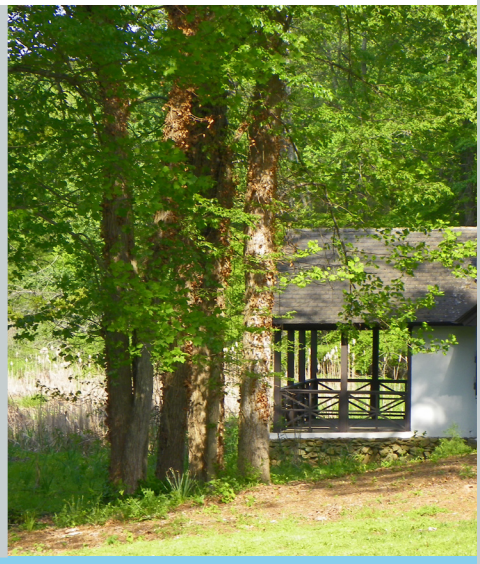
Forsyth Futures
Putting Community Knowledge to Work



MAKING PROGRESS REPORT
Environmental Sustainability 2012

FORSYTH FUTURES' MAKING PROGRESS REPORTS (MPR) serve as a tool to inform Forsyth County, N.C., residents about current issues, conditions, and trends in six areas: Educational Success, Economic Self-Sufficiency, Mental and Physical Health, Environmental Sustainability, Safety, and Community Engagement. Making Progress Report: Environmental Sustainability 2012 tracks indicators related to the state and health of the natural environment.

The **MAKING PROGRESS REPORT: ENVIRONMENTAL SUSTAINABILITY 2012** includes eight indicators:

- Clean & Plentiful Water
- Clean Air
- Energy Consumption & Clean Energy
- Alternative Transportation
- Generation of Waste & Recycling
- Land Use & The Built Environment
- Land Conservation & Biodiversity
- *Local Food (not in report, full local food system assessment of Forsyth County will be available in December 2012)*

For each indicator, this report provides a description of the indicator, indicates data points used to measure the indicator, identifies key findings, and offers recommendations on how progress is made.

REPORT HIGHLIGHTS

- **Estimated residential water usage has decreased by almost 30% over the last five years, from 70 gallons a day per capita to 51 gallons per capita.**
- **For 75% of days in 2011 air quality was considered good.**
- **As of 2011 an estimated 68 clean energy firms had offices in Forsyth County.**
- **On average 87% of all waste generated ends up in a landfill.**
- **Local agencies and organizations have conserved more than 3000 acres of land as open space or farmland.**

Trend Status & Target Goals

UNIQUE TO THE MAKING PROGRESS REPORTS ARE THE TREND STATUS AND TARGET GOALS.

TREND STATUS: For the purposes of the Making Progress Reports, Trend Status is defined as positive or negative, based on a trend of 10 years (if available). The following green icon indicates a positive trend and means the trend is moving in a desired direction, while a negative trend means the trend is not moving in the desired direction and is indicated by the red icon. If data for 10 years past was not available, the trend status was based on available years. Any measure with less than three years of data, is not comparable between years, or can only provide a picture of the current state was not assigned a trend status.

TARGET GOALS: In most cases target goals and years were set by local, state or federal entity related to the indicator. In some cases, if a target was not set by a related entity, the target was based on the federal Healthy People 2020 objectives. When there was not a set target goal or year the target is based on a 10 percent improvement by 2020.

CLEAN & PLENTIFUL WATER

DESCRIPTION

The indicator Clean & Plentiful Water consists of two main measures: water usage and water quality. Measuring water usage rates allows communities to understand increasing demands for drinkable water and to plan for future water availability.

Maintaining water quality is important to residents' health and to the ecosystem. Water pollution can occur as a result of natural or human events. For this reason, systems are in place to monitor and remove any potentially harmful contaminants before they reach residents.

TREND STATUS/MEASURES

For this report, water usage is calculated using the estimated per capita amount of metered water used per day, by residential consumers of the City of Winston-Salem surface water system, which serves the majority of Forsyth County residents. Complete data sets on water use are available from 2007 through 2011.

