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INTRODUCTION

The quality of life of a community is defined, in large part, by its natural resources. In addition to aesthetic pleasure afforded by the environment, natural resources sustain life and support the production of goods and services. However, many everyday activities negatively impact our ecosystems through degradation of air and water and depletion of resources. Thriving communities demonstrate concern for sustainability of the natural environment, manifest in access to green space, well-planned land use, clean air and water, and environmentally sustainable practices.

The data reported in this study reflect the status of the natural environment in Spartanburg County. All data are from sources recognized by subject matter experts as being valid and reliable. In order to provide context, most data are reported with appropriate comparison data or trend data. Original sources are provided so that the reader can delve further in the data as she or he wishes. Where valid and reliable data sources are limited, the data are likewise limited. Any questions may be addressed to the author of this study.

LEADING INDICATORS

Leading indicators are key variables that reflect the state of the natural environment and that are useful predictors of environmental trends.

AIR QUALITY

The US Environmental Protection Agency (EPA) is responsible for setting National Ambient Air Quality Standards (NAAQS) for airborne pollutants considered harmful to public health and the environment. Currently there are six principal pollutants for which there are regulatory standards. These are called “criteria pollutants”. They are ozone, particulate matter, carbon monoxide, nitrogen oxide, sulfur dioxide, and lead.

Since 1959, air quality has been monitored throughout South Carolina. The SC Department of Health and Environmental Control (DHEC) is responsible for air quality monitoring and reporting, and through
its Bureau of Air Quality, maintains a monitoring network for all criteria pollutants. As of August, 2010, DHEC increased the number of monitoring sites in the Upstate to 11, two of which are in Spartanburg County. These are the North Spartanburg Monitoring Station which only measures ozone, and the TK Gregg Monitoring Station that only measures particulate matter. The figure below identifies the locations of current Upstate monitoring sites.

![Map of Upstate Monitoring Sites](image)

Source: S.C. DHEC

### GROUND LEVEL OZONE AND PARTICULATE MATTER

Although all of the six criteria pollutants have the potential to cause damage to human health and the environment, ground-level ozone and particle pollution pose the most widespread health threats.

**Ozone**

Ozone is a gas made up of three oxygen molecules. While the ozone layer in the upper atmosphere protects humans and animals from harmful solar rays, ground-level ozone is a type of air pollution that is near the earth’s surface and forms on hot sunny days when nitrogen oxides (NOx) and volatile organic compounds (VOCs) react to the sun’s heat. Exposure to ground-level ozone can irritate the respiratory...
system, causing shortness of breath, wheezing, coughing and exacerbating conditions such as asthma and bronchitis.

Currently, the EPA’s ground level ozone standard, set in 2008, is 0.075 ppm (parts per million). In designating areas for attainment or nonattainment of the standard, DHEC examines monitor data over the past three years to get an average 8-hour reading. South Carolina ozone summary data from DHEC for 2010-2011 show significant ozone attainment concerns for Spartanburg (and several other areas of the state). The graphic below shows that Spartanburg was one of the three counties in the state with the highest number of days in 2008 with ozone concentration exceeding the National Ambient Air Quality Standards.

The EPA revises its standards for ozone periodically, and more a more stringent standard has been expected for some time. Notably, the 1997 standard was 0.08 ppm, and data from the Spartanburg monitor for that recording period showed average ozone levels at 0.083 parts per million. Spartanburg was considered to be in compliance, however, by virtue of the fact that the EPA rounds figures down. However, as of September 2011, SC DHEC notified counties that a more stringent ozone standard would not be enacted.
The EPA recently (2011) conducted a preliminary review of ozone air quality data from 2008-2010. Based on those data, ozone attainment in the Greenville-Spartanburg-Anderson area is 0.076 ppm and falls under the “Marginal” Potential Classification for the 0.075 ppm ozone standard. According to the EPA, “many of the mandatory measures under the Clean Air Act are not required for Marginal areas since they are expected to achieve attainment within three years”. The attainment deadline for Marginal areas is 2015. Emission-reducing requirements that are in place now are expected to bring the Upstate into ozone attainment by 2015.

Data submitted in March 2009, identified five areas of the state that were not meeting the 2008 ozone standards and were to be designated “nonattainment” by EPA. However, based on the most recent air quality data which shows improved ozone levels, SC DHEC has submitted an updated recommendation that each county in the State of South Carolina be designated “attainment” for the 2008 ozone standard.

Particulate Matter or Particle Pollution

Particulate Matter consists of solid particles and liquid droplets that are suspended in the air and may include dust, dirt, soot, or smoke. Currently there are two standards for inhalable particulate matter, PM\(_{10}\) and PM\(_{2.5}\). Both have their own annual and 24-hour standards. PM\(_{10}\), or “Primary Particles”, range in size from 2.5 to 10 microns in diameter and come from a wide variety of stationary, mobile, and natural sources such as construction sites, power production, diesel trucks, smokestacks, and forest fires. PM\(_{2.5}\), or “Secondary Particles”, are fine particles that have a diameter of 2.5 microns or less and come from the same sources as primary particles. To provide perspective, a human hair is approximately 70 microns in diameter.

Particulate matter can enter the body through inhalation and accumulate in the respiratory system and may cause or exacerbate respiratory conditions such as asthma and lung disease.
Currently, South Carolina is in compliance with the annual and 24 hour Particulate Matter standards as demonstrated by the graphic below. The EPA regulates PM$_{10}$ and PM$_{2.5}$. Particles larger than 10 microns are not regulated by the EPA.

Sources:

The Air We Breathe: [http://spartanburgair.wordpress.com/](http://spartanburgair.wordpress.com/)

SC DHEC Environment and Public Health Tracking: [http://www.scdhec.gov/administration/epht/Air.htm](http://www.scdhec.gov/administration/epht/Air.htm)

SC Ozone Attainment: A Short History

In the fall of 2002, the US Environmental Protection Agency (EPA) approved an option for areas meeting the 1-hour ozone standard, like those in South Carolina, to attain the 8-hour ozone standard by December 31, 2007, and obtain cleaner air sooner than federally mandated. This option, commonly referred to as the Early Action Process, requires an expeditious timeline for achieving emissions reductions sooner than required under the 1997 8-hour ozone implementation rule, while providing "fail-safe" provisions for the area to revert to the traditional process if specific milestones are not met.

Forty-five of forty-six counties in South Carolina along with SC DHEC and EPA Region 4, signed Early Action Compacts (EAC) in December 2002. By signing the EAC, EPA agreed to defer the effective date of the nonattainment designation for participating areas as long as all terms and conditions of the EAC were met.

Subsequently, SC DHEC worked with EPA, state and local governments, industry, environmental groups, and other interested parties to develop a strategy to reduce the pollution that creates ground-level ozone. In March 2004, participating EAC areas in South Carolina, submitted local Early Action Plans to include emission reduction strategies.

On April 15, 2004, the EPA publicized nonattainment areas and respective classifications for ozone. They were based on the severity of the ozone problem in each state. Three areas in South Carolina were listed as not meeting the 1997 8-hour ozone standard. Although one of the areas designated (partial York County) was not allowed to continue participation in the EAC process (due to proximity with Charlotte, NC) the other two areas were designated nonattainment with the effective date deferred. In December 2004, South Carolina submitted the EAC State Implementation Plan.

In December 2007, South Carolina provided EPA with documentation demonstrating that local stakeholders, when given the flexibility to implement programs geared toward reducing oxides of nitrogen emissions do have an impact on reducing the formation of ozone. In April 2008, based on ambient air monitoring data for 2005, 2006, and 2007, the areas in South Carolina designated as nonattainment for the 1997 8-hour ozone standard with the effective date deferred were redesignated to attainment.

From: SC DHEC, South Carolina EAC History
EMISSIONS

The primary source of ground-level ozone and particle pollution are emissions of various sources, either stationary or mobile. An inventory of emissions in the Upstate, released by the Upstate SC Air Quality Improvement Committee in 2011, in partnership with SC DHEC, assesses emissions from nonpoint, non-road, on-road and point sources by county. Because air quality does not start and stop at county boundaries, emissions data is provided for the Upstate as a whole, including Anderson, Cherokee, Greenville, Oconee, Pickens, and Spartanburg Counties.

Volatile Organic Compounds (VOCs) are a large family of carbon-containing compounds, some of which are toxic and/or carcinogenic. Most VOCs contribute to the formation of ground level ozone. They can also enter the water supply through ground water runoff. Nitrogen oxides (NOx), especially nitrogen dioxide, are emitted from high temperature combustion. NOx is manifest as an air pollutant in the brownish haze above, or downwind of, cities. The Upstate Emissions Inventory provides the following data relative to both NOx and VOCs for 2010. The primary sources of emissions in the Upstate include:

**Stationary Sources**

**Nonpoint Sources:**
- Commercial cooking
- Fires: agricultural field burning, prescribed, wildfires
- Fuel combustion: commercial, institutional, industrial, residential
- Petroleum products: all activities
- Open burning: residential / municipal
- Solvent usage
- Waste water treatment / disposal

**Point Sources:**
- Industries, power plants, mills

**Mobile Sources**

**Nonroad Sources:**
- Aircraft
- Compressed natural gas
- Propane
- Off-highway vehicles: diesel and gasoline (2 and 4 stroke)
- Pleasure craft
- Railroad equipment

**Onroad Sources:**
- Highway vehicles: diesel and gasoline
On-road sources generate most of the pollutants in the Upstate, followed closely by nonpoint sources. Nonpoint sources generate most of the VOC pollution in the Upstate, while on-road sources generate most of the NOx pollution.

In fact, onroad sources produced 34,556 tons of NOx and VOC emissions in 2010, and nonpoint sources produced 26,484 tons.
Greenville and Spartanburg lead the Upstate counties as the highest producers of both NOx and VOC emissions.

The following graph demonstrates emissions by pollutant and source for all Upstate counties. Spartanburg generates more point source VOCs and point source NOx than any other of the counties.
The leading sources of VOCs and NOx (tons per year, 2010) in Spartanburg County are indicated in the graph below.
Each month, the U.S. Department of Transportation Federal Highway Administration’s Office of Highway Policy Information compiles data relative to volume across the country, measured by Vehicle Miles Traveled (VMT). These data are used to identify traffic patterns and road usage, and are essential to planning transportation infrastructure and maintenance. VMT is also a good indicator of pollution due to vehicle emissions. In the Upstate, highway vehicles account for 58% of all nitrogen oxide emissions.

Although national trends show a decrease in driving for the last several years, VMT has increased consistently in Spartanburg County and is expected to continue according to projections based on population growth and development patterns. A 2007 study by the Strom Thurmond Institute at Clemson University demonstrated that land in the Upstate is developed five times faster than Upstate population growth. Further, most development in the Upstate is suburban, necessitating more travel and commuting than urban development (see “Development / Sprawl” page 27).

In December 2010, Upstate Forever released a report, *Assessing Upstate Greenhouse Gas Emissions from Transportation Sources Under Changing Land Use Patterns*. The authors provide projections for VMT through 2030 in accordance with current development trends. Their data, provided in the table...
below, demonstrates progressive and significant increases in VMT for Spartanburg County and projections for continued increases in VMT. The authors conclude, however, that enacting sensible growth strategies now will reduce VMT into the future.

