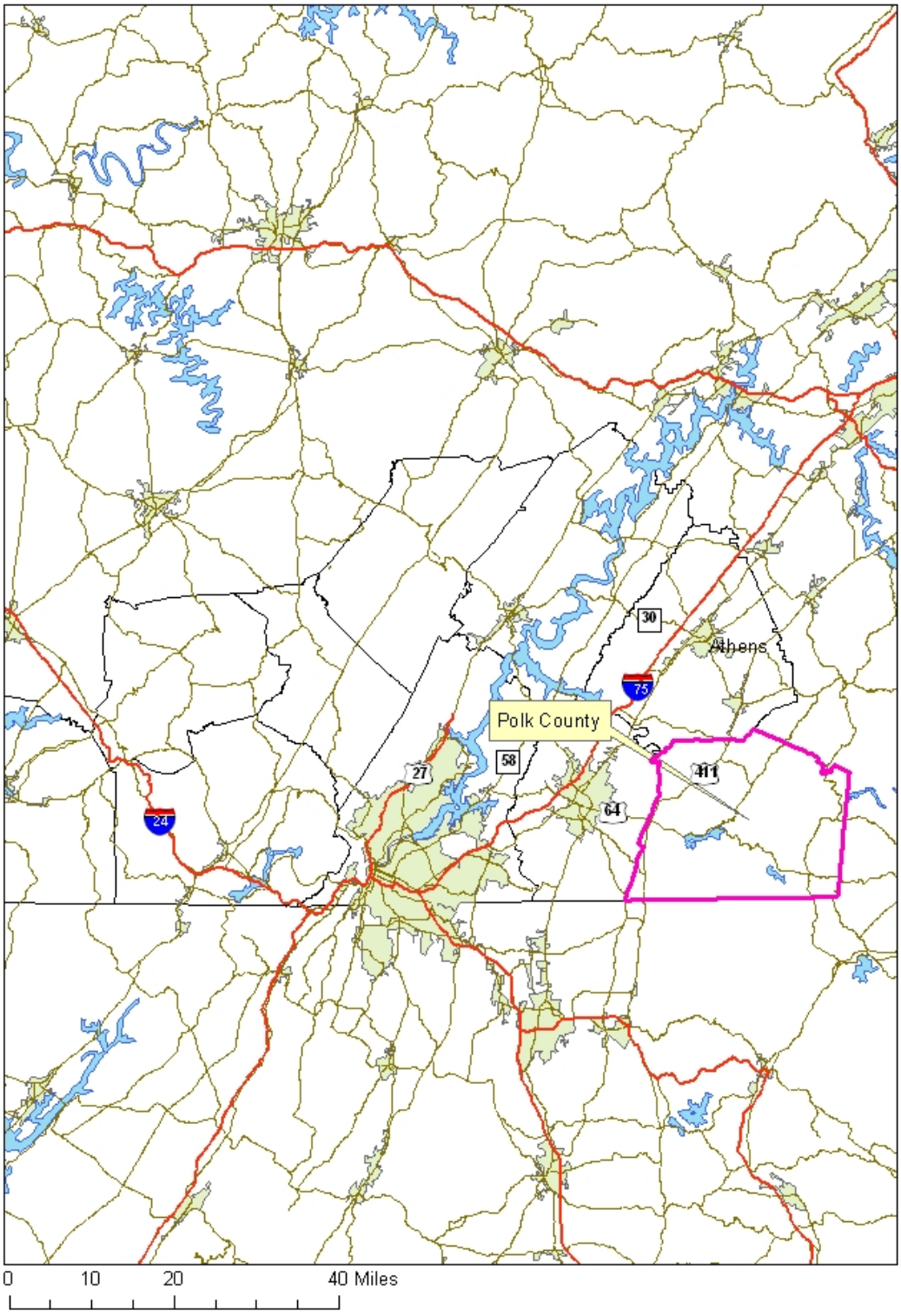
SOUTHEAST TENNESSEE MUNICIPAL SOLID WASTE REGION

POLK COUNTY

SOLID WASTE NEEDS ASSESSMENT

NOVEMBER 2009

Southeast Tennessee Counties



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]. 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.

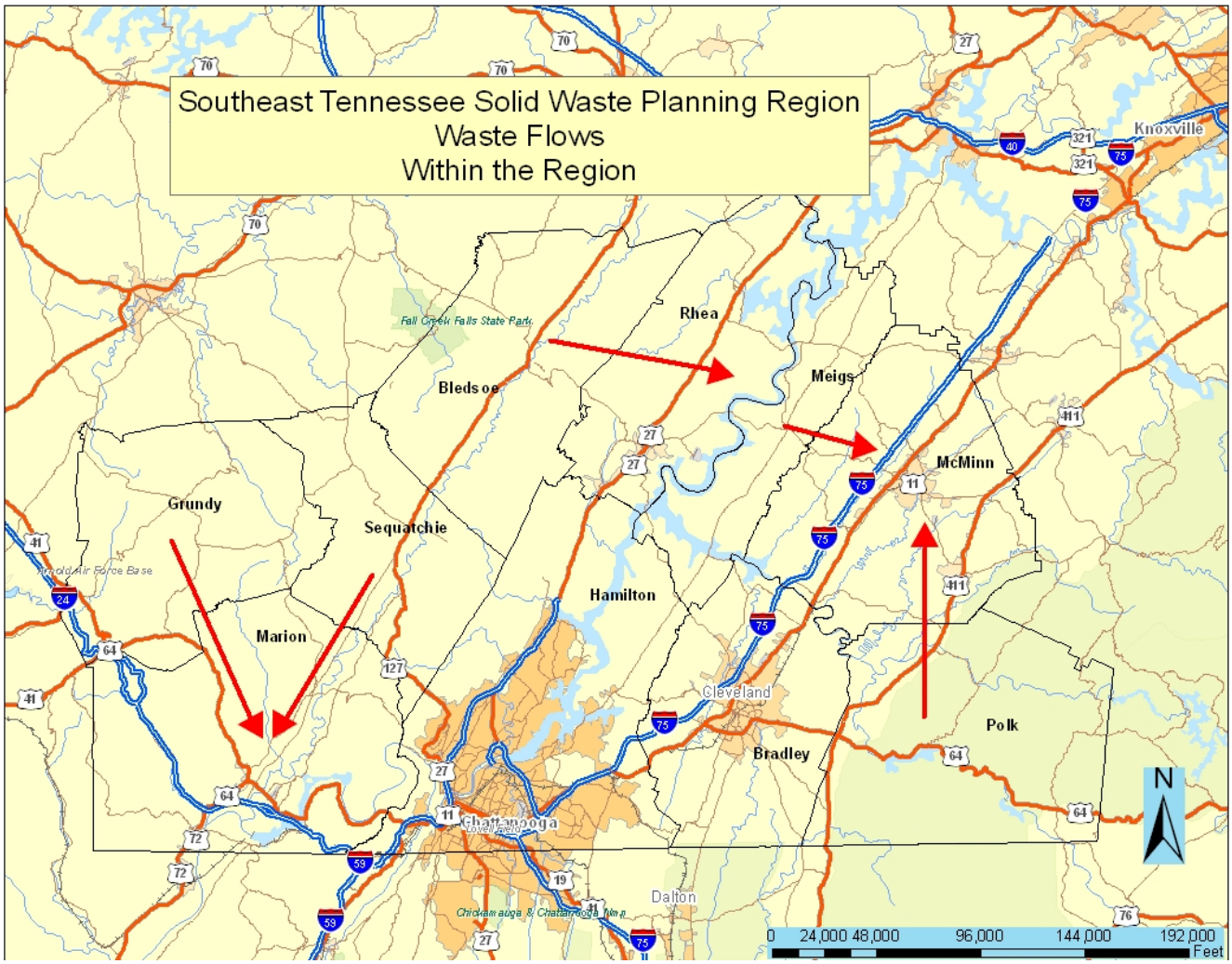
The failure to implement the waste-to-energy project did not deter the Board from remaining a regional planning entity. Board members were comfortable with the situation and wished to remain together in the event that other regional opportunities arose.