Given the importance of water quality to our health, the Environmental Protection Agency (EPA) regulates contaminant levels, treatment techniques, and monitoring and reporting practices by water systems. One way to measure the quality of drinking water is to track the number of violations, of the EPA's drinking water regulations, that a water system receives. Water quality data is available from the EPA and the Winston-Salem/Forsyth County Utility System Commission from 2004 to 2011.

Measuring the number of Sanitary Sewer Overflows (SSOs) is also an indication of water quality. The release of raw or partially untreated sewage has the potential to contaminate water systems. The trend of SSOs is based on data, starting in Fiscal Year (FY) 2001 - 2002, from the annual Wastewater Collection and Treatment Ssystem Performance Reports of the Winston-Salem/Forsyth County Utility Commission.

TREND STATUS	HOW WE MEASURED
	Per Capita Residential Water Withdrawls
	Number of Drinking Water Violations*
	Number of Sanitary Sewer Overflow Events

** Violation numbers are based on a reporting system to local authorities and the EPA potentially resulting in an underestimation.*

CLEAN & PLENTIFUL WATER, continued

KEY FINDINGS

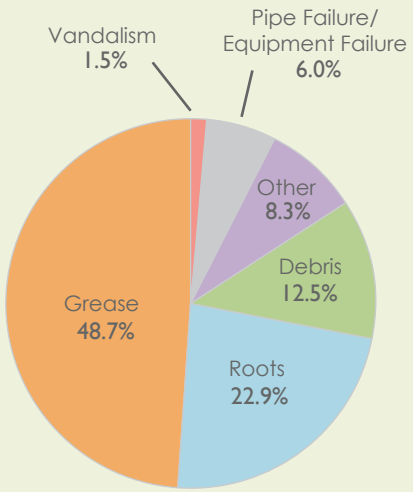
Water Usage

- In 2011, an estimated 51 gallons of water per capita were used by Forsyth County residents each day.
- This is close to a 30 percent decrease from the 70 gallons per capita used in 2007.

Water Quality

- The surface water system that serves the majority of residents in Forsyth County is the City of Winston Salem, and it did not receive any violations of EPA drinking water regulations in 2011. From 2004 through 2011 the City of Winston-Salem water system has not exceeded maximum contaminant levels.
- The other community water systems that serve Forsyth County are groundwater systems. In 2010 and 2011 most drinking water violations received by the groundwater systems in Forsyth County were for monitoring/reporting or violations of the Public Notification Rule.
- The only health-based violations, reported to the EPA, were for maximum levels of coliform in two of the groundwater systems serving less than one percent of the population in 2011.
- The number of SSOs over a year's time has decreased from 254 in FY2005-2006 to 109 in FY2010-2011. Most overflows have released less than 1,000 gallons of sewage, and the overflows are less than .05 percent of the total amount of sewer collected. As seen in Figure 1 most SSOs are due to grease blocking the collection system.

FIGURE 1. Primary Causes of Sanitary Sewer Overflows



ESTIMATED RESIDENTIAL WATER USAGE HAS DECREASED BY ALMOST 30% OVER THE LAST FIVE YEARS, FROM 70 GALLONS A DAY PER CAPITA TO 51 GALLONS PER CAPITA.

HOW DO WE MAKE PROGRESS?

The *Healthy People 2020* agenda, developed by a national interagency workgroup, set a target to reduce the water usage rate 10 percent by 2020. Using the 2011 residential water usage rate, 51 gallons a day per capita, the rate would need to decrease by slightly more than a half percent a year to reach 46 gallons a day by 2020. However, since 2007 the daily, residential water usage rate has decreased by almost 5 gallons per year. If this annual rate of change was maintained Forsyth County would reach the target no later than 2013.

Since water quality is regulated by the EPA and state agencies, targets are determined by water quality policy and regulations. For all regulated contaminants Forsyth County has remained below the maximum level allowed.

The Winston-Salem/Forsyth County Utility System Commission established a goal to reduce the number of SSOs to zero. Over the last 10 years, the number of SSOs has decreased by a rate of approximately 13 SSOs per year. If the number of SSOs continues to decrease at this rate, the County will reach the zero goal by FY2019-2020.