<table>
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<th>Year</th>
<th>1990</th>
<th>2000</th>
<th>2007</th>
<th>2018</th>
<th>2025</th>
<th>2030</th>
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<td>Abbeville</td>
<td>180,080,598</td>
<td>211,004,237</td>
<td>232,650,785</td>
<td>266,666,788</td>
<td>288,313,336</td>
<td>303,775,155</td>
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<td>Anderson</td>
<td>1,392,473,431</td>
<td>1,900,625,774</td>
<td>2,256,332,414</td>
<td>2,832,567,134</td>
<td>3,171,006,631</td>
<td>343,087,137</td>
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<tr>
<td>Cherokee</td>
<td>561,372,081</td>
<td>753,027,084</td>
<td>881,055,041</td>
<td>1,071,797,948</td>
<td>1,205,650,650</td>
<td>1,287,966,032</td>
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<tr>
<td>Greenville</td>
<td>2,624,525,200</td>
<td>3,438,923,822</td>
<td>3,990,333,115</td>
<td>4,717,686,795</td>
<td>5,367,504,519</td>
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<td>Greenwood</td>
<td>466,098,759</td>
<td>594,666,140</td>
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<td>794,809,377</td>
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<td>Laurens</td>
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<td>837,692,776</td>
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<td>1,297,787,141</td>
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<td>Oconee</td>
<td>505,704,507</td>
<td>652,205,068</td>
<td>754,755,461</td>
<td>917,416,751</td>
<td>1,018,456,471</td>
<td>1,092,213,767</td>
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<td>Pickens</td>
<td>632,337,607</td>
<td>812,031,232</td>
<td>958,370,924</td>
<td>1,125,390,927</td>
<td>1,318,811,360</td>
<td>1,373,237,149</td>
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<tr>
<td>Spartanburg</td>
<td>2,212,949,631</td>
<td>2,935,177,394</td>
<td>3,467,969,761</td>
<td>4,232,339,707</td>
<td>4,776,660,049</td>
<td>5,102,605,459</td>
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<td>Union</td>
<td>222,584,446</td>
<td>263,688,155</td>
<td>290,945,209</td>
<td>335,686,770</td>
<td>360,312,461</td>
<td>382,376,801</td>
</tr>
</tbody>
</table>
Sources:

Campbell, C.E., Allen, J. and Lu, K.S., Modeling Growth and Predicting Future Developed Land in the Upstate of South Carolina, Strom Thurmond Institute, Clemson University, November 2007, Submitted to the Saluda-Reedy Watershed Consortium.


WATER QUALITY AND SUPPLY

Water is arguably the most vital natural resource. According to ICLEI (2010), water quality and supply is dependent upon an integrated water, stormwater, and waste water system that reduces pollution and protects and restores ecological systems, minimizes energy use and maximizes efficiency, and provides equitable distribution and pricing. The Pacolet River Watershed is the entire land area that drains to the Pacolet River, including the North and South Pacolet Rivers, and flows through Spartanburg County, supplying its water. Thus, the quality and supply of water throughout the county is a function of the health of the watershed.

STORMWATER MANAGEMENT

Stormwater runoff carries various pollutants on the ground into lakes, rivers, wetlands, and ground waters, many of which are sources of drinking water. Sources of pollution are classified as “nonpoint source” and “point source”. Nonpoint source pollution includes pet waste, fertilizers, oil and gasoline from roads and driveways, and other pollutants carried by stormwater as it flows naturally over the ground into streams and other bodies of water. Significant sources of nonpoint contamination include gas stations, dry cleaners, agricultural areas, automobile repair shops, septic systems, and facilities where contaminants are used or stored. Point source pollution may come from industrial effluent and domestic water treatment facilities that discharge treated water to streams at discrete locations in accordance with conditions of a permit issued by the state.

Impervious surfaces such as asphalt and concrete seal soil surfaces so that runoff from rain and snowmelt is not absorbed to filter and renew groundwater. Instead, runoff travels over the ground or is drained into storm sewer systems, carrying with it trash and other pollutants. Polluted stormwater runoff is commonly transported through Municipal Separate Storm Sewer Systems (MS4s), from which it is often discharged untreated into local water bodies. Each regulated MS4 is required to develop and
implement a stormwater management program (SWMP) to reduce the contamination of stormwater runoff and prohibit illegal discharges.

Stormwater is managed by local governments through flood and erosion control, drainage systems, and planning. In 2010, the City of Spartanburg approved a revision to the Stormwater Management Ordinance establishing a Stormwater Utility Fee that was enacted in 2011. Each city residence is charged a stormwater utility fee that pays for the maintenance and repair of the ditches, pipes, tunnels, culverts and other drainage structures throughout the city. The annual fee for most residences is $30. A larger annual fee of $42 is charged on homes with a larger footprint.

Spartanburg County’s MS4 Monitoring System began in 2011 and establishes and maintains approximately seven monitoring stations on critical impaired water bodies in unincorporated areas of the County. On some sites permanent equipment takes regular readings of water quality, while other sites are periodically monitored. Monitoring activities are required by the Clean Water Act to provide information on the health of water bodies and to develop a strategy to improve overall water conditions in the County, to ensure the County’s continued compliance with regulations and to prevent sanctions.

Low Impact Development

Low-impact development (LID) is a term used to describe management of stormwater runoff through conservation and use of on-site natural features to protect water quality. LID preserves and replicates natural landscape features, minimizing imperviousness to create functional and appealing site drainage that treat stormwater as a resource rather than a waste product. Stormwater is managed in small, cost-effective landscape features located on each lot rather than being conveyed and managed in large, costly pond facilities. LID practices include bioretention facilities, rain gardens, vegetated rooftops, rain barrels, and permeable pavements. Such practices reduce the impact of built areas and promote the natural movement of water within an ecosystem or watershed.

Organizations such as Upstate Forever and Spartanburg County have partnered to promote LID throughout Spartanburg County. Recent renovations to the parking lot of Spartanburg County administration building included creation of a demonstration rain garden for stormwater runoff. Developers are able to learn from and apply the principles of the rain garden to properties throughout the county.

Impervious Surfaces

When the ground is covered with vast impervious areas from paved surfaces, the volume and rate of stormwater runoff increases, causing flooding and decreased stream stability which may affect the ability of streams and rivers to dilute toxic spills. The result is increased costs for water treatment, accumulation of pollutants, adverse effects on aquatic life, and reduced water supplies because groundwater is not recharged.

Most impervious surfaces are attributable to roofs of commercial, residential, and industrial structures and to streets and parking areas. In fact, 60 to 70 percent of impervious cover is thought to be
attributable to transportation-related infrastructure. The amount of impervious cover generated by development can be limited through flexible regulations governing street width, parking ratios, sidewalk and driveway specifications, and other aspects of paving.

A 2007 *Audit of Pavement Standards in Spartanburg and Anderson Counties*, produced by Upstate Forever, assessed regulatory practices for reducing impervious surfaces in new development in the Upstate. The ultimate objective of the audit was to reduce the amount of stormwater runoff in the Broad River watershed (Spartanburg), Saluda-Reedy watershed (Greenville) and surrounding watersheds, and to minimizing the infrastructure costs associated with development.

According to the report, “points were assigned to each standard for the purpose of comparing existing regulatory requirements to model low impact development standards and to provide an objective point of comparison between the communities in the audit” (p.2). The highest possible score was 100, indicating that a community is applying very good regulatory practices for reducing impervious surfaces in new development. Overall scores in the audit ranged from a low of 29 (City of Anderson) to a high of 60 (City of Landrum). Spartanburg County communities scored higher than Anderson County communities; however, the overall score for Spartanburg County was less than one-half of optimal.

<table>
<thead>
<tr>
<th>Total Pavement Audit Points (out of 100), Spartanburg and Anderson Counties</th>
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<tr>
<td>Spartanburg County</td>
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<tr>
<td>47</td>
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<tr>
<td>Anderson County</td>
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<td>36</td>
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Sources:


WATER QUALITY

The U.S. Environmental Protection Agency (EPA) maintains national health-based standards for drinking water quality to protect the public from various disease organism and chemical contaminants. In South Carolina, the Department of Health and Environmental Control (DHEC) regulates public water systems to ensure that these standards are met. Public water systems are required to test their water at frequent intervals and to make the results public via a water quality report known as the Consumer Confidence Report. Drinking water comes from either ground water or surface water. Drinking water that comes from ground water through private wells is not regulated by federal standards, while treated ground water and surface water is regulated. Potential water contaminants that are monitored include:

- Microbiological contaminants such as viruses and bacteria (e.g. fecal coliform or E. Coli) which may come from sewage treatment plants, septic systems, agriculture, pet waste, and wildlife
- Inorganic contaminants such as salts and metals (e.g. fluoride, nitrate, chlorine) which can be naturally occurring or due to urban stormwater runoff, wastewater discharges, or industrial discharge
- Organic chemical contaminants (e.g. organic carbon, trihalomethanes, haloacetic acids) which include byproducts of industrial processes and petroleum production, urban stormwater runoff, septic systems or gas stations
- Radioactive contaminants which can be naturally occurring or the result of mining or oil and gas production

Drinking water in Spartanburg County comes from Lake Bowen, Lake Blalock, and Municipal Reservoir #1. The North and South Pacolet Rivers and their tributaries feed these water sources. Two facilities treat the water from the three lakes.

The Spartanburg Water System (SWS), metro sub districts, and DHEC routinely monitor for over 150 chemical and biological contaminants in the county’s drinking water. According to the Spartanburg Water System’s (SWS) 2010 Water Quality Report, the SWS continues to meet and surpass all state and federal water quality standards under the Safe Drinking Water Act. The SWS 2010 Water Quality Report provides levels of specific contaminants in area drinking water. SWS tests for over 150 substances.

A number of local organizations are dedicated to restoring and protecting the natural ecosystems vital to watershed health. Along with private land owners, these organizations work to establish and maintain riparian buffers within the Pacolet River Watershed to help mitigate the threat to the Pacolet Rivers and their tributaries.
Sources:

S.C. Department of Health and Environmental Control, Environmental Public Health Tracking: [http://www.scdhec.gov/administration/epht/Dwater.htm](http://www.scdhec.gov/administration/epht/Dwater.htm)


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**DO YOUR PART TO REDUCE POLLUTED RUNOFF**

**Home:**

- Properly Maintain septic systems
- Use less toxic cleaners and properly dispose of them
- Sweep yard debris and trash away from any storm drains
- Pick up, bury, or flush pet waste
- Never pour paint, solvents or cleaners into a storm drain

**Lawn & Garden:**

- Use native plants: they often require less water and fertilizer
- Landscape with plants that filter pollutants and reduce runoff
- Test soil to determine fertilization needs
- Use environmentally safe fertilizers and pesticides when possible
- Compost leaves, grass and yard waste

**Automotive**

- Never drain any automotive fluids into storm drains
- Service your car regularly
- Wash your car on the grass or at a car wash to reduce runoff into storm drains
- Clean up leaks
- Drive less

Source: SC DHEC Environmental Public Health Tracking
“Conservation of our natural and historical resources is no longer an option if we are to continue to be a special place. In the face of dramatic changes in our landscape, we must decide which rich natural and cultural heritage we will leave to future generations. To meet this complex challenge, we must have a shared vision and clear objectives. To enhance quality of life and to maintain our South Carolina heritage, we must sustain a land base consisting of areas that are publicly owned and managed, as well as private farms and forests where strategies allow natural resources to be managed and conserved while maintaining the cultural and economic values that are important to us all.”