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

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

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 Marion-Grundy-Sequatchie.

The following is a detailed description of Polk 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.

The most important feature in Polk County is the Blue Ridge Mountains, which divide the county east and west. From the western slopes of the mountains, rivers formed fertile bottom lands that attracted the first settlers. On the east side is the Copper Basin, a resource-rich area surrounded by mountains that limit accessibility. Most of the area in between these two sections of the county is extremely mountains tracts of land that are part of the Cherokee National Forest, which is under the control of the U.S. Forest Service. Although these areas are within the same county, they are topographically disparate and the eastern part is partially isolated from the rest of Polk County and much of the southeast Tennessee region.

Table 1.1 Historic Population

Year	County	Benton	Copperhill	Ducktown
1950	14,074	N/A	924	1,064
1960	12,160	638	631	741
1970	11,669	749	563	562
1980	13,602	1,115	418	583
1990	13,643	992	362	421
2000	16,050	1,138	427	511

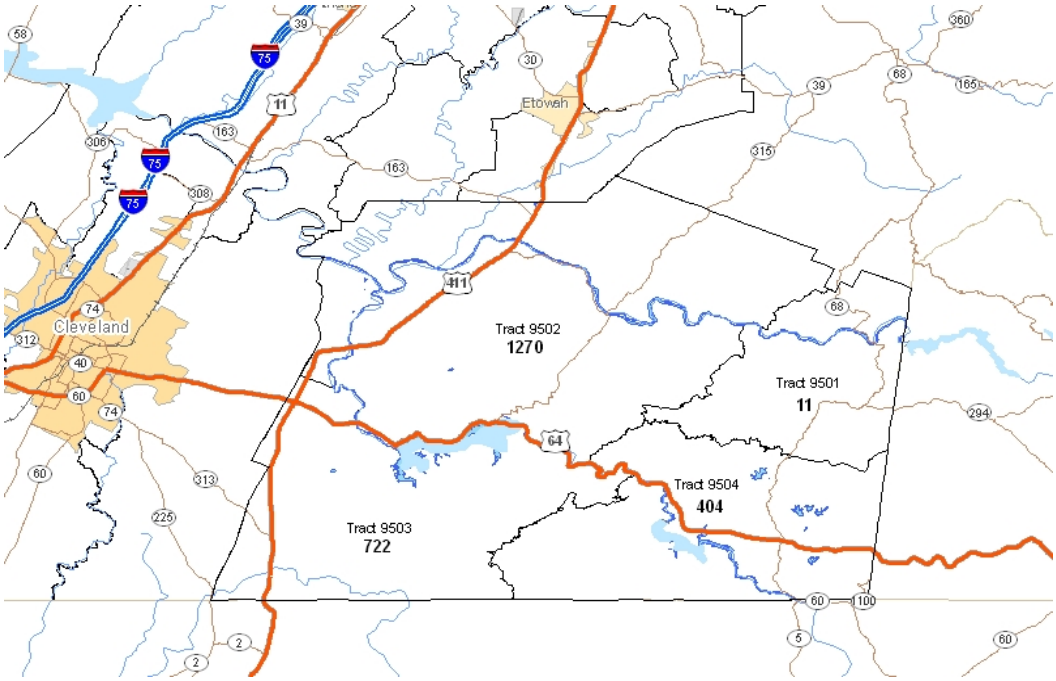
Source: U.S. Census Bureau

The progression of population reductions in Copperhill and Ducktown from the 1960s to 1990 is probably associated with reductions in the copper mining industry that dominated the Copper Basin region for almost a century. By the 1990s, the industry had essentially ceased to provide the jobs necessary for any population growth, there was nothing to take its place, and most of the area's natural resources were depleted.

On the west side of the mountains, Benton's population continued growing except for an apparent plateau period between 1980 and 1990. Since then, the population has increased only slightly. Current estimates put the county's population at about 16,000 and much of that growth occurred on the west side of the county.

Although the county does not have the industrial, commercial, or institutional resources to support additional population growth, there are adequate highways that are free from congestion and provide linkages to the urban areas of Cleveland and Chattanooga where employment is available. There are (or were before the current economic recession) significant employment opportunities in the cities of Athens and Etowah near the higher growth areas of the county. The following map illustrates where the additional population is located.

Figure 1.1
Population Increase by Census Tract: 1990 - 2000
(Additional population figure is located below each Tract no.)



Source: U.S. Census Bureau, TIGER 2000 files.

Tracts 9501 and 9504 comprise the Copper Basin area where growth has been marginal at best. Tracts 9502 and 9503 are on the west side of the Blue Ridge Mountains with easy access to Cleveland, Etowah, and other centers where industrial expansions have occurred.

As the following table indicates, only one third (29.6%) of Polk County's workforce had a job in the county at the beginning of the decade. Polk's southern border is the Georgia state line, and many workers (about 1/5) take advantage of the proximity to the Atlanta metropolitan area for employment opportunities.

Table 1.2 Polk Workforce

Worked in county	2,006
Worked outside of county	3,336
Worked outside of state	1,444
Total	6,786