	WHERE WE ARE		WHERE WE COULD BE	
MEASURE	CURRENT	CURRENT ANNUAL CHANGE	NEEDED ANNUAL CHANGE TO GET TO	TARGET 2020
Per Capita Residential Water Withdrawls	50.9 (2011)	-4.8	-0.6 gallons per capita	45.8
Number of Sanitary Sewer Overflows	109 (FY2010-11)	-13.2	Maintain current rate of change	0

CLEAN AIR

DESCRIPTION

The quality of the outdoor air in our community is affected by various pollutants released into the atmosphere. Some of the most common pollutants include ozone, particulate matters (PM), emissions of carbon monoxide (CO), nitrogen dioxide (NO2), and sulfur dioxide (SO2). Poor air quality can potentially lead to respiratory and other health issues.

TREND STATUS/MEASURES

The EPA and local agencies track air quality through the Air Quality Index (AQI), which is an indicator of pollutants in the air and the health risks they pose. The AQI ranges from 0 to 500, and AQI values greater than 100 indicate unhealthy air quality conditions. Values ranging from 0 to 50 are considered "good" air quality scores, and values between 51 and 100 are considered "moderate" conditions.

The Making Progress Report also examines the contribution of individual pollutants to unhealthy air quality conditions. Between 2002 and 2011 the percent of days the AQI has fallen in the "good" or "moderate"range of 0 to 100 has increased, as well as the percent of days individual air pollutants fall in this range.

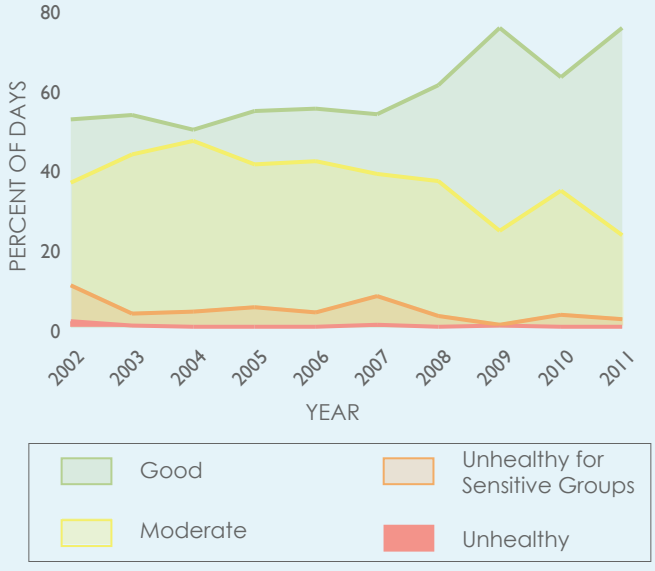
TREND STATUS	HOW WE MEASURED
	Percent of Days Air Quality Index is Good or Moderate
	Percent of Days Criteria Air Pollutants are Good or Moderate

KEY FINDINGS

Air Quality Index (AQI)

- In 2002 only approximately half of days were considered to have "good" air quality conditions, while 38 days were considered "unhealthy for sensitive groups," and 5 days were unhealthy. Figure 2 demonstrates that by 2011 the percent of "good" days increased to 75 percent, with only 7 days of the year considered "unhealthy for sensitive groups."
- The most common pollutants contributing to poor air quality conditions are particulate matters and ozone. In 2011 the pollutants PM2.5 and Ozone were the main sources of pollution for about 90 percent of measured days.
- For the pollutants CO, NO2, SO2, and PM10 contaminant levels have remained in the "good" range for 90 to 100 percent of measured days each year from 2002 to 2011.
- The percent of measured days where levels of PM2.5 have fallen in the "good" range has increased from 64 percent of measured days in 2002 to 85 percent in 2011, an increase of approximately 33 percent.
- Ozone levels have also decreased over the past 10 years, with a 20 percent increase in the percent of days with "good" levels of Ozone from 2002 to 2011.

FIGURE 2. AQI Category by percent of Days Each Year, (2002 - 2011)



HOW DO WE MAKE PROGRESS?

Measures of air quality suggest that Forsyth County has made significant progress in reducing the number of days with poor air quality. *Healthy People 2020* recommends decreasing the number of days per year that the AQI is above 100 to seven days. Currently, Forsyth County is below this target, and maintaining this trend would mean continued progress for the County.

ENERGY CONSUMPTION & CLEAN ENERGY

DESCRIPTION

The types of energy produced and the levels of energy consumed are directly related to greenhouse gas (**GHG**) emissions and overall air quality. Increasing energy efficiency and alternative energy sources are cost-effective ways to reduce emissions. As the population continues to grow, the importance of these measures will continue to increase.