- South Carolina Conservation Bank -

CONSERVED LAND

Three nonprofit organizations in the county, Spartanburg Area Conservancy (SPACE), Upstate Forever, and Pacolet Area Conservancy work to ensure that forests, waterways, and other green spaces throughout the county are protected and preserved for future generations. These three nonprofits have protected 3,594 acres in Spartanburg County through various land protection tools such as conservation easements. Local subject matter experts indicate that acres of land set aside for greenways in Spartanburg County are increasing. Further, there are three large preserves in Spartanburg County protected through SPACE: the 118-acre Edwin M. Griffin Nature Preserve (home to the Cottonwood Trail), the 36-acre Upper Chinquapin Greenway, and the 13-acre Glendale Shoals Preserve.

The S.C. Conservation Bank was born of a 2002 effort to determine which lands in South Carolina are significant and how they could be protected and sustained. The Conservation Bank is funded from a portion of the state documentary fee and provides grants across the state to purchase and preserve natural and historic sites. Three properties in Spartanburg County have been acquired and protected through Conservation Bank grants (as indicated) to SPACE and the Preservation Trust:

- The Chinquapin Greenway ($692,340) – SPACE used this grant to purchase this 41 acre greenway, an integral part of the Palmetto Trail and provides passive recreation opportunities to the residents of Spartanburg County. It is the first phase of a greenway connecting I-85 and downtown Spartanburg.
- The McCorkle Tract ($415,000) – Also purchased by SPACE, this tract adjoins a nature preserve operated by SPACE. It is a 28.75 acre tract that protects an extra 1.5 miles of frontage on Lawson’s Fork Creek, a major water source for Spartanburg County. It includes 3.5 miles of trails and 450 feet of boardwalk over wetlands.
- The DuPre House ($250,000) – This grant allowed the Preservation Trust of Spartanburg to acquire this historic house and 1.91 acres. According to the Conservation Bank website, “The Preservation Trust of Spartanburg used matching funds from the Conservation Bank to be able to purchase the house and restore it to its former glory. Once restored, the house is planned to be used for the Spartanburg Convention and Visitors Bureau. The grounds surrounding the house will also be made into a passive urban park for the residents of Spartanburg. Without
assistance from the Conservation Bank, it is likely that this house would have been torn down to make way for infrastructure extensions.”

Sources:


The Spartanburg Area Conservancy (SPACE):  www.spartanburgconservaton.org

PADDLING TRAILS

There are a number of well-known “paddling trails” in the rivers throughout the county. North, South, and Middle Tyger Rivers, Lawson’s Fork Creek, Jimmies Creek, and Island Creek offer various levels of challenge, including whitewater segments.

The Spartanburg Area Transportation Study (SPATS) has mapped two Blueway Trails for paddling and kayaking, the 7.5 mile Tyger River Blueway and the 4.5 mile Pacolet / Lawson’s Fork Blueway.

Sources:

South Carolina State Trails Program:  http://www.sctrails.net

Spartanburg Area Transportation Study:  www.spatsmpo.org


CITY, COUNTY AND STATE PARKS

The amount of land set aside as parks and open spaces by local and state governmental entities is a measure of public priority given to preserving public lands for the benefit and use of all. Parks contribute to a community’s welfare in many ways, including:

- increasing residential and commercial property values
- filtering pollutants from the air and controlling stormwater runoff
- increasing neighborhood cohesion
- providing opportunities for physical activity
- providing visual and auditory buffers to construction and development
- preserving critical wildlife habitat
The total area covered by urban parkland in the United States exceeds one million acres, with parks ranging in size from the 1.7 acre Post Office Square in Boston to the 490,125 acre Chugach State Park in Anchorage. City parks and other urban parks receive more use than national or state parks. Cities may have plenty of parkland that's well distributed throughout the area, or they may have enough land but an inequitable distribution, or they may lack even a basic amount of park space for their citizens.

The Center for City Park Excellence maintains the nation's most complete database of park facts for the largest 85 U.S. cities. Of those cities, the median parkland per 1,000 city residents is 12.9 acres. Data from 2006 indicate that there are 2.44 acres of parkland per 1,000 residents of Spartanburg County. This falls significantly short of the national average of 6.25 acres per county resident at that time. No new county parkland has been acquired since 1999; however, the Tyger River Park has been developed since that time.

Many communities have a goal of providing neighborhood parks within ½ mile walking distance of homes in that radius. As illustrated in the graph below, of the major metropolitan areas in the U.S., the City of Albuquerque has the greatest amount of parkland within city limits - 2,933 square feet per person. Raleigh is second, with 1,332 square feet per person.
The Spartanburg City Parks and Recreation Division operates 22 area parks, five recreation centers, and the River Birch Hiking Trail. Located throughout the city, these green spaces and recreation centers offer a wide variety of programs for all ages. The Spartanburg County Parks System provides active and passive leisure opportunities to county citizens via 23 parks and recreational facilities, and one state park is located in Spartanburg County, the 7,054-acre Croft State Park.
Sources:

City of Spartanburg Parks and Recreation: http://www.cityofspartanburg.org


Spartanburg Parks Commission: http://www.spartanburgparks.org


LAND USE

The way land is used determines whether natural resources are preserved and whether communities are sustainable. Land use planning encompasses various disciplines to systematically assess land and water potential, alternatives for land use, and economic and social conditions in order to select and adopt the best land-use options. Its purpose is to select and put into practice those land uses that will best meet the needs of people while safeguarding resources for the future (United Nations ) in the most ethical and efficient manner.

A land use plan is often one element of a comprehensive plan, (see page 51) that dictates public policy in terms of transportation, utilities, land use, recreation, and housing. The terms land use planning, regional planning, urban planning, urban design, and smart growth are often used interchangeably. Land use planning often leads to land use regulations such as zoning, a tool for implementing land use plans.

According to the Smart Communities Network, two main features of land use practices over the past several decades have converged to generate haphazard, inefficient, and unsustainable urban sprawl: zoning ordinances that isolate employment locations, shopping and services, and housing locations from each other, and low-density growth planning aimed at creating automobile access to increasing expanses of land.
Smart growth is a positive response to years of policies and practices that have contributed to traffic congestion, an inadequate supply of affordable housing, the jobs-housing imbalance and a loss of green space. Smart growth policies and practices are economically sound, environmentally responsible, and supportive of community livability—growth that enhances quality of life. Smart growth is not “no growth,” but rather a series of strategies for harnessing the economic energy of growth or redevelopment to improve community livability.

The Urban Land Institute

Sources:


Urban Land Institute:
http://commerce.uli.org/Content/NavigationMenu/MyCommunity/SmartGrowth/Smart_Growth.htm

U.S. Department of Energy Smart Communities Network:

DEVELOPMENT / SPRAWL

A 2007 study by the Strom Thurmond Institute at Clemson University demonstrated that, from 1990 to 2000, land in the Upstate region of South Carolina was developed at five times the rate of population growth. Thus far, this 5 to 1 ratio is unchanged. Further, ever-increasing acres are being developed in the Upstate as suburban neighborhoods are built farther and farther away from urban areas – the definition of urban sprawl. Based on 1990-2000 trends, it is estimated that the proportion of low-density development (defined by less than 90 intersections per square mile) in the Upstate increases at a greater rate as compared to high density or compact development (defined by 90 or more intersections per square mile). By 2030, if these trends continue, 894,391.94 acres in the Upstate will be characterized by low-density development, and 51,630.62 acres will be characterized by compact development. In terms of population, 91% of individuals in the Upstate will reside in low-density development by 2030, and the remaining 9% will reside in compact development.
Development practices are directly related to vehicle miles traveled (VMTs) and resulting greenhouse gas emissions. If development were slowed to the rate of population growth, or a 1 to 1 ratio, overall VMT and greenhouse emissions would decrease by approximately 11%. Further, because residents of urban (compact) areas generally drive 31% less, on average, than their suburban (low-density) counterparts, compact development such as urban infill is considered a viable strategy for reducing greenhouse gas emissions in the Upstate. The Strom Thurmond Institute study provides impact projections for the Upstate in 2030 by various land use patterns.

According to a survey reported on by the Wall Street Journal, 88 percent of the Millennial Generation (born between the mid 1980s and the early 2000s) wants to live in an urban, rather than a suburban setting. The generation, also known as Generation Y, Generation Next, Net Generation, and Echo Boomers, is approximately 102 million strong. The implication is that 70 million people in the U.S. are driving an unmet demand for urban living options, while there is an equally large oversupply of suburban homes. One-third of these millennials, the next cohort of workers, are willing to pay for the ability to walk to work and other amenities.

Implications for Spartanburg involve sustainability, urban infill issues, connectivity, public transportation, and many others.

There are a number of organizations in the Upstate that are concerned with “smart growth”, or planning for land use as the population continues to grow, such that environmental impact is reduced and resources are conserved. A 2010 survey of 6,000 Upstate residents by Ten At the Top, a regional nonprofit dedicated to planning for the Upstate’s future, revealed that Upstate residents have significant concerns about pressures that are already emerging as a result of growth. These include increased traffic congestion, increased land used for development, visual clutter, impact on the environment (especially air and water quality), need for infrastructure improvements, and concern for public safety.

Sources:

Campbell, C.E., Allen, J. and Lu, K.S., Modeling Growth and Predicting Future Developed Land in the Upstate of South Carolina, Strom Thurmond Institute, Clemson University, November 2007, Submitted to the Saluda-Reedy Watershed Consortium.


Ten at the Top: http://www.tenatthetop.org
TREE COVER

The layer of leaves, branches and stems of trees that cover the ground when viewed from above is known as an Urban Tree Canopy (UTC). A healthy and sufficient UTC improves water quality, conserves energy, lowers city temperatures, reduces air pollution, enhances property values, provides wildlife habitat, and has aesthetic and educational benefits. (In fact, Fairfax County, VA estimates that trees contribute more than $54 million worth of cost savings through ecosystem service benefits each year). For these reasons, most cities are concerned with preserving UTCs.

According to a study done by Barry Nocks and Stephen Sperry at Clemson University’s Strom Thurmond Institute, the 10 county Upstate region lost over 700,000 acres of forest cover from 1992 to 2010. The amount of loss is almost equal to the combined size of Greenville and Cherokee Counties.