Source: 2000 U.S. Census

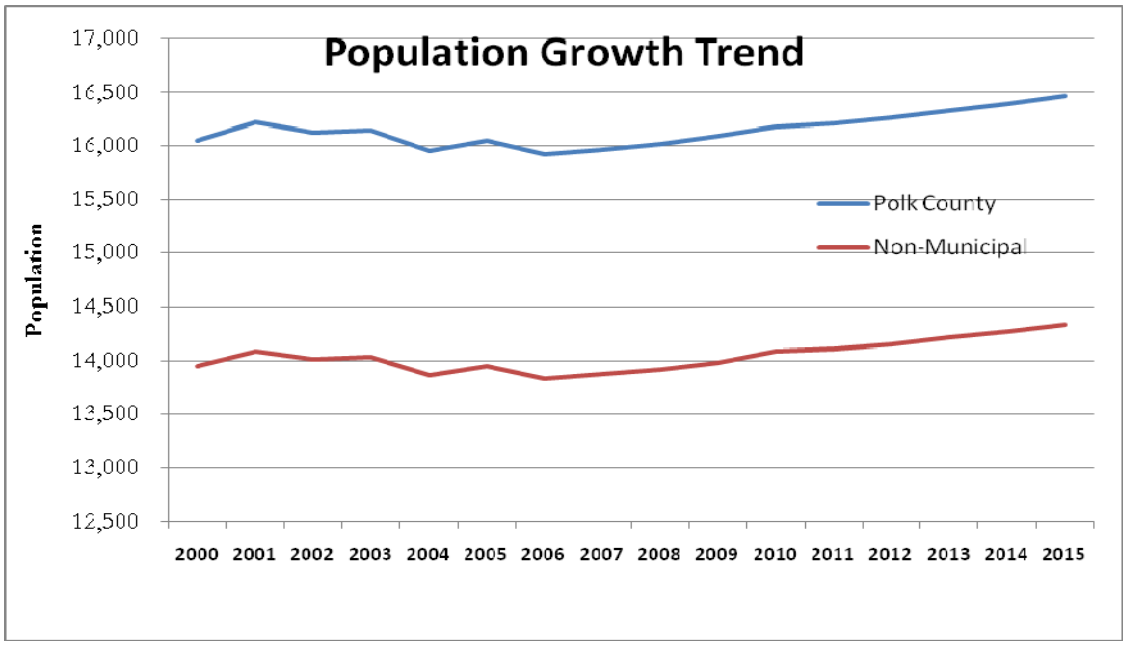
Table 1.3 Population Projections

Year	County	Benton	Copperhill	Ducktown	Non-Municipal
2000	16,050	1,169	511	427	13,943
2001	16,220	1,181	516	432	14,091
2002	16,129	1,175	514	429	14,012
2003	16,148	1,176	514	430	14,028
2004	15,956	1,162	508	424	13,861
2005	16,052	1,169	511	427	13,945
2006	15,919	1,159	507	424	13,829
2007	15,968	1,163	508	425	13,872
2008	16,019	1,167	510	426	13,916
2009	16,092	1,172	512	428	13,979
2010	16,177	1,149	515	430	14,083
2011	16,209	1,151	516	431	14,110
2012	16,262	1,155	518	433	14,157
2013	16,326	1,160	520	434	14,212
2014	16,396	1,165	522	436	14,273
2015	16,470	1,170	524	438	14,338

Sources: **Historic statistics are derived from U.S. Census Bureau data.**
Projections are derived from a "step-down" method and data from the Tenn. Dept. of Health.

Without a pronounced economic recovery in adjoining counties, the Polk County population will likely follow a slow growth scenario (Figure 1.2). A downturn in tourism due to recessionary pressures also result in a negative impact on population growth since tourism is very important to the Polk County economy.

Figure 1.2



Over the past several years, many retired people have found that southeast Tennessee is a great retirement area. Polk County has probably benefited from this trend because it has numerous, low-cost properties in the Blue Ridge Mountains located near the Ocoee and Hiwassee Rivers that were and are available for development.

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. With 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.

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.

The following table illustrates problems with the Polk County economy. Employment in the county includes only about 1/3 of the available workforce. Over the last decade, manufacturing jobs have fallen by 36% and health care jobs were reduced by 65%. Overall, about 11% of the total jobs available within the county disappeared, and replacement jobs have not found their way into the county.

Table 2.1

Average Employment by Sector

	2002	2003	2004	2005	2006	2007	2008
Utilities	5	5	23	23	23	22	21
Construction	73	72	84	87	88	93	89
Manufacturing	443	352	325	297	270	306	283
Wholesale Trade	60	67	61	35	34	33	26
Retail Trade	327	343	328	393	369	355	356
Accommodation & Food Services	278	267	253	297	342	289	303
Trans./Warehousing	36	32	34	33	65	32	31
Finance & Insurance	107	113	113	115	115	124	99

Real Estate	41	53	53	53	53	53	53
Professional & Tech. Services	39	31	32	34	35	30	27
Educational Service	337	334	301	361	322	355	380
Health Care/Social Services	390	386	410	449	406	132	137
Other Services	27	30	39	29	35	30	27
Admin. Support/Waste Management & Remediation	44	26	34	31	39	38	41
Arts, Entertainment, Rec.	239	240	266	267	285	289	285
Information	23	26	17	16	16	15	14
Public Admin.	173	176	170	178	183	179	190
TOTAL:	2,642	2,553	2,543	2,698	2,680	2,375	2,362

Source: U.S. Dept. of Labor, Division of Workforce Development, November 2009.

Polk County's economy is heavily dependent on surrounding areas since a majority of the workforce is employed outside the county. Unemployment has remained higher than the State average of about 10 percent and is not expected to begin declining until after 2011 when new industry is slated for locations in the northern sections of Hamilton and Bradley Counties, both of which are very near Polk County.