TREND STATUS/MEASURES

One of the most common greenhouse gases produced by human activity is Carbon Dioxide (CO_2). Electricity and natural gas consumption, and vehicle use are all contributors to the levels of CO_2 in the atmosphere. The levels of energy consumed and CO_2 produced are used as measures of the indicator Energy Consumption.*

Developing forms of renewable energy is also important for decreasing greenhouse gas emissions. The number of initiatives in Forsyth County to increase energy efficiency and produce clean energy serves as a measure of efforts to reduce GHG emissions; examples include clean energy firms and residential home upgrades.

HOW WE MEASURED
Amount of Electricity and Natural Gas Consumed
Amount of Carbon Dioxide (CO_2) Produced
Number of Clean Energy Firms

KEY FINDINGS

Energy Consumption

- In 2011 approximately 5.1 billion killowatt-hours (kWh) of electricity were consumed by residential, commercial and industrial accounts in Forsyth County. From 2000 to 2011 electricity consumption in Forsyth County increased by almost eight percent.
- The CO_2 emissions rate for electricity consumption is 2,100 tons of CO_2 produced per every one million kWhs used. In Forsyth County 10.71 million tons of CO_2 were produced due to electricity consumption in 2011.
- In 2009 natural gas consumption reached 11.2 trillion British Thermal Units (BTUs), emitting 693,647 tons of CO_2, an increase of 8.7 percent in emissions since 2000.
- As Figure 3 shows residential and commercial accounts consumed about 80 percent of the electricity produced, while industrial accounts consumed almost half of natural gas produced.
- Per capita CO_2 emissions from electricity use have decreased slightly since 2000, from 32.3 to 30.1 in 2011 per capita, per capita emissions from natural gas use have remained constant between 2000 and 2009.
- In 2008 vehicles produced almost three million tons of CO_2 in Forsyth County.

AS OF 2011 AN ESTIMATED 68 CLEAN ENERGY FIRMS HAD OFFICES LOCATED IN FORSYTH COUNTY.

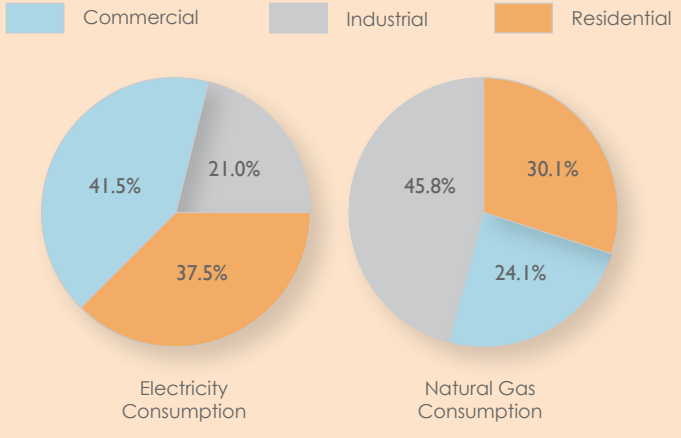
Clean Energy Production

- As of 2011 an estimated 68 clean energy firms had offices located in Forsyth County. Most of the firms are focused on Energy Efficiency/Building Sciences, but the list also includes renewable energy producers (solar, wind, biomass, hydroelectric, or geothermal) and a Smart Grid/Energy Storage Firm.
- The Block by Block program, an initiative to help residents in Forsyth County retrofit homes to increase energy efficiency, completed upgrades for 25 homes in a 2011 pilot program.

HOW DO WE MAKE PROGRESS?

The City of Winston-Salem Greenhouse Gas Inventory suggests using the Kyoto Protocol Target as a goal for Forsyth County. The Kyoto target recommends reducing GHG emissions to seven percent below 1990 levels. In Forsyth County this would mean reducing GHG levels to 7.1 million tons a year. For a detailed analysis of greenhouse gas projections and a local action plan see the City of Winston-Salem Sustainability website.