Sources:


POPULATION GROWTH / DENSITY

According to the U.S. Census Bureau, population in Spartanburg County grew by 25 percent from 1990 to 2010. This was a lower percentage of growth than either neighboring Greenville County or the 10 county Upstate region experienced over the same time period (38% and 28%, respectively). However, the population is expected to increase by 9.4% in Spartanburg County over the next ten years.
### Population and Projected Population Growth 1990-2035, Select Upstate Measures

<table>
<thead>
<tr>
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<th></th>
<th></th>
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<tbody>
<tr>
<td>Spartanburg County</td>
<td>226,793</td>
<td>253,791</td>
<td>283,530</td>
<td>296,880</td>
<td>310,220</td>
<td>323,550</td>
<td>336,810</td>
<td>350,110</td>
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<tr>
<td>Greenville County</td>
<td>320,127</td>
<td>379,616</td>
<td>443,160</td>
<td>468,020</td>
<td>492,890</td>
<td>517,740</td>
<td>542,290</td>
<td>567,010</td>
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<tr>
<td>ACOG Region*</td>
<td>887,993</td>
<td>1,028,656</td>
<td>1,161,500</td>
<td>1,223,170</td>
<td>1,284,820</td>
<td>1,346,470</td>
<td>1,406,460</td>
<td>1,467,370</td>
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<tr>
<td>Upstate Region**</td>
<td>1,059,891</td>
<td>1,220,542</td>
<td>1,356,900</td>
<td>1,425,770</td>
<td>1,494,650</td>
<td>1,563,510</td>
<td>1,629,510</td>
<td>1,697,140</td>
</tr>
</tbody>
</table>

* ACOG Region is the area served by the Appalachian Council of Governments: Anderson, Cherokee, Greenville, Oconee, Pickens, and Spartanburg Counties  
** Upstate Region includes the counties served by the ACOG and Abbeville, Greenwood, Laurens, and Union Counties

Population density impacts most environmental issues, including air and water quality, energy consumption, and land use. In 1992, there were 2,091 people residing per urban square mile in the Upstate; however, by 2010, density had declined to 1,201 per urban square mile. Although overall population density increased in Greenville and Spartanburg Counties, urban population density dropped...
by 34% during this time period. These data indicate that the Upstate is experiencing significant sprawl as a consequence of development spreading out across previously undeveloped areas, rather than infilling partially developed areas. A consequence of sprawl is loss of forest cover and farmland, along with all of its other environmental and economic consequences. A number of Upstate organizations and stakeholders advocate increasing population density by developing less land relative to population growth.

Sources:

Appalachian Council of Governments FactFinder Online:  http://factfinder.scacog.org


U.S. Census Bureau, American Fact Finder QuickFacts: http://quickfacts.census.gov/qfd/states/45/45083.html

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**FARM LAND**

Decreased farmland is concomitant with urban sprawl. The U.S. is losing vast acres of farmland annually and at an accelerating rate. In addition to the obvious necessity of farms to produce food, farmland also shelters wildlife, supplies scenic open space and helps filter impurities from air and water.

According to statistics provided by the American Farmland Trust:

- **Less than one-fifth of U.S. land is high quality for farming.**
- **In the U.S., farmland is being lost at a rate of more than one acre per minute.**
  Between 2002 and 2007, 4,080,300 acres of agricultural land were converted to developed uses—an area nearly the size of Massachusetts. Between 1982 and 2007, 41,324,800 acres of rural land were converted to developed uses. This represents an area about the size of Illinois and New Jersey combined.
- **During the 25-year span from 1982 to 2007, every state lost prime farmland.**
  States with the biggest losses included Texas (1.5 million), Ohio (796,000), North Carolina (766,000), California (616,000) and Georgia (566,000). Between 2002 and 2007, 7,491,300 acres of rural land were converted to developed uses—an area nearly the size of Maryland. This amounts to an average annual conversion rate of 1,498,200 acres.
- **Farmlands are increasingly in the path of development.**
  An astounding 91% of fruits and 78% of vegetables are produced in urban-influenced areas.
- **Wasteful land use is the problem, not growth itself.**
  From 1982 to 2007, the U.S. population grew by 30 percent. During the same time period, developed land increased 57 percent.

The latest U.S. Department of Agriculture data (2007) show that Spartanburg County ranks 30th of the state’s 46 counties for total value of agricultural products sold. The top crops by acreage are forage, peaches, nursery stock, and soybeans (for beans). The top livestock by numbers are turkeys, cattle, horses, layers (chickens), and goats. The average age of the 1,242 principal farmers in Spartanburg County is 59.8 years. Of these farmers, only 49 percent report farming as their primary occupation.

### Select Farm Characteristics, Spartanburg County

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</tr>
</thead>
<tbody>
<tr>
<td># of farms</td>
<td>1,429</td>
<td>1,412</td>
<td>1,242</td>
<td>-12</td>
</tr>
<tr>
<td>Land in farms (acres)</td>
<td>125,192</td>
<td>126,377</td>
<td>109,917</td>
<td>-13</td>
</tr>
<tr>
<td>Average size of farm (acres)</td>
<td>100</td>
<td>90</td>
<td>89</td>
<td>-1</td>
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<tr>
<td>Market value of Products sold</td>
<td>$23,114,000</td>
<td>$25,266,000</td>
<td>$26,295,000</td>
<td>+4</td>
</tr>
<tr>
<td>Average market value of products sold per farm</td>
<td>$21,663</td>
<td>$17,893</td>
<td>$21,172</td>
<td>+18</td>
</tr>
<tr>
<td>Government Payments</td>
<td>$388,000</td>
<td>$499,000</td>
<td></td>
<td>+29</td>
</tr>
<tr>
<td>Average per farm government payment</td>
<td>$2,830</td>
<td>$3,784</td>
<td></td>
<td>+34</td>
</tr>
</tbody>
</table>

Although the diversity of crops has decreased annually since 2003, the numbers of acres harvested has increased since 2005.
Acres Harvested, Spartanburg County

Diversity of Spartanburg County Crops

USDA National Agricultural Statistics Service
Sources:

American Farmland Trust: http://www.farmland.org/resources/fote/default.asp


BIG BOX SPACE

“Big Box” describes large (over 20,000 square feet) retail buildings. When big box development is not well regulated and integrated into the existing community, negative impacts include traffic congestion, disruption of neighborhoods, loss of trees, loss of farmland and open space, abandoned shopping centers and downtowns, air and water pollution, and sprawl. Addition impact of big box retail occurs when national chains close one store in order to open a bigger one nearby, leaving vacant, and often blighted, buildings.

There has not been an updated inventory of vacant “big box” space in Spartanburg County since the last done by Upstate Forever and reported in the 2009 Community Indicators The Status of Natural Resources in Spartanburg County. At that time, there was nearly 1,000,000 square feet of vacant big box space in Spartanburg County and City. At the end of 2004, there was 2.984 million square feet of empty retail space across Anderson, Greenville and Spartanburg Counties. Of that, 58 percent was vacant big box space. At that time, Spartanburg County had the highest percentage of empty big box space. The area surrounding the intersection of I-26 and U.S. Highway 29 has especially been affected by the big-box abandonment trend.

Subject matter experts propose that vacant big box space is ripe for redevelopment into the mixed use villages modeled by other cities around the country, but this has not occurred so far on any large scale in Spartanburg. Subject matter experts indicate that South Carolina legislators are aware of the problems resulting from vacant big box space, and legislative options are being considered.
The sustainable food movement, or “farm-to-table”, is concerned with producing food locally and delivering it to local consumers. The movement is motivated by changing attitudes about food safety, freshness, seasonality, and small-farm economics. By promoting consumption of foods that travel the shortest distance from farm to point-of-sale, farm-to-table minimizes the environmental impact of consumption. Adherents to this consumer movement are often referred to as “locavores”.

According to the Worldwatch Institute (2011), American food travels an average of 1,500 to 2,500 miles from farm to table. “Food Miles”, the distance food travels from the farm to the store where it is purchased, are among the fastest growing sources of greenhouse gas emissions worldwide. In addition to the fuel used to transport food long distances, additional fuel, in the form of refrigeration and packaging, is required to preserve the food. Food miles have been steadily increasing over the past decades as food is increasingly imported. Even in agricultural areas, much of the fresh food in grocery stores has traveled surprisingly long distances. The graph below, from the Leopold Institute for Sustainable Agriculture, illustrates that, even in the farming state of Iowa, much of the produce is transported long distances to the consumer.

Source: Leopold Center for Sustainable Agriculture, Iowa State University.
Despite the farm-to-table movement, it should be noted that there is an ongoing debate that it may be more energy efficient to raise particular foods in particular places. For example, a study by the Leopold Center for Sustainable Agriculture showed that tomatoes grown in the ground in Spain and shipped to Sweden require less overall energy to produce and ship than tomatoes grown in a hothouse in Sweden.

However, urban agriculture has taken root in many cities across the nation to meet demand for locally grown food and to make vacant lots productive and attractive. Urban farms are larger than traditional community gardens; thus, communities frequently enact zoning changes to allow for produce production and sales in residential areas.

In Spartanburg County, Hub City Farmers Market (HCFM) is a nonprofit organization working to increase the demand for, and availability of, healthy foods by working closely with local food producers. HCFM currently operates two producer-only markets in the City of Spartanburg, one on Saturdays and one on Wednesdays. In addition, it operates a mobile farmers market that travels to various communities around the county to increase widespread access to fresh produce. The markets include over 40 vendors, including 25 local farmers. Through its community garden program, HCFM works with schools, after school centers, senior centers, churches, businesses and neighborhoods to create community gardens so that residents throughout the county can eat homegrown fruits and vegetables.

In 2010, the Spartanburg Area Conservancy (SPACE) partnered with the Converse Deli in Spartanburg to further the farm-to-table movement locally. SPACE provides a half acre of farmland on the Cleveland Preserve for Converse Deli to grow fruits and vegetables that are served in the restaurant. In exchange, the Deli donates to SPACE ten percent of the day’s proceeds on the 21st of each month.

Sources:

Hub City Farmers Market: www.hubcityfm.org


Leopold Institute for Sustainable Agriculture: http://www.leopold.iastate.edu

Spartanburg Area Conservancy: www.spartanburgconservation.org

Worldwatch Institute: http://www.worldwatch.org/research
SECONDARY INDICATORS

Secondary indicators are other variables that have a direct impact on the environment, are tangentially reflective of the state of the environment, or derive from leading indicators.

WASTE MANAGEMENT

Waste is categorized broadly as either hazardous or nonhazardous. Nonhazardous waste is further categorized as municipal solid waste (MSW), construction and demolition debris (C&D), land clearing debris (LCD), and industrial solid waste (ISW). MSW typically consists of items such as yard trimmings, food scraps, paper, wood, rubber, leather, textiles, plastics, metals, and glass.

The Spartanburg County Solid Waste Management Fund is supported by service fees collected from commercial garbage depositors and an annual charge to each residence. Currently, there are two class 3 permitted MSW landfills in operation in Spartanburg County, the Wellford Landfill and the Palmetto Landfill. The Palmetto Landfill is quickly reaching its capacity and will have to close some time in the near future; however, a relocation site has not been found. Once the landfill closes, it must be grassed over and the land cannot be used for any other purpose.

Landfills are not a sustainable approach to waste management. Sources of significant pollution themselves, they are the largest source of human caused-methane, a primary greenhouse gas. Further, according to the EPA, all landfill liners will eventually leak, and their toxic leachate can contaminate soil and groundwater. Roughly 20 percent of the sites on the Superfund list are solid waste landfills.

Because Spartanburg County is situated near the top of the Broad River watershed, it is difficult to site a landfill in the county without impacting major water bodies throughout the rest of the state. The Tyger, Enoree and Pacolet rivers in Spartanburg County ultimately flow into the Broad River in the Midlands, the Cooper River in the Lowcountry, and finally into the Atlantic Ocean. Any landfill contamination of these county rivers widely threatens water quality, so extending the life of the existing Spartanburg County MSW landfill is viewed by subject matter experts as being extremely important.