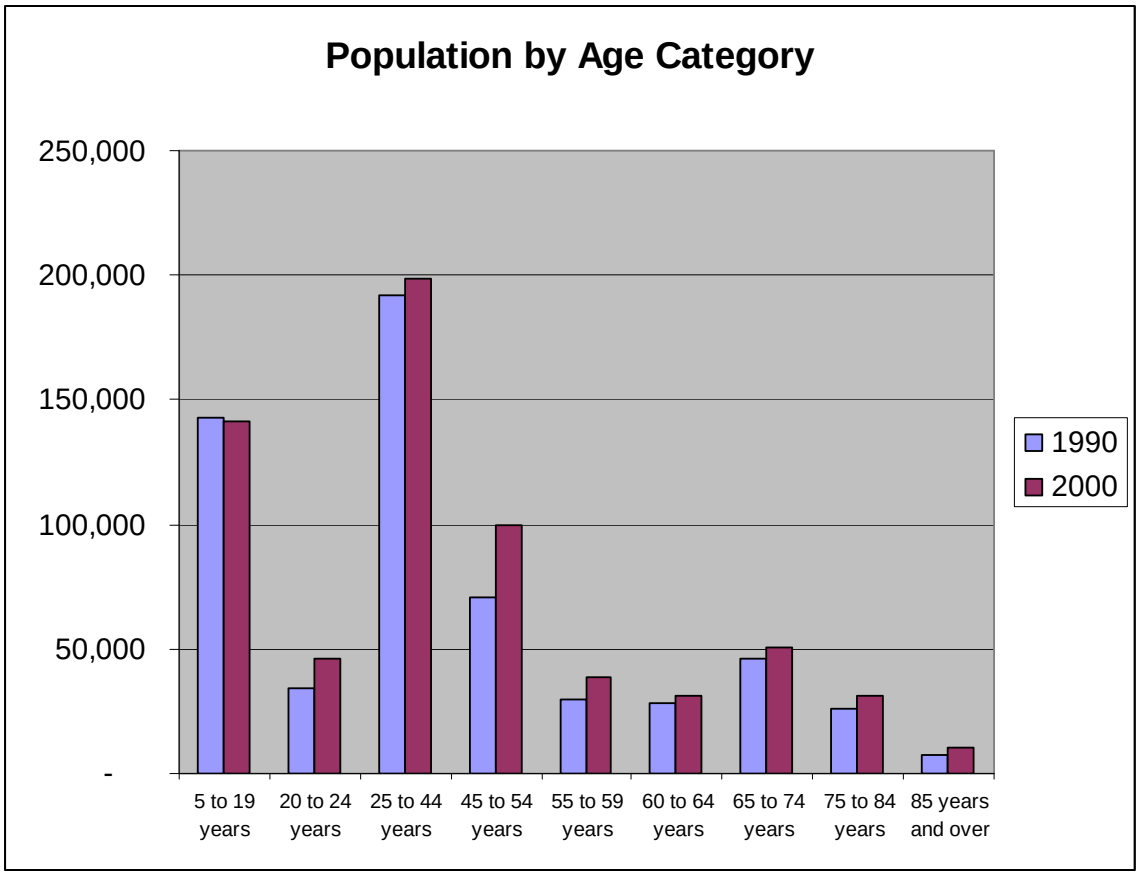
Table 2.2 Economic Profile

Year	Civilian Labor Force	Employed	Unemployed		Per Capita Income	Retail Sales (1,000s)	Bank Deposits ($Millions)
			Number	Percent			
1998	6,950	6,540	410	5.9%	18,391	48,733	197
1999	6,950	6,600	350	5.0%	19,171	52,614	209
2000	7,540	7,200	340	4.5%	20,394	64,475	214
2001	7,400	7,040	370	5.0%	20,776	71,315	222
2002	7,310	6,880	450	6.2%	20,959	79,517	212
2003	7,330	6,880	450	6.1%	21,463	84,010	198
2004	7,260	6,830	430	5.9%	32,273	90,757	196
2005	7,260	6,840	420	5.8%	24,204	96,685	188
2006	7,370	6,960	410	5.6%	24,856	86,849	191
2007	7,030	6,670	370	5.3%	26,242	82,333	188
2008	7,070	6,520	560	7.9%	24,100	91,505	120
2009	7,030	6,200	830	11.8%	24,050	78,000	110
2010	7,040	6,210	830	11.8%	24,000	79,000	100
2011	7,060	6,250	810	11.5%	23,900	83,000	105
2012	7,120	6,310	810	11.4%	23,800	85,000	125
2013	7,140	6,330	810	11.3%	23,850	88,000	160
2014	7,160	6,410	750	10.5%	23,900	90,000	175
2015	7,170	6,440	730	10.2%	23,950	93,000	180

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 2007 to 2012 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. Health care legislation that is currently under consideration by Congress may have a bearing on future trends, but it is unlikely to have a significant impact within the next 5 years. 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.

Figure 2.1



Source: U.S. Census Bureau, 2008.

Future prospects for industrial development are somewhat better due to the announcement by Volkswagen AG that it will locate a manufacturing facility in Chattanooga, and Wacker

Chemical will be building a manufacturing facility near Cleveland. Both of these are near enough to benefit the Polk County workforce.

The County has space in its industrial park near Benton 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.

The east side of Polk County has severe economic development constraints because there is only one narrow highway that connects it to the rest of the region. As of December 2009, that highway is closed due to a massive rock slide that will take months to clear and forces Copper Basin residents to make a two hour detour in order to get to jobs in the Cleveland and Chattanooga area. The best prospects for growth in this part of the county come from tourism, second home construction, and immigration from the Atlanta metropolitan area, which is currently more accessible than any Tennessee economic region.

Polk County residents have fared reasonably due to their proximity to two economic growth areas, Chattanooga and Cleveland. As the following table indicates, per capita incomes range from a high of 6 percent to a low of 1.55 percent, slightly lower than the combined non-metro areas in the State.

Table 2.3 Per Capita Income Comparison

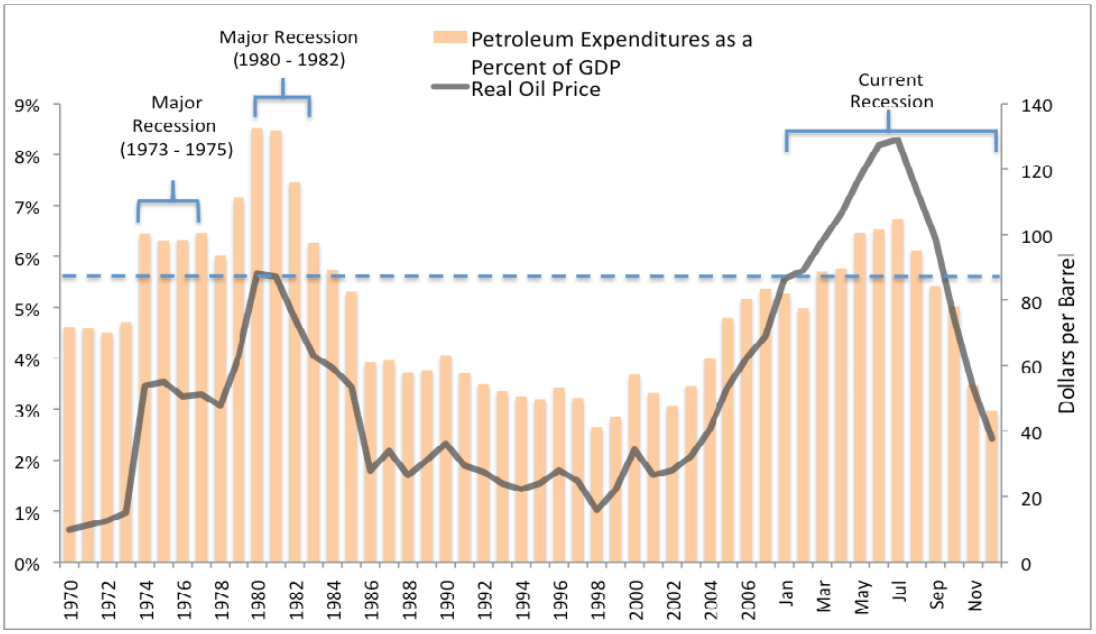
Year	1998	1999	2000	2001	2002	2003	2004	2005	2006
Tennessee	23,989	24,898	26,095	26,833	27,435	28,257	29,539	30,827	32,172
Polk	18,391	19,171	20,394	20,776	20,959	21,463	23,273	24,204	24,856
Tennessee Nonmetropolitan Portion	19,265	19,961	20,886	21,385	21,868	22,833	23,639	24,649	25,422
Difference, Polk/Nonmetro.	874	790	492	609	909	1,370	366	445	566
Percent Difference	4.54%	3.96%	2.36%	2.85%	4.16%	6.00%	1.55%	1.81%	2.23%

Source: Tenn. Dept. of Labor & Workforce Development, November 2009.

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.

The following table illustrates clearly the relationship between energy inputs into the economy and economic performance. When oil prices near 5 ½ percent of GDP, recessionary pressures generally become more pronounced and growth either ceases or becomes anemic. Prices as of the end of November 2009 are about $72 per barrel.

