, Marion 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 stagnate or decline in the near term. However, waste systems must be maintained. More collection capacity will not be needed, and existing facilities 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 meet 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
20.2	20.2	15.6	69.3
20.2	20.2	15.6	69.3

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

Assuming a population of about 28,000 in 2009 and a waste volume of about 61,000 tons (including recycling and diversion) the per capita waste generation rate for Marion County was 2.2 tons per person. That amounts to about 12 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 large industrial contribution to the waste stream, the total amount falls to 18,830 tons, 0.67 tons per person and 3.7 tons/person/day. If a normal industrial component were added back in to the total waste, Marion County would likely have an average waste fairly near the national figure.

The county achieved the “real time” waste reduction goal solely through the inclusion of industrial recycling. Without that component, achieving the 25% waste reduction goal would not have been possible; there is simply not enough recycling capacity to reduce the waste stream in any significant way.

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 throughput. 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.

Marion County owns a permitted Class I disposal facility that is operated by the Authority (see previous description).

Table 6.1: Regional Landfills

Site Name(s)	Annual Tons Marion County	Permit Number	Current Capacity	Maximum Capacity	Projected Life of Facility
Marion County Landfill	36,000	SNL58-105-0197	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 Marion 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 Marion County waste collection facilities.

Figure 6.1 Marion County Landfill and 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

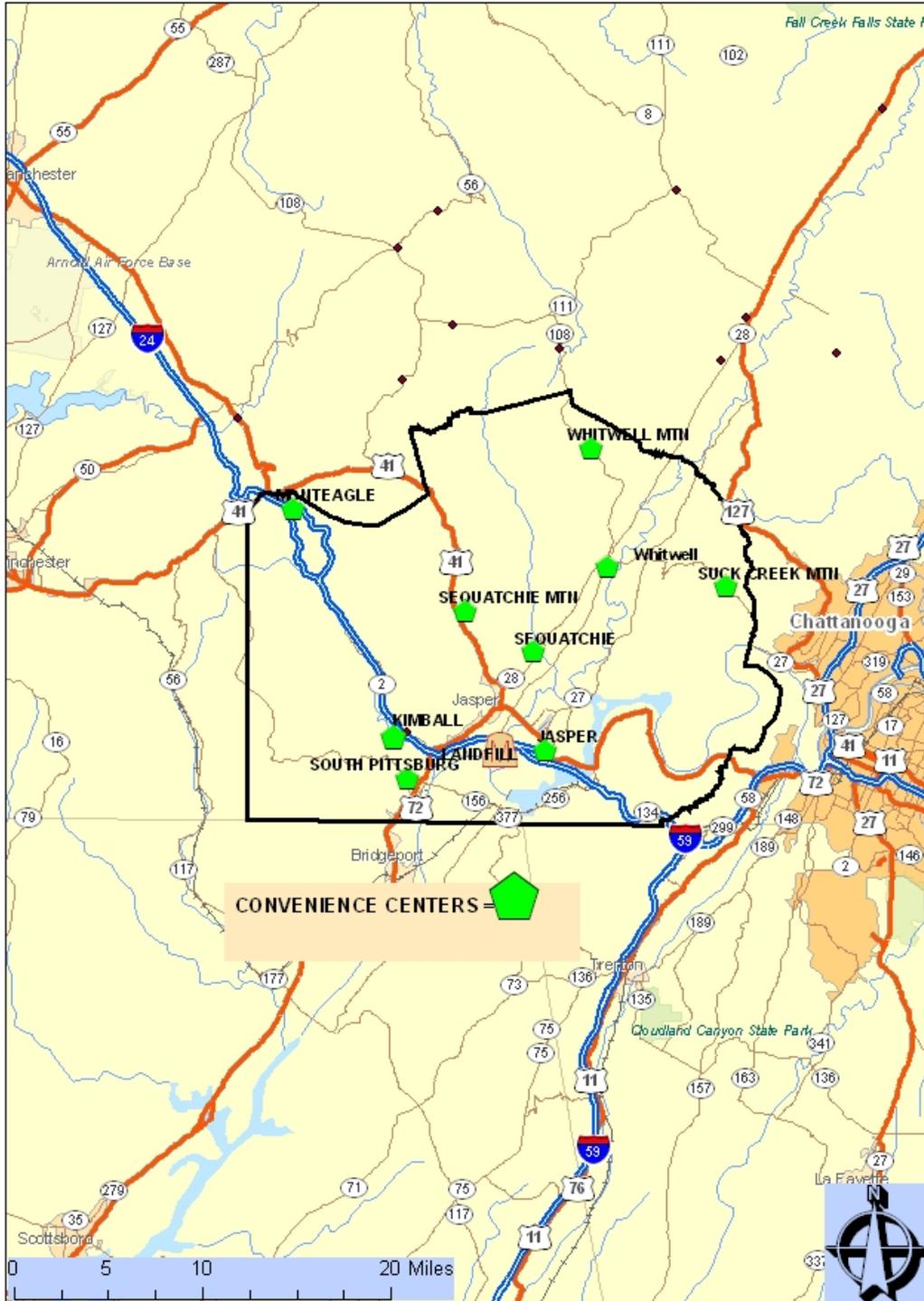
Provider of Service	Service Area	Population Total Under This Service	Frequency of Service (Weekly, Bi-weekly, on call, etc.)	Annual Tonnage Capacity	Type Service (Curbside, Convenience Center, Green Box)
Marion County	County-wide drop-off	28,000	As Needed	16,000	Convenience Center
Jasper	Town	3250	Weekly	2,075	Curbside
Kimball	Town	1400	Weekly	895	Curbside
South Pittsburg	City	3300	Weekly	2,100	Curbside
Whitwell	City	1700	Weekly	1,085	Curbside