FIGURE 3. Percent of Energy Consumed by Type of Consumer



** A total number for greenhouse gas emissions is not given in this report due to the need of Clean Air and Climate Protection software. For a complete inventory of GHG emissions from 2000 to 2008 see the Greenhouse Gas Inventory and Local Action Plan to Reduce Emissions adopted by the City of Winston-Salem.*

ALTERNATIVE TRANSPORTATION

DESCRIPTION

The indicator Alternative Transportation explores the use of transportation modes other than personal cars, including public transportation, biking and walking. Increasing the use of alternative modes of transportation has a positive impact on air quality and the use of limited natural resources.

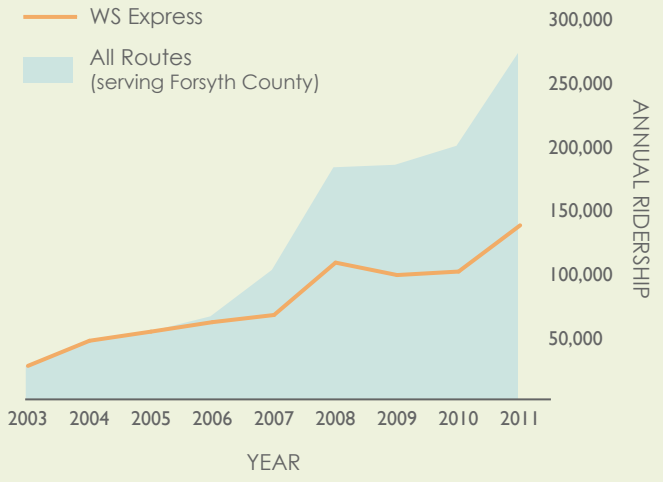
TREND STATUS/MEASURES

Measures of alternative transportation use include public transportation ridership, pedestrian/bicycle counts and miles of bike paths. There are two public transportation systems that operate in Forsyth County: Piedmont Authority for Regional Transportation (PART) and the Winston-Salem Transit Authority (WSTA). It is difficult to capture the exact Forsyth County market share of the Authorities because of the regional (multi-county) nature of the systems. Routes with at least one stop in Forsyth county were included. Trend data is available for each authority, however, due to the addition and removal of routes and stops, a trend status was not determined.

While little data is currently available on the number of pedestrians and bicyclists in Forsyth County, a bicycle and pedestrian count was conducted in 2011 by the City of Winston Salem Department of Transportation (DOT). Understanding the miles of existing and planned bike routes and greenways can also provide an indication of how accessible biking is to Forsyth County residents.

HOW WE MEASURED
Public Transportation Ridership
Count of Pedestrians and Bicyclists
Miles of Bike Lanes

FIGURE 4. Annual Ridership of PART routes serving Forsyth County (2003 - 2011)



KEY FINDINGS

Public Transportation

- Between 2007 and 2010 the average ridership on WSTA fixed routes was 2,784,326 riders a year. Average ridership increased by about four percent each year. Based on ridership numbers from January to April 2011, it appears this trend is continuing.
- From 2003 to 2011 the presence of PART in Forsyth County increased rapidly, going from one route in 2003 to seven in 2012. Due to this increase in routes, annual ridership on routes serving Forsyth County has increased from 26,241 in 2003 to 271,255 in 2007.
- The PART Winston-Salem (WS) Express route, which goes through Kernersville to Guilford County, has the highest ridership of routes serving Forsyth County. As seen in Figure 4 ridership on the WS Express accounted for half of total ridership on PART routes serving Forsyth County in 2011. By 2011 the number of riders on WS Express had increased by more than five times since its first full year of operation in 2003.

Pedestrians & Bicyclists

- Over multiple days in May 2011, seven bicycle and pedestrian counts were done at various locations in Winston-Salem. During this time period, 351 pedestrians were counted, and 115 bicyclists.
- More than 70 miles of roads have designated bike routes in Winston-Salem and Forsyth County.
- Greenways are another route option for bicyclists and pedestrians. Currently, the City-County Planning Department, City Engineering Department, and WS DOT are updating the *Greenway Plan - Winston-Salem and Forsyth County 2015* document. *The Greenway Plan Update (Draft)* lists 11 existing greenways totaling 23 miles, another 8 greenway projects in development, and prioritizes at least 25 miles of proposed greenway projects.

GENERATION OF WASTE & RECYCLING

DESCRIPTION

The amount of waste generated is an indicator of the amount of resources used by Forsyth County residents. The disposal of household waste has an effect on the natural environment and quality of life of residents. The majority of waste generated ends up in landfills and has the potential to harm local air and water quality.