Figure 2.2

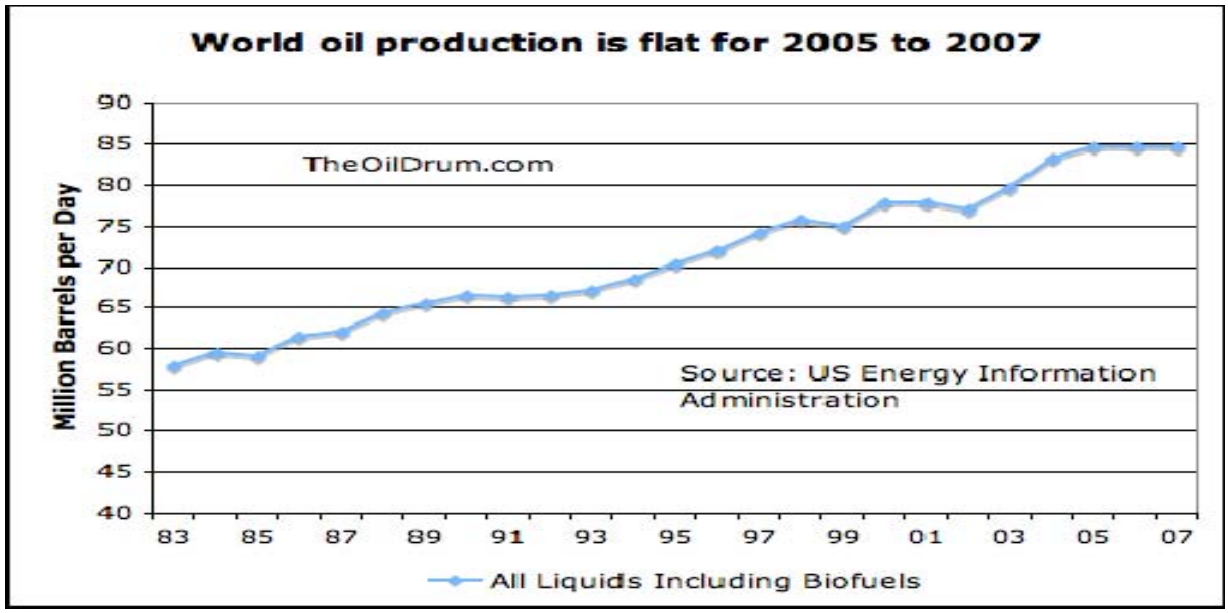


Oil depletion is the primary culprit as some of the largest oil fields in the world begin to decline. Statistics published by the International Energy Agency (EU), the Energy Information Agency (US), and the BP Statistical Abstract indicate that crude oil production has not increased above mid-2005 levels. 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.

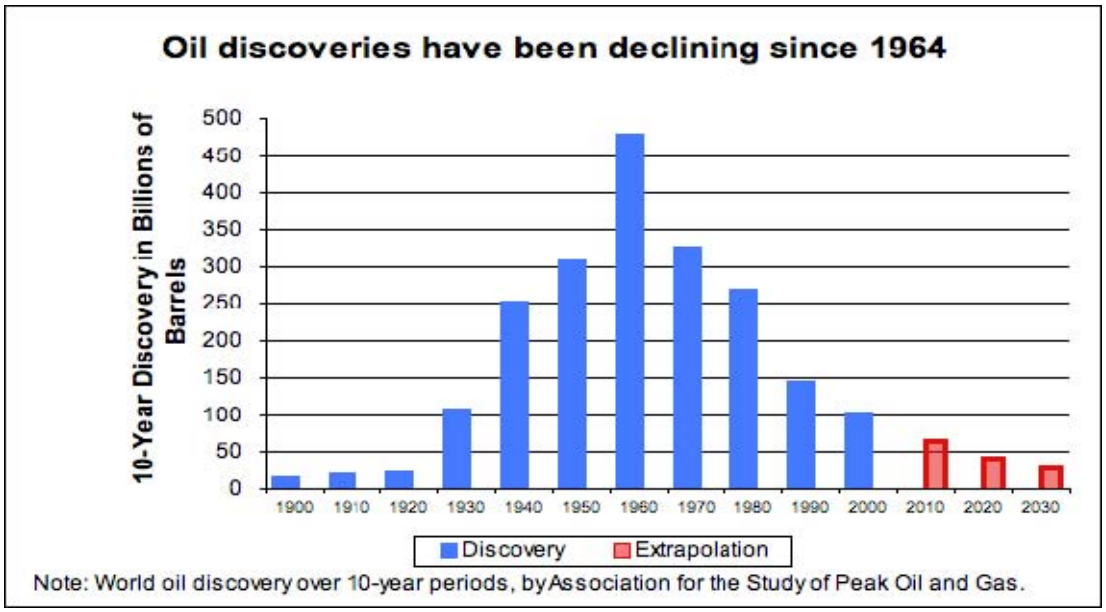
[2] Hirsch, R.L., Bezdek, R.H, Wendling, R.M. *Peaking of World Oil Production: Impacts, Mitigation and Risk Management*. DOE NETL. February 2005.

Figure 2.3



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. The basic message that projects like this convey is that the cheap oil has been found; from now on we have to contend with much higher energy costs.

Figure 2.4



If the previous analysis is correct, we cannot expect to have unfettered economic growth without the development of new energy resources. Consequently, the growth scenario expressed in **Table 2.2** is conservative and does not assume a growth trend

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 Polk 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
Census 2000

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

Figure 3.1

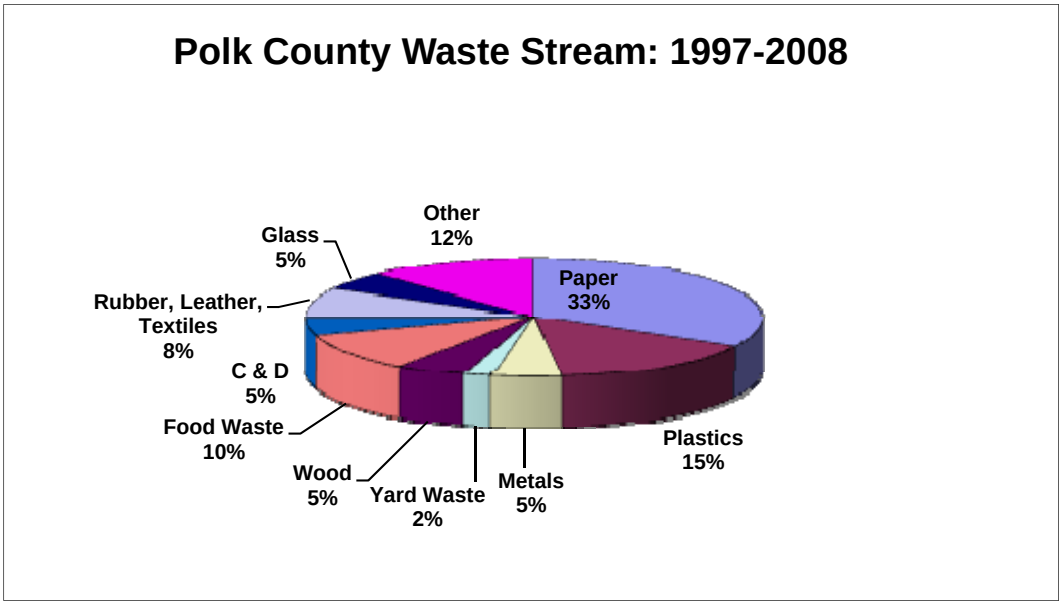


Table 3.3

Jurisdiction/ Sector	Collection	Disposal Options	Current Problem Waste Handling	Future Problem Waste Handling	Other Problem Waste
Polk County	Six county convenience centers. Available to all residents, including those within municipal areas.	All waste collected at convenience centers is taken to the Bradley County Class I landfill near Cleveland, TN.	**Waste Tires**: Mac Tire, Inc. contract **Automotive Fluids**: No program **Used Oil:** Grassy Creek and Benton Convenience Centers **Latex Paint**: No program **Electronics**: None	**Waste Tires**: Continue contracting. 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.