HAZARDOUS WASTE

Hazardous waste includes a large number of substances that are regulated because they may pose a risk to human health and / or the environment. These substances are typically produced through manufacturing, mining or other industrial or commercial activities. Federal and state laws place strict controls on the treatment, storage, and disposal of these wastes.

Hazardous household waste includes household products that contain corrosive, toxic, ignitable, or reactive ingredients. Products such as electronics and their components, paints, cleaners, oils, batteries, flammable gas containers, pharmaceuticals, swimming pool chemicals, fluorescent lighting, and
pesticides contain potentially hazardous ingredients and require special care upon disposal. It is against
the law to dispose of these products in regular landfills.

Improper disposal of household hazardous wastes includes pouring them down the drain, on the
ground, into storm sewers, or putting them out with the trash. Recycling centers are available in the
county for some batteries, tires, oil and gasoline. There are four recycling centers in Spartanburg County
available for recycling electronics. Spartanburg County Public Works Department is working with a local
citizen’s group to offer one-day events to collect household hazardous material from residents;
however, there are no recycling options for much of the hazardous waste generated by Spartanburg
County households.

Sources:

Report for FY10. Retrieved from

Spartanburg County Public Works Department, My EcoVille:
http://spartanburg.myecoville.com/residential-recycling-programs/hazardous-waste/

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RECYCLING

Recycling is an important way for individuals and businesses to reduce and reuse the waste they
generate. Recycling conserves natural resources. When recycled materials are used in place of virgin
materials during manufacturing, the environmental damage caused by mining for metals, drilling for
petroleum, and harvesting trees is avoided. Recycling saves landfill space, conserves energy, and
reduces water pollution, air pollution and the green house gas emissions that cause global warming.
Recycling is also a significant industry, providing jobs and revenue to communities.

Spartanburg County operates seventeen recycling / collection centers and two drop-off recycling
centers. The City of Spartanburg provides residents with 96-gallon rolling carts for recyclable items
(paper products, aluminum /metal cans, plastic, and corrugated cardboard). Each residence is charged
$102 as a part of its annual tax assessment for weekly curbside trash collection, twice monthly curbside
recycling collection, curbside yard waste removal, and transport of those materials to disposal or
processing.

SC DHEC is required by the SC Solid Waste Policy and Management Act of 1991 to produce three reports
annually that focus on solid waste management activities in the state. The following recycling data is
provided by this source. Recycling data are kept by source of waste – residential, industrial, commercial,
and institutional / nonprofit.
From the table below, it is clear that the amount of waste recycling varies widely by peer county and by type of waste.

| Municipal Solid Waste, All Sources, by Peer County, FY2010 (in tons) |
|------------------------|-----------------|-----------------|-----------------|-----------------|
|                        | Spartanburg     | Greenville      | Richland        | Charleston      |
| Total Glass            | 83.9            | 3,919.8         | 1,423.0         | 3,153.3         |
| Total Metal            | 21,891.2        | 43,732.7        | 27,628.7        | 27,510.1        |
| Total Paper            | 28,381.8        | 57,95.7         | 23,310.8        | 31,333.8        |
| Total Plastic          | 1,860.8         | 5,010.0         | 726.5           | 1,509.6         |
| Banned Items*          | 16,542.0        | 74,998.1        | 7,807.4         | 60,763.0        |
| Mixed Recyclables**    | 1,961.1         | 104.0           | 7,988.8         | 4,546.0         |

*appliances, DIY used motor oil, lead-acid batteries, tires, yard trimmings

** recyclables that are not collected separately

The following table provides comparison by peer county for waste generation, disposal, and recycling. The S.C. Solid Waste Policy and Management Act of 1991, amended in 2000, set the statewide recycling goal at 35 percent for all MSW (residential, industrial, commercial, and institutional / nonprofit), and a disposal goal of 3.5 pounds or less of MSW per person, per day (p/p/d). Spartanburg’s overall recycling rate is approximately 23 percent, and its disposal rate is 4.8 pounds p/p/d. In other words, there are 6.1 pounds of waste per person per day generated in Spartanburg County. Of this, 1.4 pounds are recycled and 4.8 pounds are disposed of in landfills.

| Municipal Solid Waste Generated, Recycled, and Disposed by Peer County, 2010 (In Pounds per Person per Day) |
|--------------------------------------------------------|-----------------|-----------------|-----------------|-----------------|
| County       | Recycling Rate (%) | Generated (P/P/D) | Disposed (P/P/D) | Recycled (P/P/D) |
| Spartanburg  | 22.6              | 6.1             | 4.8             | 1.4             |
| Greenville   | 37.1              | 6.2             | 3.9             | 2.3             |
| Richland     | 19.5              | 5.3             | 4.2             | 1.0             |
| Charleston   | 31.4%             | 6.4             | 4.4             | 2.0             |
When recycling is broken out by source, it is evident that Spartanburg’s amount of residential waste recycled is less than the amount of commercial waste and the amount of industrial waste recycled. This is also true for Richland County, but the inverse is true for Greenville and Charleston Counties. Of peer counties, Spartanburg recycles the least amount of institutional / nonprofit waste.

<table>
<thead>
<tr>
<th>County</th>
<th>Residential</th>
<th>Commercial</th>
<th>Institutional / Nonprofit</th>
<th>Industrial</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spartanburg</td>
<td>22,239.6</td>
<td>26,493.6</td>
<td>244.5</td>
<td>23,857.8</td>
<td>72,835.6</td>
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<tr>
<td>Greenville</td>
<td>81,419.5</td>
<td>68,174.1</td>
<td>1,449.2</td>
<td>37,837.2</td>
<td>188,880.0</td>
</tr>
<tr>
<td>Richland</td>
<td>18,218.4</td>
<td>20,274.1</td>
<td>5,261.3</td>
<td>26,014.3</td>
<td>69,768.0</td>
</tr>
<tr>
<td>Charleston</td>
<td>75,676.5</td>
<td>27,006.0</td>
<td>2,274.4</td>
<td>25,109.5</td>
<td>130,066.3</td>
</tr>
</tbody>
</table>

In FY10, three counties met the state’s recycling goal of 35 percent – Greenville, Pickens and York. In addition, 29 counties met the state’s disposal goal of 3.5 pounds per person per day. Two SC counties, Charleston and Richland, offer curbside collection of recyclables to single-family residences county-wide.

Sources:


US Environmental Protection Agency, Mid-Atlantic Municipal Solid Waste: http://www.epa.gov/reg3wcmd/solidwasterecyclingfacts.htm
Recycling Quick Facts

✓ Every year nearly 900,000,000 trees are cut down to provide raw materials for American paper and pulp mills.
✓ Every year we generate around 14 million tons of food waste which is 106 pounds of food waste per person 570,000 tons of this is composted for a 4.1% recovery rate. The rest, or 13.4 million tons is incinerated or landfilled and occupies 6.3 million cubic yards of landfilled MSW.
✓ Each year American throw away 25,000,000,000 Styrofoam cups. Even 500 years from now, the foam coffee cup you used this morning will be sitting in a landfill.
✓ In 1998, 62.8% of the 102 billion aluminum cans produced were recycled. That totals 64 billion cans, 46 billion more than in 1991, Aluminum can recycling saves 95% of the energy needed to make aluminum from bauxite ore. Energy savings in 1998 alone were enough to light a city the size of Pittsburgh for ten years.
✓ The Container Recycling Institute (CRI) estimates that the 36 billion aluminum cans landfilled last year had a scrap value of more than $600 million. Over the past twenty years we've worth over $12 billion on today's market. Some day we may be mining our landfills for the resources we've buried.
✓ There were 270 million scrap tires discarded in 1998, 84% of which were passenger car tires, 15% were from light and heavy trucks. These tires weigh 3.4 million tons. 177.5 million of these tires are being reused, mostly chipped and burnt for their high BTU content. Somewhere between 500 and 800 million scrap tires are in scrap tire piles across the US. Each passenger car tire contains 7 gallons of oil.
✓ It takes a 15-year-old tree to produce 700 grocery bags.
✓ Recycling two gallons of used motor oil saves enough energy to run the average household for 24 hours.
✓ Each year, steel recycling saves about 76 percent of the energy needed to make steel from iron ore.
✓ Disposable diapers last centuries in landfills – an average baby will go through 8,000 of them.
✓ One tree can filter up to 60 pounds of pollutants from the air each year.
✓ The energy saved from recycling one glass bottle will run a 100-watt light bulb for four hours.
✓ By recycling about 30% of our waste every year, Americans save the equivalent of 11.9 billion gallons of gasoline and reduce the greenhouse gas equivalent of taking 25 million cars off the road.
✓ Nearly 90% of what we throw away could potentially be recovered through reuse, recycling or composting.
✓ Producing recycled white paper creates 74% less air pollution and 35% less water pollution than producing paper from virgin fibers.

Sources: US Environmental Protection Agency, Spartanburg County, and eco-cycle
Sustainable transport can mean public transport, car pooling, walking and cycling as well as technologies such as biodiesel and electric and hybrid cars. The phrase encompasses a wide range of economic, social and environmental effects that should be taken into account when developing new transport systems and policies for cities.

TRANSPORTATION PLANNING AND INFRASTRUCTURE

Communities that prioritize a clean and sustainable environment support low-carbon and high resource-efficiency transportation options by developing supportive infrastructure such as pedestrian and bike-friendly streets, connectivity, charging stations, tax incentives for fuel-efficiency, robust public transit, and local fuel production among many others.

Transportation Planning

Both Spartanburg city and county are implementing master plans for parks, recreation, pedestrians and bicycles. These efforts have resulted in growing miles of biking and walking trails, improved sidewalks and bicycle racks, and policy and environmental changes. Spartanburg Area Transportation Study (SPATS) is the Metropolitan Planning Organization charged with identifying needed transportation projects within the Spartanburg urban area. SPATS is charged with designing and implementing a five year transportation improvement plan and a long-range transportation plan, both of which are designed to reduce projected VMT. Of course, these efforts alone will not significantly reduce pollutants emitted by vehicles but are a vital part of a comprehensive approach to doing so.

Local partners, led by SPATS and Partners for Active Living, have been implementing the Spartanburg Bike and Pedestrian Master Plan which provides infrastructure in the city and county for alternative modes of transportation conducive to choosing walking or biking for daily business and recreation. This plan incorporates principles of “complete streets”, accepted transportation design that ensures roadways provide safe infrastructure for all users - bicyclists, public transportation users, drivers, and pedestrians of all ages and abilities. The 2011 status of the Master Plan indicates:

- A comprehensive trail poster of public bike, walking and hiking trails, paths and blueways is available at http://www.spatsmpo.org/index.cfm?PageID=54&ParentPageID=22&NavID=22
- Spartanburg County has over 400 miles of sidewalks and pedestrian crosswalks
- Partners for Active Living has coordinated the funding and placement of over 180 bike racks and two Bicycle rental stations
- Miles of mountain bike trails, nature trails, bicycle lanes, and ADA improvements continue to increase throughout the county
- There are 185.5 miles of public trails (hiking, walking, biking, paddling, and mixed use) and bike facilities in Spartanburg County
See Appendix I for a listing of public trails and bike facilities in Spartanburg County

Sources:

National Complete Streets Coalition: http://www.completestreets.org/

Partners for Active Living: http://www.active-living.org/Complete-Streets.html


Public Transportation

Sustainable transport can mean public transport, car pooling, walking and cycling, as well as technologies such as biodiesel and electric and hybrid cars. The phrase encompasses a wide range of economic, social and environmental factors that should be taken into account when developing new transport systems and policies.