TREND STATUS/MEASURES

The state of North Carolina requires all solid waste management facilities to submit annual reports on waste generation and disposal. From this data the NC Department of Environment and Natural Resources (DENR) compiles an *Annual Solid Waste Summary Report* by county. Through these reports Forsyth County is able to track the amount of waste generated and to identify trends in waste disposal. The following key findings are a summary of information from the Annual Solid Waste Reports for Forsyth County.

TREND STATUS	HOW WE MEASURED
	Amount of Waste Generated Per Capita
	Percent of Waste Recycled

KEY FINDINGS

Waste Generation

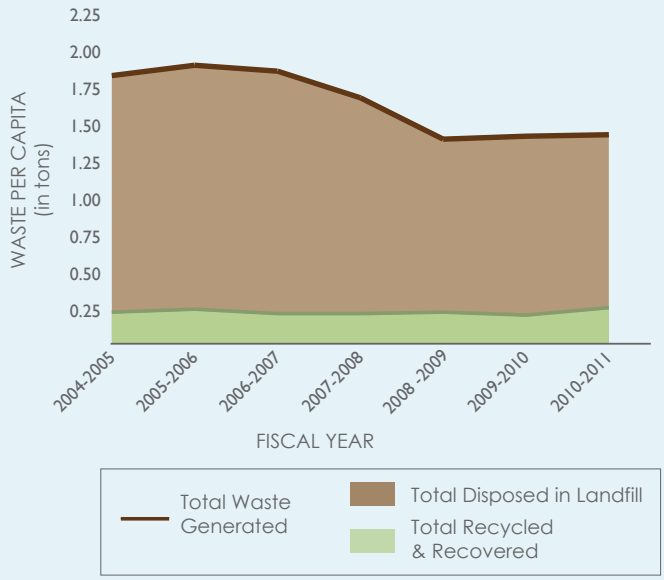
- In FY2010 - 2011 Forsyth County produced almost 500,000 tons of solid waste.
- Since FY2004 - 2005 the total amount of solid waste generated per capita has decreased by 22 percent, from 1.8 to 1.4 tons.*

** The Annual Solid Waste Summary Report attributes most of the decline in amount of waste generated to the weak economy and people purchasing fewer goods.*

Recycling

- As seen in Figure 5, the majority of waste in Forsyth County ends up being disposed of in a landfill: on average 87 percent of all waste generated.
- In FY2010 - 2011 the waste disposal rate was 1.17 tons per capita, down from 1.6 tons per capita in FY2004 - 2005.
- The proportion of all waste generated that is recycled or recovered has increased since FY2004 - 2005 to FY2010 - 2011 from 11 percent to 16 percent, approximately a 44 percent increase in recycling.
- The recycling rate has increased from 0.20 tons per capita in FY2004 - 2005 to 0.23 tons per person in FY2010 - 2011.

FIGURE 5. Amount of Waste Disposed or Recycled per Capita (FY2004-2005 to FY2010-2011)



HOW DO WE MAKE PROGRESS?

The *Forsyth County 10 Year Solid Waste Management Plan Update* sets a waste disposal target of 1.27 tons per capita by June 30, 2019. Even though the current disposal rate (1.17 tons per capita) is below this target, efforts should continue to promote recycling and recovery. An economic recovery in the next seven years could mean an increase in total waste and potential increase in the rate of waste disposed.

LAND USE & THE BUILT ENVIRONMENT

DESCRIPTION

Land use and the built environment have an impact on the health of the environment, as well as the physical health and quality of life of Forsyth County residents. The indicator Land Use & the Built Environment examines current land use and development patterns and efforts towards a more sustainable built environment. Land use patterns that are considered more sustainable involve higher housing and population densities, a decrease in development on undeveloped land, and more walkable communities. Measures of land use include the number of acres lost to new development, number of acres available for development, housing density and population density. In Forsyth County, the Winston-Salem/Forsyth County City-County Planning Board has tracked and reported on measures of land use in preparation for *Legacy 2030*, the County's comprehensive plan. For more information on these measures please visit www.legacy2030.com.