Polk County has six convenience centers strategically located to maximize access for all residents (see attached map). The minimum number of convenience centers required was calculated using the formula that determines a reasonable number by land area and by population. With a current population of about 16,000, the minimum required number of centers would be only one (or 1.3 to be specific) using the TDEC formula of dividing the population by 12,000. The following table shows an alternate method, which involves dividing square miles in the total service area by 180.

Table 4.1
Convenience Center Calculation by Square Miles of Service Area

	Total County	Deductions	Total Minus Deductions	Required Centers Centers (Divide by 180)
County	435.1			
Benton		2.3		
U.S. Forest		238.8		
Total	435.1	241.1	194	1.08

As the previous table indicates, the county is only required to have one center based on either calculation method. Deducting the ~239 square miles of federally-owned national forest reduces the amount of property actually controlled by the county by a significant margin. It is, in reality one of the smallest counties in Tennessee: 87th out of 95 and that does not include old mining properties in the Copper Basin that require extensive remediation due to a century of mining, smelting, and other industrial processes that essentially left the area a wasteland.

Transportation Considerations

Polk County is split between the Tennessee River Valley region and the rugged Blue Ridge Mountains. Highway 411crosses the county north to south and construction will soon complete a project to widen the highway to four lanes. This highway crosses U.S. 64 just south of Benton, which is also a four lane route to Cleveland. However, as previously mentioned, the highway narrows considerably as it crosses the Blue Ridge Mountains through the Ocoee Gorge, and this is a choke point for people living in the Copper Basin since the road is always dangerous and sometimes impassable.

Other transportation options include a major CSX Railroad line that parallels U.S. 411 and an excursion line that connects the north end of the county to the Copper Basin area. This line was maintained for industrial needs, but currently it is only used for occasional rail excursions.

Regional solid Waste Flow and Life-Cycle

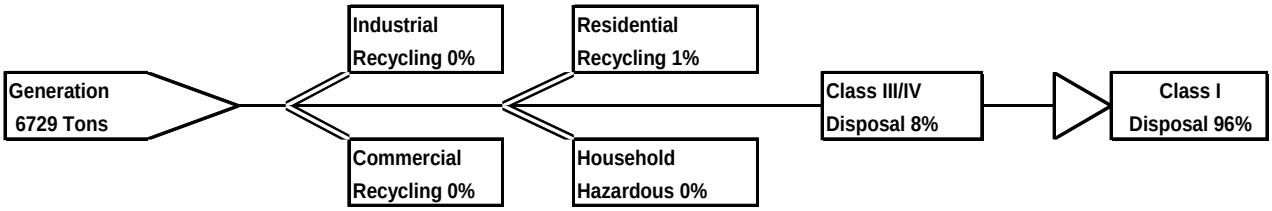
The following chart represents data collected for the 2008 Annual Report for the Southeast Tennessee region. As is apparent, there are no data available on waste reduction or diversion because it is very difficult to document waste diversion in a rural county. Most of the yard waste is disposed on site 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.

The following table was taken from the Re-Trac® database, which provides an overview of waste collection over the last two (2) years.

	2008	2007
RESIDENTIAL:		
Solid Waste	7,816.93 Tons	8,399.52 Tons
Recycling	373.75 Tons	469.43 Tons
Total Tons Collected	8,190.68 Tons	8,868.95 Tons
Total Tons Diverted (for diversion calc.)	373.75 Tons	693.51 Tons
Total Tons Disposed (for diversion calc.)	7,816.93 Tons	8,175.44 Tons
Total Tons Collected (all sectors):	8,190.68 Tons	8,868.95 Tons
Total Tons Diverted (for diversion calc.):	373.75 Tons	693.51 Tons
Total Tons Disposed (for diversion calc.):	7,816.93 Tons	8,175.44 Tons
Real Time Diversion Rate:	4.56%	7.82%

A small amount of Polk County's waste was sent to the McMinn County Class III/IV landfill and was thus counted as diversion. The majority of waste reduction, however, was derived from recycling at the county's convenience centers. There is virtually no information on industrial recycling, and as presented previously, very little industrial activity in the county. As a result, the county must rely heavily on recycling the residential waste that arrives at convenience centers.

Table 4.2 Waste Generation



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

Current Year Generation (Disposal + Reported Diversion)	Current Year Disposal	Current Year Population	Disposal per Capita Ratio
8,190.7	7,816.9	15,671	0.5
8,190.7	**7,816.9**	**15,671**	**0.5**

Table 5.2

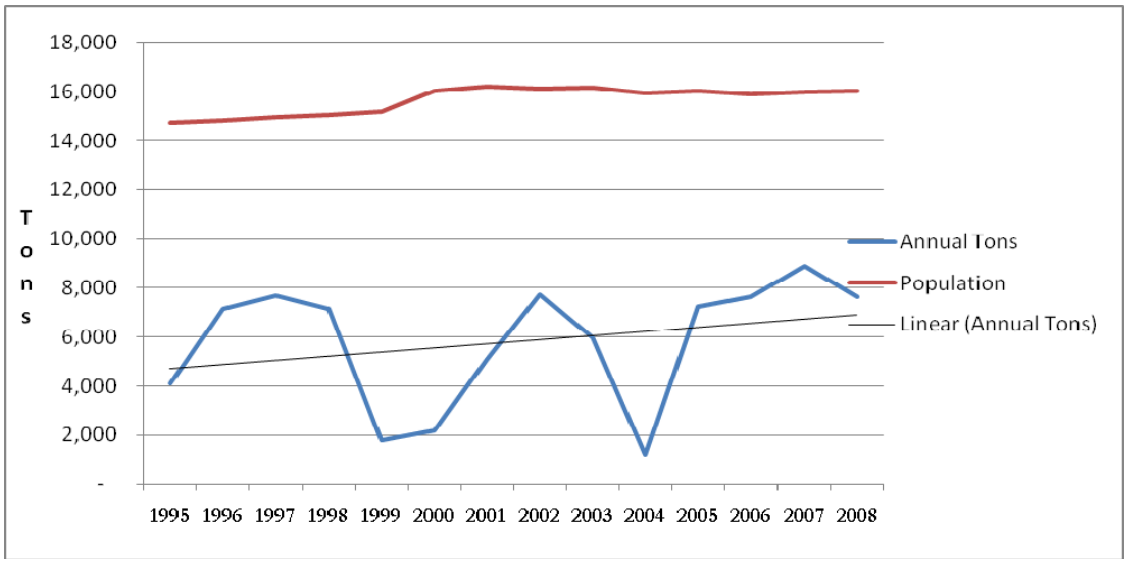
MSW % Reduction Compared to Base Year	MSW % Reduction Pop Ratio	MSW % Reduction Using Pop Econ Ratio	MSW % Reduction Real Time Comparison
-72.9	-72.9	-80.5	4.6
-72.9	**-72.9**	**-80.5**	**4.6**

Source: Table generated by ReTrac

The base year per capita waste generation rate was 0.86 tons as indicated in a May 26, 1994 letter from Paul Evan Davis (TDEC) to Jack Marcellis, past chairman of the Southeast Tennessee Municipal Solid Waste Region. Assuming a 2008 population of about 16.000, Polk County's waste generation rate was 0.51 tons per person annually (8,190tons/16,000). That amounts to a 40% reduction in per capita waste from the base year figure. This is at odds with the foregoing table, which is obviously based on a different set of figures than those available locally.