Note: Population figures are from the 2000 U.S. Census and have been rounded higher to approximate growth. ***Annual tonnage capacities are estimated.***

The county's convenience centers are equipped with a 4 yd³ compactor feeding into a 40 yd³ receiving container. Open-top containers for bulky materials are available at the Jasper and Whitwell convenience centers. The following is a map of all Marion County solid waste facilities and photographs of each convenience center.

Municipal services provide about 35 percent of the population with waste collection. All residents also have access to convenience centers located within or near municipal boundaries.

MARION COUNTY SOLID WASTE FACILITIES





Foster Falls Convenience Center



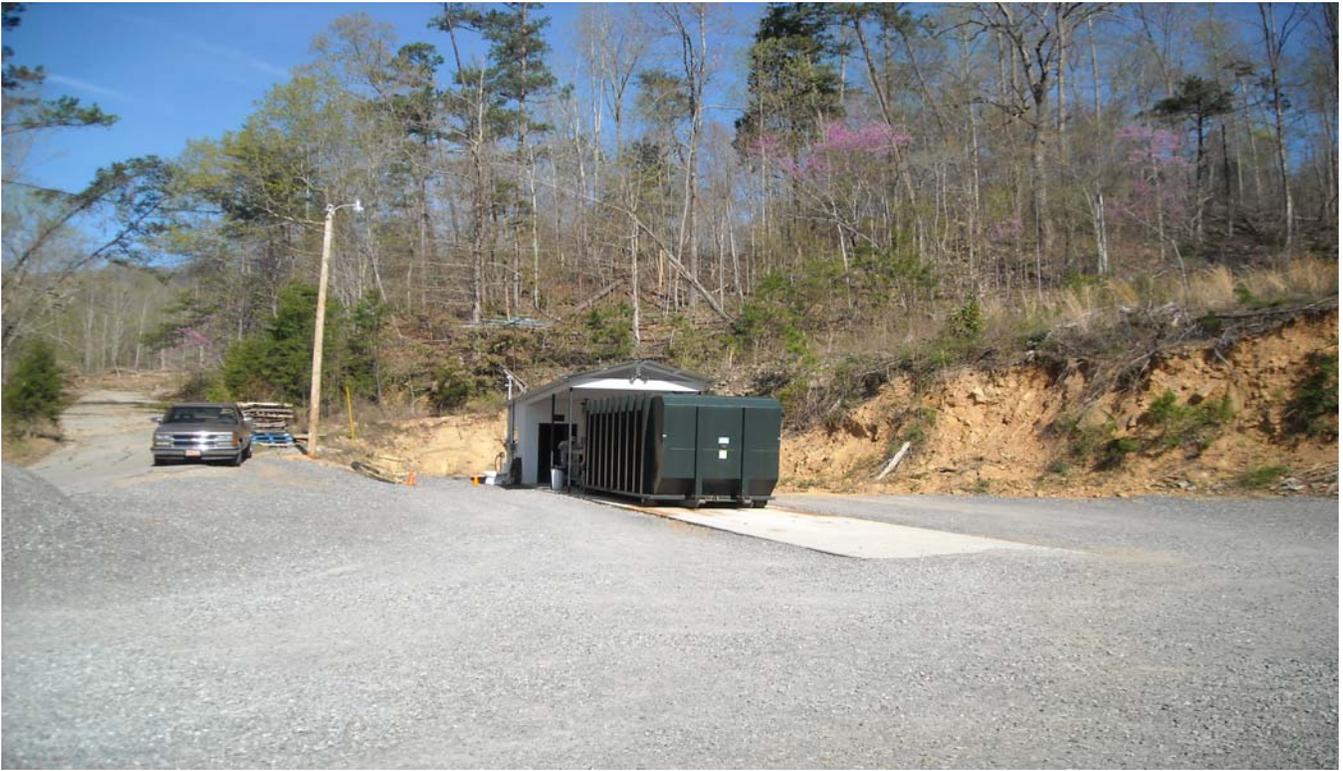
Jasper Convenience Center



Kimball Convenience Center



Sequatchie Community Convenience Center



South Pittsburg Convenience Center (New Construction)



Monteagle Convenience Center



Whitwell Mountain Convenience Center



Whitwell Convenience Center



Suck Creek 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.

The Marion County Solid Waste Authority is a 501(c)3 organization that operates the county landfill, collects waste from the convenience centers, and provides maintenance to waste facilities throughout the county. This is a non-profit organization that is separate from county government and provides services at cost. Expenditures and revenues for that organization are not included in the following.

Table 7.1 Expenditures & Revenues

EXPENDITURES				
Description	Current Need	Unmet Needs	Total	Explanation
Salary and Benefits	\$ -	\$ 50,000	\$ 50,000	Recycling Coordinator
Transportation/Hauling	-	-	-	
Collection & Disposal Systems	-	-	-	
Equipment	90,000	90,000	90,000	Roll-off recycling containers and cardboard compactor/paint recycling containers
Convenience Centers	545,000	-	545,000	Facility Upgrades
Transfer Station	-	-	-	
Recycling Center	-	-	-	
Landfill Post-Closure	-	-	-	
Landfill Disposal Fees	-	-	-	
Contracted Services	-	-	-	
Administration	-	-	-	
Education	5,000	2,000	7,000	Website development/media
Capital Projects	-	-	-	
Trustee's Commission	-	-	-	
Total:	640,000	142,000	782,000	
REVENUE				
Property Taxes	429,000	132,000	561,000	
Sales Taxes	135,000	-	135,000	
Surcharges	-	-	-	
Disposal Fees	-	-	-	
Collection Charges	-	-	-	
Industrial or Commercial Charges	-	-	-	
Convenience Center Charges	-	-	-	
Transfer Station Charges	-	-	-	
Grants	66,000			Litter/Tire Grants
Other	-	-	-	
Total:	630,000	132,000	762,000	