Currently 95 percent of transport energy comes from petroleum, and transportation systems are responsible for the preponderance of world energy-related greenhouse emissions. As such, petroleum-based transportation systems are not sustainable, and communities are looking for public transportation alternatives. The environmental impacts of transport can be reduced by improving the walking and cycling environment in cities, enhancing the role of public transport, and instituting options such as electric rail and electric buses.

In the Upstate, Proterra Inc. located its headquarters and manufacturing facility in Greenville in 2010 to manufacture zero emission electric busses. Greenville Transit Authority (GTA), however, has not been successful in its two applications for federal funding to pay for a bus rapid transit (BRT) service using Proterra’s zero-emission vehicles. BRT lines are designed to provide faster, more efficient service than conventional bus lines without incurring the expense of a rail system. Seneca, in Oconee County, is the first Upstate county to announce service using electric buses. The city of 8,300 residents plans to buy five Proterra buses and launch all-electric bus service.

Although its first two applications have been rejected, Greenville Transit Authority is reapplying for $21.7 million to run eight Proterra buses along the previously proposed BRT line and also launch express service to various spurs. As it did in its 2010 application, GTA envisions “transit villages” — clusters of housing, shops and offices — springing up within a 10-minute walk of each stop on the line.

In Spartanburg County, The Spartanburg Area Transportation Study (SPATS) is considering sustainable alternatives in the creation of its Transit Master Plan. A group of representatives from diverse organizations in the community comprise the Transit Planning Committee and are guiding the process for the creation of the Transit Master Plan.
Sources:


Electric Vehicles

The production and use of gas and diesel fuel for transportation accounts for 27 percent of the pollution in the U.S. that leads to global warming. Plug-in hybrid electric vehicles (PHEVs) are gaining in popularity and are viewed as one of the key strategies to reduce dependence on oil and, thereby, reduce emissions that lead to global warming.

Electric vehicles have to be charged every two or three days on average. However, longer trips require more frequent charging. Although most rechargeable electric vehicles can be recharged from a residential wall socket, there is a growing need for publically accessible charging stations. These stations are usually accessible to multiple vehicles and are important elements of a community infrastructure that supports sustainability. Businesses and governments are increasingly providing public charging stations free of charge or for a nominal fee.

Currently, there are 15 active electric vehicle charging stations in the City of Spartanburg. By the end of 2011, it is anticipated that there will be at least three more, for a total of 18. It is estimated that there are approximately 40 charging stations throughout neighboring Greenville County, with 16 in the city of Greenville. Both counties are viewed as leaders in the state because of these numbers. Locations of charging stations in South Carolina cities can be found at the Plug In Carolina website: [http://www.plugincarolina.org/](http://www.plugincarolina.org/). It should be noted that this list is not necessarily current, but that there are at least nine cities throughout the state with public charging stations.

The Natural Resources Defense Council has issued a set of policy recommendations to facilitate the widespread use of electric vehicles and to address various impacts of the use of electric vehicles. Some of these recommendations include:

- Promote the advancement of commercial hybrid technology
- Reduce the pollution from electric power plants
- Establish programs for battery recycling and proper disposal
- Facilitate off-peak battery charging
- Ensure air-quality benefits
Sources:


Plug in Carolina: http://www.plugincarolina.org/

Spartanburg Area Transportation Study (SPATS): http://www.spatsmpo.org


ENERGY USE

ENERGY CONSUMPTION

South Carolina has the 26th highest resident population of the 50 states and the 27th highest output of carbon dioxide (79.18 million tons). On average, each South Carolina resident produces approximately 20 tons of carbon dioxide each year. Driven in part by the energy-intensive chemical manufacturing industry, South Carolina's industrial sector accounts for approximately two-fifths of State energy consumption.

According to the U.S. Energy Information Administration:

- South Carolina’s four nuclear power plants typically supply more than one-half of the state’s electricity generation.
- South Carolina receives most of its coal from Kentucky.
- Industry is the State’s largest energy-consuming sector and accounts for nearly two-fifths of total energy consumption.
- Two new nuclear reactors could come online in South Carolina by 2016, if licensing and construction go as planned.
- Per capita electricity use in South Carolina is higher than the nationwide average, due in part to high air-conditioning demand during the hot summer months and the widespread use of electricity for home heating in winter.
- South Carolina has adopted energy standards for public buildings and other energy-reduction goals that together are meant to reduce energy use by 20 percent from 2000 levels by July 1, 2020.
ENERGY CONSERVATION

Energy conservation can be achieved through increased efficiency in energy usage, as well as decreased energy consumption and consumption from alternative energy sources.

Along with business and industry, county agencies are undertaking fuel conservation efforts, largely due to budgetary constraints. For example, the current county budget maintains the same budgeted amount for fuel, $1.3 million, as the previous fiscal year. Thus, the county has adopted a goal of reducing consumption by 10 percent, with ongoing tracking that allows for adjustments as necessary. Although the city of Spartanburg, meanwhile, has increased its budget for fuel by almost 14 percent from $880,000 last year to $1 million this year, fuel consumption is being closely tracked and multiple efficiency efforts have been enacted.

Green Building

Green building is a process (as well as the resulting structure) that uses environmentally responsible design and resource efficiency from the design phase to the construction, operation, and maintenance phases and beyond. Also known as green construction or sustainable building, the ultimate objective of green buildings is to reduce the overall impact of the built environment on human health and the natural environment by improving efficiency and by reducing waste and pollution. Thus, the practice protects ecosystems and biodiversity.

The EarthCraft program started in 1999 to further green building science in the southeast. Through a partnership between Upstate Forever and the Homebuilders Association of Greenville, the EarthCraft program was introduced to the Upstate with the building of Greenville’s first “green home”, completed in the spring of 2006. The home meets all EarthCraft and Energy Star standard and is built with sustainably produced and recycled materials wherever possible. Since that time, a number of other Upstate homes have followed these green building guidelines.

LEED, or Leadership in Energy and Environmental Design, is an internationally-recognized green building certification system developed by the U.S. Green Building Council (USGBC) in 2000. LEED promotes sustainable commercial and residential building and development practices through rating systems that recognize projects that implement strategies for better environmental and health performance. The
LEED rating systems are developed by diverse groups of volunteers representing a cross-section of the building and construction industry.

Although reliable and quantifiable data reflecting green building practices in Spartanburg are not available at this point, it is clear that these practices continue to increase in the area. According to subject matter experts, it is common for business and industry to seek LEED certification, and homebuilders and home buyers are increasingly interested in sustainable construction.

Links to various green building resources, including EarthCraft builders, a directory of LEED-accredited building professionals, and a directory of screened and approved green businesses from the National Green Pages, can be found at the Upstate Forever website. The S. C. Green Building Directory, hosted by the Sustainability Institute, is a statewide electronic resource that provides users with information they need to find products and services that support green building practices for new construction or remodeling of residential and commercial facilities in South Carolina.

Sources:


EarthCraft: http://earthcraft.org/


Upstate Forever: http://www.upstateforever.org/ufs_ECHMain.html

U.S. Environmental Protection Agency, Green Building Basic Information: http://www.epa.gov/greenbuilding/pubs/about.htm


RENEWABLE ENERGY

Renewable energy is derived from sources that are naturally replenished such as sunlight, wind, rain, tides and geothermal heat. The primary renewable energy technologies generate electricity through include solar power, wind power, and water power. Biomass and biofuels are renewable energy sources used for transportation. Of all the renewable energy technologies, wind power is currently the most cost competitive when compared to traditional, fossil-fuel-based energy production technologies. In fact, wind power is the fastest growing energy source around the world. The United States now has a total of 40.2 gigawatts of installed wind capacity. This is equivalent to about 50 large coal-fired power plants.
According to local subject matter experts, the source of Spartanburg County’s energy infrastructure is approximately 50 percent coal and 50 percent nuclear, plus or minus 1-3%. Although these sources minimize dependence on foreign oil, this benefit is somewhat tainted by emissions and safety concerns. Coal-fired power plants have scrubbers and are required to meet air quality standards; however, like oil, coal is a nonrenewable resource.

Lockhart Power owns a hydroelectric generation plant on the Pacolet River in Pacolet. The power is used to serve local loads, although it is normally supplemented with power coming from outside the Pacolet area, since demand is normally greater than local generation. Although there has been other hydroelectric generation in Spartanburg County in the past, subject matter experts are unaware of any other active hydroelectric generation sites. Lockhart Power is currently pursuing development of two additional hydroelectric sites in Spartanburg County, which would be operational in the next 2-3 years and has also recently started up the WREN (Wellford Renewable Energy) landfill gas to power facility at the Wellford landfill in Spartanburg County.

Sources:


MILES AND QUALITY OF INFRASTRUCTURE

Spartanburg County’s $25 per car Road Maintenance Fee has been instrumental in the steady improvement of the County’s infrastructure over the last six years. Projected funding results in the ability to plan infrastructure building and repair work with some certainty over the next several years. The fee allows for a $3 million annual road resurfacing program that repaves roads, repairs drainage systems, cleans ditches and maintains right-of-ways. In addition, a $19.5 million Capital Improvement Program has been initiated to improve safety of roadways through road widening, intersection improvement, and bridge replacement.

While the SC Department of Transportation owns and maintains as many miles of roads and about the same number of bridges in Spartanburg as the county does, the following data are provided for county roads and bridges only.
ROADS

Spartanburg County maintains 1,708.8 miles of paved roads which are broken down into 4,761 segments for management purposes. The condition of each road segment is assessed based on 19 measures of distress, and an “Overall Condition Index” (OCI) is calculated for each segment. The index ranges from 0 (meaning the road segment has failed and needs to be completely rebuilt) to 100 (meaning the segment has no distress and is in perfect condition). The County’s goal is to maintain each road segment at not less than a rating of 50, resulting in the least cost to tax payers. OCI ratings are:

- 0-40 very poor
- 40-50 poor
- 50-60 fair
- 60-100 good

The following table provides information relative to the condition of county-maintained roads over the last several years. The percentage of road surface below “fair” has decreased by 5.4% over the past six years.