According to the 1995 Annual Progress Report, Polk County produced about 4,114 tons of waste. Reported tonnage for the next three consecutive years was over 7,000 tons annually. The obvious conclusion to be derived from these larger amounts is that original waste generation figures were lower than would seem plausible. In 1999, 2000, and 2004, the tonnage falls precipitously only to rebound in subsequent years. This can be explained by Polk County's proximity to Georgia: large volumes of waste were hauled out of the county to north Georgia landfills, and waste haulers were not required to divulge either the quantity or destination of the waste.

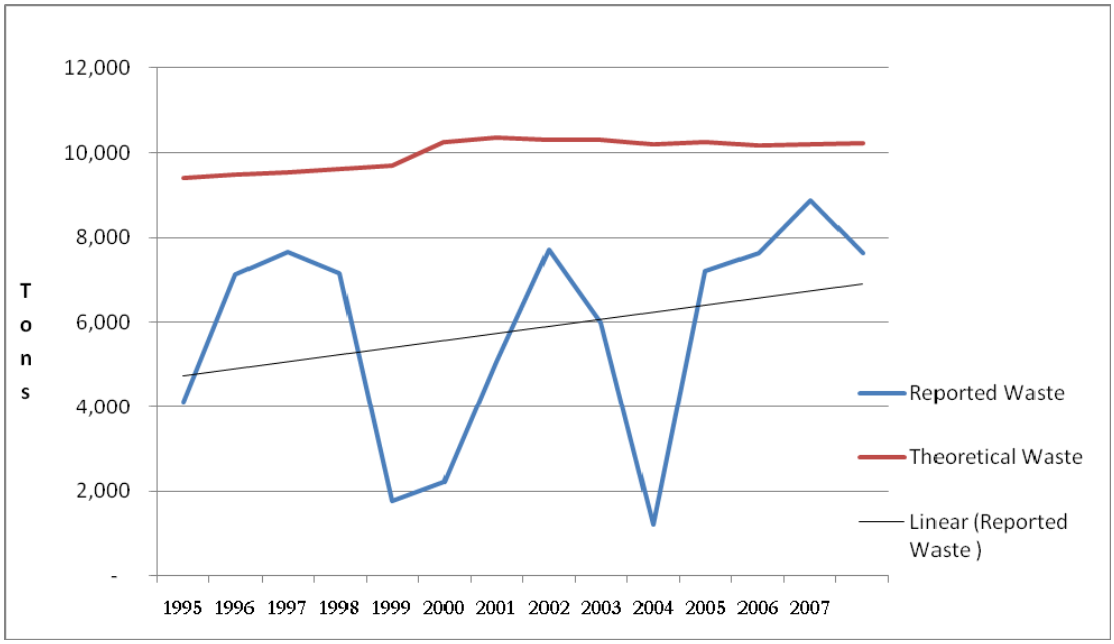
Figure 5.1 Annual Tons vs Population



Source: Re-Trac 2008; SETDD Population assumptions.

Omitting the outliers from the preceding graph would likely show a very mild growth pattern with waste generation figures in the 7,000 ton range annually. Since there are no major industries and a limited number of commercial enterprises, the county's waste should not fluctuate to any great degree, and as reporting has become more accurate in the past three years, waste volumes have become more closely in line with amounts that would be expected.

Figure 5.2 Reported Waste Generation vs Theoretical Generation



Source: Re-Trac, 2008

Using an estimated generation rate of 3.5 pounds of waste per person per day, the preceding table indicates that the peaks in reported waste generation are closer to actual waste production, especially as the last three years of data are in line with these peaks.

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 Polk County. The following is a list of landfills available for waste disposal.

Table 6.1: Regional Landfills

Site Name(s)	Annual Tons Polk County	Permit Number	Current Capacity	Maximum Capacity	Projected Life of Facility
Bradley County Landfill	7,600	SNL06000006	Capacity not determined	Capacity not determined	20 years
Bradley County Demolition	N/A	DML06000114	Capacity not determined	Capacity not determined	20 years
McMinn County Landfill	200	SNL54105003	Capacity not determined	Capacity not determined	25 years
McMinn County Landfill (Demolition)	200	DML54000098	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.

Most of the waste collected at Polk County convenience centers is hauled to the regional, landfill in Bradley County although a small amount is hauled to the McMinn County Landfill. Both facilities are within easy hauling distance. McMinn County operates a Class III/IV landfill adjacent to its disposal facility near Athens, TN. About 200 tons of demolition waste from Polk County is sent to the Class III/IV facility annually. Bradley County also has a construction/demolition landfill adjacent to its Class I facility. With all of these disposal options, Polk County officials encounter no difficulties in negotiating reasonable waste collection and disposal agreements (see attached landfill location map).

All recycling must be hauled outside the county for sale and/or processing. Currently, paper products are taken to Cleveland Recycled Fiber in Bradley County; metals are hauled to Chattanooga where there are several end user options; and tires are hauled by a state-wide contractor.

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)
Polk County	County-wide drop-off	16,000	As Needed	8,000	Convenience Center

As the attached convenience center map indicates, Polk County has adequate waste collection service for all residents.

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

EXPENDITURES				
Description	**Current Need**	**Unmet Needs**	**Total**	**Explanation**
Salary and Benefits	$ -	$	$	
Transportation/Hauling	-	-	-	
Collection & Disposal Systems	-	-	-	
Equipment	-	-	-	
Convenience Centers	-	-	-	
Transfer Station	-	-	-	
Recycling Center	-	-	-	
Landfill Post-Closure	-	-	-	
Landfill Disposal Fees		-	-	
Contracted Services	415,800	-	-	Waste collection and disposal
Administration	-		-	
Education	12,000	2,000	14,000	Website development
Capital Projects	-	-	-	
Trustee's Commission	-	-	-	
Total:	427,800	2,000	429,800	

The county also needs additional containers to handle recycling, including glass and plastic.

Table 7.2 Revenues

REVENUE				
Description	**Current Need**	**Unmet Needs**	**Total**	**Explanation**
Property Taxes	415,800	-	415,800	Contract services
Sales Taxes		-	-	
Surcharges		-	-	
Disposal Fees		-	-	
Collection Charges		-	-	
Industrial or Commercial Charges		-	-	
Convenience Center Charges		-	-	
Transfer Station Charges		-	-	
Other	30,000		30,000	Litter Grant
Total:	445,800	-	445,800	

Note that the previous year's budget included a transfer from the fund balance. Currently, revenues from property tax are not sufficient to fund additional programs.