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

Jasper, Kimball, South Pittsburg, and Whitwell provide curbside waste collection service to their residents. In general, municipal programs use workers from other divisions to perform solid waste tasks. There is no municipal recycling program in the county.

Like many rural counties, Marion provides a full service waste collection program. All waste hauling and disposal is provided by the Solid Waste Authority, so the only staff accountable to the county mayor are the convenience center operators who report directly to the County Mayor's office.

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.

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 Marion 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 Marion County waste is currently disposed. This facility provides has adequate capacity of all of the waste generated in the county for the next 20 years.

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: All convenience centers need used oil/antifreeze collection containers.

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

Funding Source: Grant or private contractor that will collect fluids without a fee

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. The Monteagle Convenience Center compactor has extensive leaks.

Action Item: Purchase new compactors

Funding Source: County Solid Waste Fund

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

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

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

Recommendation 6: Develop recycling programs in schools

Action Item: Meetings with Chamber of Commerce Recycling Committee and school Officials

Funding Source: Solid Waste Management Fund

Conclusion

In order to remain in compliance with statutory requirements, Marion County should develop a comprehensive waste reduction, diversion, and recycling program. Many of these programs can be implemented with little cost to the county. Among these are used oil recycling containers that can be provided and serviced by private companies; scrap metal collection, which can also be contracted to private interests; and used paint that can be collected in barrels for re-use by county residents.

In general, Marion County has all of the facilities in place to meet statutory requirements. 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 Solid Waste Authority that operates the Marion County Landfill is fully capable of assuring waste disposal options for at least the next ten years.

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.