<table>
<thead>
<tr>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Poor</td>
<td>4.5%</td>
<td>1.8%</td>
<td>1.8%</td>
<td>0.6%</td>
<td>1.1%</td>
<td>0.6%</td>
</tr>
<tr>
<td>Poor</td>
<td>4.8%</td>
<td>2.9%</td>
<td>4.3%</td>
<td>2.3%</td>
<td>2.8%</td>
<td>2.6%</td>
</tr>
<tr>
<td>Fair</td>
<td>8.2%</td>
<td>8.2%</td>
<td>4.6%</td>
<td>4.6%</td>
<td>4.2%</td>
<td>3.7%</td>
</tr>
<tr>
<td>Good</td>
<td>82.5%</td>
<td>87.1%</td>
<td>89.4%</td>
<td>92.4%</td>
<td>91.9%</td>
<td>93.1%</td>
</tr>
<tr>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Planners estimate that county roads deteriorate at about 4 OCI points per year. The cost of maintaining roads is provided in the table below.
### Cost of Maintaining County Roads, 2000 and 2010

<table>
<thead>
<tr>
<th>Rating</th>
<th>Description</th>
<th>OCI</th>
<th>Fiscal Year 2000</th>
<th>Fiscal Year 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Amount needed to maintain to 50 OCI</td>
<td>Amount needed to maintain to 50 OCI</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Square Yards</td>
<td>Percentage</td>
</tr>
<tr>
<td>Very Poor</td>
<td>0-40</td>
<td>206,814</td>
<td>1.1%</td>
<td>$2,469,768</td>
</tr>
<tr>
<td>Poor</td>
<td>40-50</td>
<td>542,588</td>
<td>2.8%</td>
<td>$3,798,116</td>
</tr>
<tr>
<td>Fair</td>
<td>50-60</td>
<td>801,081</td>
<td>4.2%</td>
<td>$4,006,406</td>
</tr>
<tr>
<td>Good</td>
<td>60-100</td>
<td>17,723,543</td>
<td>92.0%</td>
<td>$10,273,289</td>
</tr>
</tbody>
</table>

The annual amount needed to maintain these roads at 50 OCI is projected to be $4,249,000 each fiscal year for the years 2001, 2012, 2013, and 2014.

Sources:


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**BRIDGES**

The SC Department of Transportation evaluates county bridges every 1 – 2 years. A “sufficiency rating”, ranging from 0 to 100, is calculated for each bridge. A rating of 0 means a bridge has failed and needs to be rebuilt. A rating of 100 means a bridge has no distress and is in perfect condition. The County’s goal is to maintain bridges at or above a sufficiency rating of 50 (“fair”). Sufficiency ratings are:

- 0-35  Needs replacing as soon as possible (load restricted)
- 36-50  Place on replacement list
- 51-75  Watch for further degradation
- 76-90  Average condition
- 91-100 Excellent or new condition
Spartanburg County maintains 150 bridges. During fiscal year 2010, two bridges were replaced and three new bridges were added at a total cost of $1,982,000. The following table provides sufficiency ratings for county bridges 2008-2010.

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Number of Bridges</td>
<td>Percent</td>
<td>Number of Bridges</td>
</tr>
<tr>
<td>0-35 Need replacing ASAP</td>
<td>2</td>
<td>1%</td>
<td>1</td>
</tr>
<tr>
<td>36-50 Placed on replacement list</td>
<td>2</td>
<td>1%</td>
<td>2</td>
</tr>
<tr>
<td>51-75 Watch for further degradation</td>
<td>68</td>
<td>47%</td>
<td>67</td>
</tr>
<tr>
<td>75-90 Average</td>
<td>12</td>
<td>8%</td>
<td>12</td>
</tr>
<tr>
<td>90-100 Excellent or new condition</td>
<td>62</td>
<td>42%</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td>146</td>
<td>100%</td>
<td>147</td>
</tr>
</tbody>
</table>

Sources:
Spartanburg County Government, Engineering Department:
http://www.spartanburgcounty.org/govt/depts/pubwrks/envsrv.htm

**COMPREHENSIVE PLANNING / REGULATORY IMPLEMENTATION**

Spartanburg County is required by law to have a Comprehensive Plan that ensures orderly growth and harmonious development of the county. A Comprehensive Plan dictates public policy in terms of transportation, utilities, land use, recreation, and housing. The plan falls under the purview of the County’s Planning and Development Department and currently encompasses the 1998-2015 period. An ongoing process, the plan monitors growth and engages stakeholders in long-range planning to accommodate growth in the most balanced manner.
Stakeholders and subject matter experts recognize that the current governmental infrastructure is a dysfunctional proliferation of fragmented units that include numerous special purpose districts (SPD’s), and other quasi-public facility and service providers (Part VIII, Organization Element, Spartanburg County Comprehensive Plan). This infrastructure evolved over time and is a product of urban sprawl, historical constraints on county government, financial constraints, and lack of holistic vision. As the comprehensive plan evolves, this infrastructure must change to accommodate new land use planning and growth management policies that are informed by the latest thinking in urban planning and by experiences of communities similar to Spartanburg. Local subject matter experts are calling for regulatory changes that include new policies and incentives that support sustainability, such as low impact development, reduced parking lot sizes, high occupancy vehicle (HOV) lanes, and permeable paving.

According to ICLEI, the association of cities and counties committed to climate protection, clean energy and sustainability, comprehensive plans provide a long-range vision for the future growth and development of the community that addresses economic, environmental and social problems and opportunities within the community. Good comprehensive plans ensure sustainable communities that think and act systemically. The ICLEI has identified several characteristics of sustainable communities.

Sustainable communities:

- Possess a strong capacity to respond to and bounce back from adversity
- Foster innovation by cultivating a spirit of proactive problem solving
- Measure progress by improvements in the health and wellbeing of their people, environment and economy
- Steward natural resources so that future generations have as many opportunities available to them
- Cultivate collaboration among all facets of the community to encourage innovation, resource sharing, and mutual accountability
- Embrace ethnic, cultural, economic, and biological diversity to engender multiple approaches to accomplishing goals
- Inspire leadership by backing visionary policies and practices
- Continuously improve as they learn more about the impacts of their actions through tracking performance and outcomes

Thus, a sustainability plan should embrace all of these aspects in order to achieve multi-faceted sustainability goals. Environmental, economic, and social needs must all be addressed.

Many local governments are enacting policies and programs to address concerns about the impacts of urban sprawl and climate change to their communities. Although localities are not large enough to enact policies that addresses global issues, they understand that effects of stronger hurricanes, heavier rainstorms, more frequent floods, and retention of heat in the urban infrastructure are will have to be addressed on the local level.
Recognizing that climate change poses direct threats to cities and towns, many communities across the country have adopted zoning laws and land-use plans that promote higher-density and mixed development in order to decrease carbon emissions from vehicles and to preserve agricultural land. Many cities have adopted building codes that increase energy efficiency, and many cities are producing significant energy from renewable sources.

In 2005, the U.S. Mayors Climate Protection Agreement was endorsed by the U.S. Conference of Mayors and signed by local elected leaders across the country. This Agreement pledged that all communities will achieve a 7 percent reduction from 1990 emissions levels by 2012. As of August 24, 2011, 1,054 mayors had signed the agreement. South Carolina mayors who signed the agreement represented Charleston, Clemson, Columbia, Greenville, Greenwood, Lexington, Rock Hill, and Sumter.

Cities Committed to the U.S. Mayors Climate Protection Agreement
Crosscutting indicators are indicators in more than one community indicators area. Typically, they are leading indicators in one area and secondary indicators in another area.

HEALTH

The County Health Rankings Model developed by the University of Wisconsin Public Health Institute holds that health outcomes are determined by four factors: health behaviors, clinical care, social and economic factors, and the physical environment. In fact, the physical environment, both environmental quality and the built environment, that accounts for approximately 10 percent of health outcomes.

ENVIRONMENTAL EXPOSURE

Although individuals are exposed in the workplace and in the environment to chemicals known to cause cancer and other health problems, the interplay between genetics, lifestyle choices and exposure is too complicated to definitively estimate the number of deaths due to exposure alone. People are exposed to countless carcinogens on a daily basis. For example, benzene, often found in vehicle exhaust, arsenic, which contaminates some drinking water supplies, and radon, a natural radioactive gas found in many homes, are all known carcinogens. Other known human carcinogens that are commonly found in the environment include asbestos, hexavalent chromium, aflatoxins and vinyl chloride.
Although approximately two-thirds cancers are caused by lifestyle factors such as smoking, diet and alcohol, the remaining third trigger the debate about the impact of environmental exposure. The 2008-2009 Annual Report of the President’s Cancer Panel of the National Cancer Institute concludes that

“The public remains unaware of many common environmental carcinogens such as naturally occurring radon and manufacturing and combustion by-products such as formaldehyde and benzene. Most also are unaware that children are far more vulnerable to environmental toxins and radiation than adults. Efforts to inform the public of such harmful exposures and how to prevent them must be increased. All levels of government, from federal to local, must work to protect every American from needless disease through rigorous regulation of environmental pollutants”

CLIMATE CHANGE

According to the World Health Organization (WHO), global warming that has occurred since the 1970s was causing over 140,000 excess deaths annually by the year 2004. Because climate change affects the fundamental requirements for health – clean air, safe drinking water, sufficient food and secure shelter - all populations are affected in some way, but some are more vulnerable than others. People living in developing countries, coastal regions, megacities, and mountainous and polar regions are particularly vulnerable. Further, people who live in areas with weak health infrastructure, the elderly and children (particularly children living in poverty) are among the most vulnerable to environmental exposure and other health risks associated with climate change.

Specifically,

• Extreme high air temperatures contribute directly to deaths from cardiovascular and respiratory disease, particularly among elderly people.
• High temperatures raise the levels of ozone and other pollutants in the air that exacerbate cardiovascular and respiratory disease. Urban air pollution causes about 1.2 million deaths every year.
• Pollen and other allergen levels are higher in extreme heat, often triggering extreme allergic reactions and asthma. A study by the Mount Sinai School of Medicine (2011) resulted in a predictive model that evaluates the long-term impact of global climate change on a local level. The model showed an overall 7.3 percent increase in asthma-related emergency department visits by children up to age 17, with increases in individual counties throughout New York State ranging from 5.2 to 10.2 percent. As a result of their findings, the researchers called for stronger efforts to reduce pollution that contributes to climate change and pollution that forms ozone.
• Increasingly variable rainfall patterns are likely to affect the supply of fresh water. A lack of safe water can compromise hygiene and increase the risk of diarrheal disease, which kills 2.2 million people every year. In extreme cases, water scarcity leads to drought and famine.
Floods are also increasing in frequency and intensity. Floods contaminate freshwater supplies, heighten the risk of water-borne diseases, and create breeding grounds for disease-carrying insects such as mosquitoes.

The World Health Organization (WHO) advocates for policy change and individual behavior change that have the potential to reduce greenhouse gas emissions and, in turn, produce major health benefits. In 2009, the World Health Assembly endorsed a new WHO work plan on climate change and health. The work plan includes advocacy to raise awareness that global climate change is a fundamental threat to human health, development of a global research agenda and coordination of scientific evidence linking climate change and health, and building international capacity to reduce health vulnerability to climate change.

Sources:


Robert Wood Johnson Foundation and University of Wisconsin Population Health Institute County Health Rankings: http://www.countyhealthrankings.org


World Health Organization: http://www.who.int/mediacentre/factsheets/fs266/en/

ECONOMIC DEVELOPMENT

Thriving communities are marked by a number of common characteristics that promote high quality of life. These include sound and well-maintained infrastructure and stewardship of the natural environment. Local land use management practices have profound impact on local economies, and environmental problems leverage significant economic toll. For example, a non-attainment of EPA 8-hour ozone standards will likely mean a loss to Spartanburg County of millions of federal highway dollars and a loss in economic development opportunities because nonattainment results in restrictions being placed on new industries. High quality business is attracted to thriving communities marked by sound land use practices, as are people whose skills are in demand.
Sources:

The Air We Breathe:  [http://spartanburgair.wordpress.com/](http://spartanburgair.wordpress.com/)


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**SPOTLIGHT ON LOCAL INITIATIVES**

There are numerous local initiatives and organizations in Spartanburg County that are working to preserve or improve the natural environment. Below are some examples that are not mentioned elsewhere in this report.