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

Municipalities in the county collect waste, but it is taken to local convenience centers for disposal. The county provides all waste collection services at convenience centers through a contract with a privately-owned company.

The organization chart for Polk County's waste collection and disposal system is very simple because the county does not own a landfill and contracts for all services. The County Mayor is in charge of the litter grant program, which includes an educational component.

Like many small counties, Polk provides a full service waste collection program, including recycling, as efficiently as possible. Funding for new positions is in short supply, but the county has one full-time person to handle waste reduction and recycling programs It is a very lean operation due to the lack of revenue to fund extensive operations.

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; a 40 yd^3 container for metals. The primary center is located in Benton on Welcome Valley Road to serve the primary population centers.

Benton Convenience Center

The view of this center shows the covered ramp where waste can be dumped into a roll-off container below. This center handles all of the used tires, which are hand loaded into a semi trailer by the attendant. The entrance to the recycling/used tire collection area is pictured below.

In addition to his waste handling job, the attendant also collects cardboard and metals.

Reliance Convenience Center

The center pictured above is located at the Hiwassee River, a major tourist, trout fishing, and hunting destination. There are not many permanent residents near this center, and waste collection volumes are limited during the off season.

Linsdale Convenience Center

Linsdale is a rural area in the northeast section of the county that has seen the highest growth over the last decade.

South Polk (Old Fort) Convenience Center

The center located in the southwestern section of the county serves a small, rural population that also has access to the Benton Convenience Center where recycling is available.

Grassy Creek Convenience Center

Grassy Creek is located just north of Copperhill in the extreme southeastern part of the county and the state. In addition to waste collection, the center accepts used tires, used oil, and mixed metals.

Turtletown Convenience Center

The center pictured above is located in the heart of the Blue Ridge Mountains, and it is the most isolated facility in the entire southeast Tennessee region. Currently, a rockslide on U.S. 64 requires residents to make a 100 mile detour if they want to reach other parts of Tennessee. The rail line in the background was abandoned and is now used only occasionally for excursion trips.

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 7.2 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.

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?

Polk County was one of the first counties in the region to develop well-maintained convenience centers. Even so, 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 programs (taken from the 2008 Annual Report) are associated with the Tennessee Department of Transportation Litter Grant Program, which provides funds to local governments for litter collection and education.

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.

There are sufficient waste disposal facilities, and capacity is available from either of two permitted disposal facilities in neighboring counties. The recycling program is operated in an efficient manner, and they are located near the largest population concentrations: the Town of Benton (county seat), and the City of Copperhill.

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.

As energy costs increase, municipalities will probably grow as residents move closer to jobs, commercial establishments, and other amenities. There will be increased pressure on the own to provide additional services while the cost of these services will require the municipalities to carefully prioritize needs as they relate to statutory requirements.

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.

Finally, the county does not have a "problem" waste strategy, primarily because there are limited funds to deal with this issue. However, paint collection and/or redistribution could be implemented at the two primary convenience centers.

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: Provide signs at major intersections indicating the location of waste collection and recycling services.

Funding Source: Tennessee Dept. of Transportation grant and/or general fund.

Recommendation 2: Benton and Grassy Creek 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: Increased cardboard collections at convenience centers will require methods to compact or bale materials to increase density enough to make it transportable.

Action Item: Apply for grant funds to purchase a compactor and roll-off container designated for cardboard collection.

Funding Source: Solid Waste Management Fund

Recommendation 4: Encourage and coordinate the development of recycling and waste reduction programs in Benton, Copperhill and Ducktown staffed by city employees, including wood waste processing.

Action Item: Meetings between county and municipal officials.

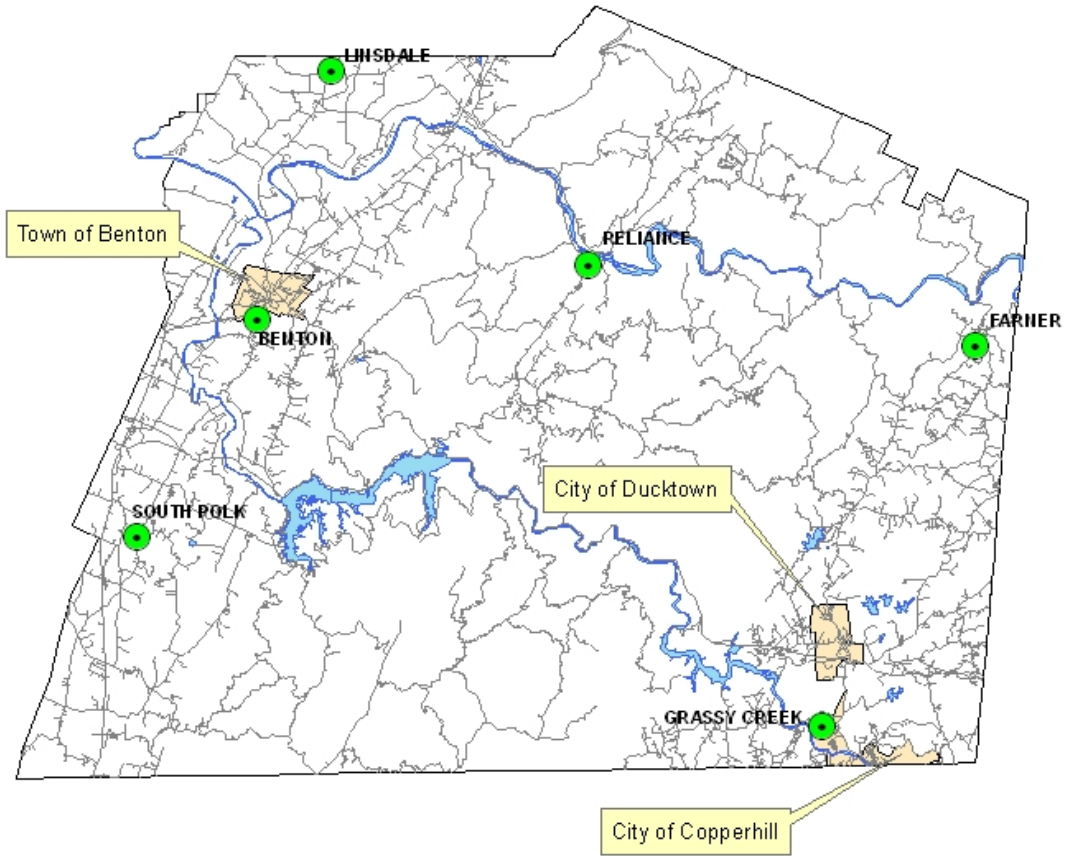
Funding Source: Appalachian Regional Commission/USDA Rural Development, Rural Utilities Service/Solid Waste Management Fund

Conclusion

In general, Polk 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 recycling options using the most cost-effective methods available.

ATTACHMENT I

Polk County Convenience Centers



Legend

- Convenience Centers
- Roads
- Lakes/Streams
- Municipal Boundaries

0 2.5 5 10 Miles

N

ATTACHMENT II

Landfill Location Map