**Milliken & Company**

Milliken & Company, one of the world’s largest privately-held technology companies, is headquartered in Spartanburg and employs over 7,000 associates. The company’s commitment to environmental excellence is realized in environmental policies, adopted in 1990, that include sustainable practices, waste reduction and recycling, use of green energy, and community outreach. Policy outcomes and strategies include:

- Preferring all other means of disposal before using landfills, less than one-tenth of one percent of Milliken’s total domestic waste stream is landfilled.
- The company is a Leonardo Academy Cleaner and Greener certified international manufacturer and maintains a unique carbon negative status as a manufacturer
- The company achieves the highest possible score from EPA for superior fuel efficiency and environmental performance and is also a member of the EPA WasteWise program
- 99.9% of solid waste generated by operations is reused, recycled, or converted to energy
- Annually for 10 years Milliken has sponsored the Earth Run to promote environmental stewardship, fitness and an appreciation of nature
- Much of the 650 acre headquarters is open to the public as an arboretum, recognized as one of the great collections of trees and plants in the southeast
- Methane gas generated in county landfills is piped to the company’s manufacturing facilities and used to replace natural gas

**BMW**

In 2010, the BMW manufacturing facility generated approximately 62 million kilowatt-hours of power through its landfill-gas-to-energy program, which represents about 37 percent of the company’s overall electricity use. This places BMW in fourth place on the U.S. Environmental Protection Agency's list of
the top 20 on-site producers and users of green energy behind Kimberly-Clark Corp., the city of San Diego and the U.S. Air Force.

The automaker began siphoning Methane gas from the Spartanburg County landfill in 2003. The gas is piped 9 miles to the manufacturing plant where it is cleaned and burned to meet about 50 percent of the plant's energy needs. In 2009, BMW invested $12 million to improve the program, which reduces local carbon emissions by 92,000 tons per year and saves about $5 million in energy costs annually.

Source:


City of Spartanburg Storm Drain Labels

Storm drains in the City of Spartanburg are being labeled according to the destination of the water that goes down the drains. For example, labels may say “Drains to Lawson’s Fork Creek” or “Drains to Fairforest Creek”. These labels are raising residents’ awareness that stormwater does not go to sewage treatment facilities; rather it drains into creeks and other tributaries. Awareness promotes behaviors such as picking up pet waste so that it does not end up in storm drains. There is also some movement in various neighborhoods to establish pet waste stations so that dog-walkers have convenient access to pet waste bags and containers in which to place them.

County Septic Tank Replacement Program

Spartanburg County Stormwater Management Department is the recent recipient of two federal grants that underwrite the cost of replacing failing septic tanks. Replacing leaking septic tanks will help reduce the amount of contamination by human waste leaking into the ground and eventually into county streams and other water bodies. Like animal waste, human waste can carry fecal coliform bacteria. All streams in Spartanburg County are contaminated with fecal coliform to some extent.

One grant, a federal “319” grant administered by state Department of Health and Environmental Control, provides septic tank owners who live in areas of northern Spartanburg County defined by the North Pacolet, Lower South Pacolet, and Buck Creek watersheds with up to 60 percent of the cost of repairing faulty septic tanks, regardless of household income level. The second, a federal Community Development Block Grant, will pay for 100 percent of the cost of a septic tank repair for lower income county residents who qualify and who live outside municipalities. Residents who live in municipalities are generally on sewer systems. Funding began in November 2011. In excess of 20 septic tanks had been repaired in the first month of the grant, with a $1,600 average cost to repair the tanks.

Source:

Spartanburg Soil and Water Conservation District: http://www.spartanburgswcd.org/news.htm
**Livestock Fencing**

When cattle and other livestock are allowed to freely roam across stream banks, they contaminate waters with urine and manure, the primary source of fecal coliform bacteria. Further, erosion caused by congregations of livestock near water bodies is a constant source of sediment flow into streams. The federal 319 grant recently awarded to the Spartanburg County Stormwater Management Department (see section above) provides funding for agricultural projects in the North Pacolet, Lower South Pacolet, and Buck Creek watersheds, aimed at reducing livestock contamination of creeks and other water bodies. Regardless of income, residents in these areas can receive up to 60 percent of the cost of projects such as livestock fencing along creeks.

**The Air We Breathe**

The Air We Breathe is a collaboration of the Spartanburg Area Chamber of Commerce, the Spartanburg Development Association, Upstate Forever, and Spartanburg County government to reduce ground-level ozone and other forms of pollution in Spartanburg County. The collaboration is concerned with the impact of pollution on the health, economic development, and general quality of life in Spartanburg County.

**Sustainable Spartanburg**

Sustainable Spartanburg is a local grassroots effort that promotes conservation of natural resources. The organization’s website promotes local “green” events and provides information on sustainable practices and local resources. [http://sustainablespartanburg.com](http://sustainablespartanburg.com)

**Bicycle-Friendly Community**

Spartanburg was the first SC community to receive recognition as a bicycle friendly community by the League of American Bicyclists. As of 2011, Spartanburg maintains its status as a bronze-level bicycle friendly community. The only other communities in the state to hold similar recognition are Hilton Head Island (silver), Charleston (bronze), Columbia (bronze), and Greenville (bronze).

**Schools**

Boiling Springs Elementary and Pine Street Elementary Schools are the first public schools in the area to enact no-idling automobile policies in their loading zones and pick up / drop off lines. The schools conducted campaigns to educate children and parents on the environmental impact of emissions resulting from extended idling. Signs are posted, and the policy is viewed as non-negotiable, for both environmental and student safety reasons.
## Spartanburg County Public Trails and Bike Facilities

### Shared Use

<table>
<thead>
<tr>
<th>Name</th>
<th>Length</th>
<th>Type</th>
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<tbody>
<tr>
<td>Cottonwood Trail Preserve</td>
<td>5</td>
<td>walking, running, hiking, bicycling</td>
</tr>
<tr>
<td>Pride Trail (adjacent to Pine Street)</td>
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<td>walking, running, bicycling</td>
</tr>
<tr>
<td>Wadsworth Trail</td>
<td>3</td>
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</tr>
<tr>
<td>Mary Wright Greenway</td>
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<td>walking, running, bicycling</td>
</tr>
<tr>
<td>Cleveland Park</td>
<td>1.7</td>
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<tr>
<td>C.C. Woodson/Leadership Spartanburg</td>
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<tr>
<td>Salvation Army trail</td>
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<tr>
<td>Duncan Park Trail</td>
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<tr>
<td>Westview Elementary School Trail Loop</td>
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### Walking, Hiking

<table>
<thead>
<tr>
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<th>Length</th>
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<tbody>
<tr>
<td>Peters Creek</td>
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</tr>
<tr>
<td>Pacolet River Preserve Trail</td>
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</tr>
<tr>
<td>Hatcher Garden</td>
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<td>walking, hiking, educational</td>
</tr>
<tr>
<td>River Birch Trail</td>
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<td>walking, hiking, hiking, running</td>
</tr>
<tr>
<td>Nature Trail at Croft State Park</td>
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<td>walking, hiking</td>
</tr>
<tr>
<td>Horace Craig Trail at Croft State Park</td>
<td>1</td>
<td>walking, hiking</td>
</tr>
<tr>
<td>Boiling Springs Comm Pk Tr</td>
<td>0.27</td>
<td>walking, running, hiking, hiking</td>
</tr>
<tr>
<td>SCALE Trail in Duncan</td>
<td>2</td>
<td>walking, running, hiking, hiking</td>
</tr>
<tr>
<td>Glendale Shoals</td>
<td>1</td>
<td>walking, hiking</td>
</tr>
<tr>
<td>Town of Pacolet Nature Trail</td>
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<td>walking, hiking, educational</td>
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<tr>
<td>Mean Green Trail at Pine St. Elementary</td>
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<tr>
<td>Va-Du-Mar Park Trail</td>
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<tr>
<td>Brookwood Park Trail in Landrum</td>
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<td>Barnet Park Path</td>
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<tr>
<td>CADA Park Path in Downtown Chesnee</td>
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<td>McKinney Park Path</td>
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<tr>
<td>Veteran's Park Path (Greer on Sptg. Co. side)</td>
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<td>Stone Ledge Park Path</td>
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<td>River Place Trail and Pedestrian Bridge</td>
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<td>Clifdale Elementary Walking Loop</td>
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<td>Mary Black Hospital Walking Trail</td>
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<tr>
<td>Boiling Springs Trail Rainbow Lk Rd fire station</td>
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<tr>
<td>E.P. Todd School Nature Trail and Track</td>
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</tr>
<tr>
<td>Walnut Grove Nature Trail</td>
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<td>walking, hiking</td>
</tr>
<tr>
<td>Price House Nature Trail</td>
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<td>walking, hiking</td>
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</table>

### Statewide Palmetto Trail Passages in Spartanburg County (hiking and biking)

<table>
<thead>
<tr>
<th>Name</th>
<th>Length</th>
<th>Type</th>
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</thead>
<tbody>
<tr>
<td>Liberty Trail</td>
<td>0.73</td>
<td>hiking/biking</td>
</tr>
</tbody>
</table>
Blue Wall Passage 14 hiking/biking
SC School for Deaf and Blind "Braille Trail" 1 hiking/biking
Glenn Springs 7 hiking/biking
Mary Black Rail-Trail 2 hiking/biking
USC Upstate 6 hiking/biking
Chinquapin Creek Trail at Hospice House 1.6 hiking
Croft Passage (Spring 2008) 12.6 hiking/biking
Glendale Greenway 2.2 hiking/biking

**Bike Lanes**
Reidville Road (SC 296) Bike Lane 5 bike lane
Hudson-Barksdale Bike Lane 1 bike lane
US 221 near downtown Chesnee 0.25 bike lane
SC 101 13 wide outside lane for shared-use
SC 295 5 shared-use path
Evins and Cummings Street 0.6 bike lane
SC 290 6 wide outside lane for shared-use
Spring St./Marion St. 1.2 bike lane
SC 62 (Main Street Reidville) 0.125 bike lane
Hollywood Dr./Dupre Dr. 1.2 bike lane
Magnolia St./College St./Forest St. 2.7 bike lane
Union St./Dean St. Extension 0.3 bike lane
Broad St. 0.5 bike lane
Liberty St. Connector at the Marriott 0.5 bike lane
Serpentine Dr. 0.3 sharrow
Highway 11 (Northern Crescent Bike Route) 23 new 2 ft. paved shoulder

**Mountain Bike Trails**
Mountain Bike Trails at Croft State Park 14.1 mtn biking
BMX track at N. Sptg. Complex 0.25 mtn biking/BMX
Glenn Springs Passage of Palmetto Trail 7 mtn biking
USC Upstate Passage of Palmetto Trail 6 mtn biking
Duncan Park Trails 7 mtn biking
Pump trail at GOLS (coming soon!) 0.2 mtn biking

**Blueway Trails**
Tyger River Blueway 7.5 paddling/kayaking
Pacolet/Lawson's Fork Blueway 4.5 paddling/kayaking

Source: Spartanburg Area Transportation Study 2011

www.spatsmpo.org

185.5 miles total public trails and bike facilities in Sptg. Co.