Buildings that seek green building certification are more energy efficient and use fewer limited natural resources. Two of the most common green building certifications are the US Green Building Council's LEED Certification, and ENERGY STAR Certification. For the purpose of the Making Progress Report these programs are used as measures of green building in Forsyth County. A trend status was not determined for these measures since green building certification and the brownfield redevelopment program can span multiple years.

HOW WE MEASURED

Number of Buildings Registered/Received a Green Building Certification

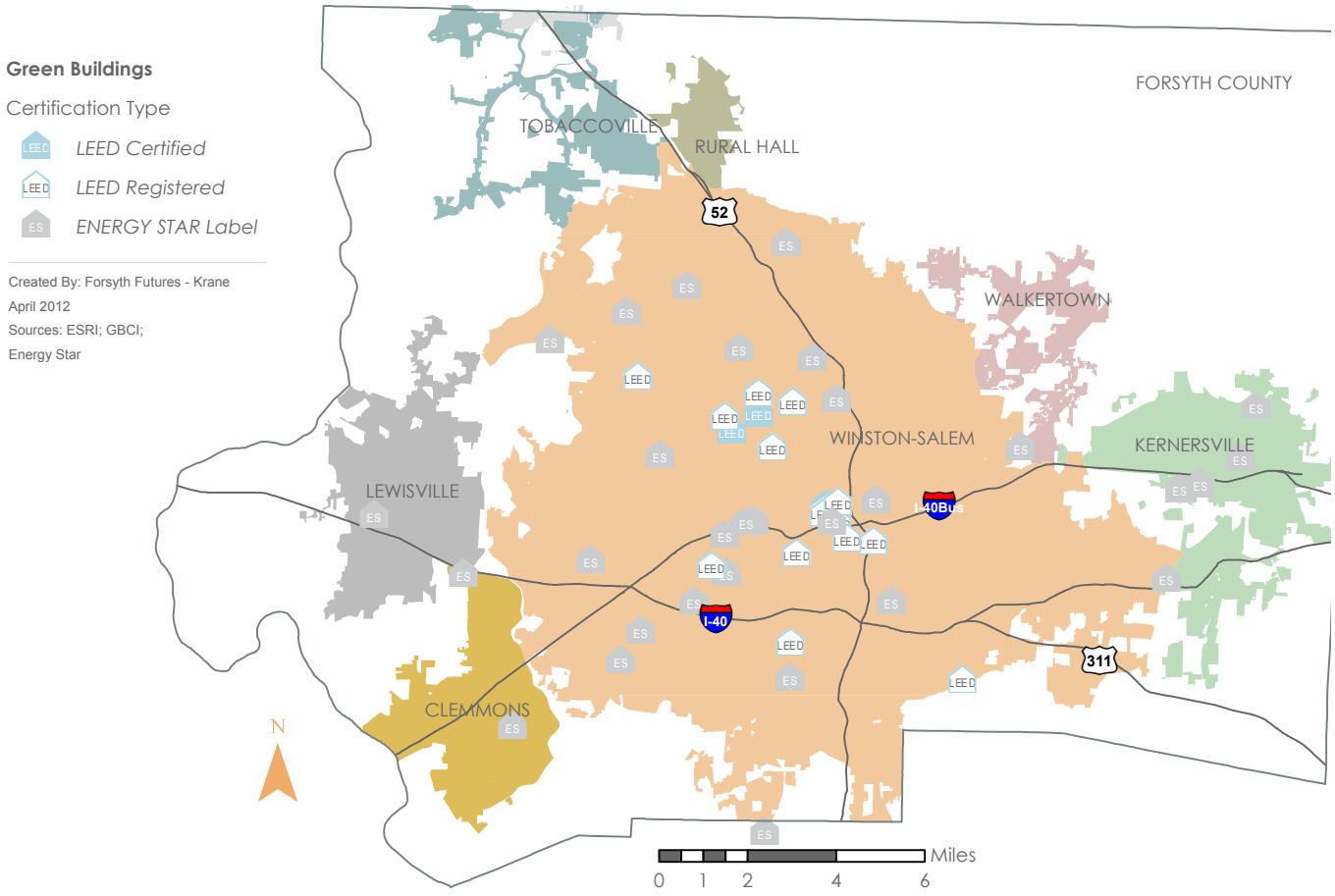
Number of Brownfield Redevelopment Programs

KEY FINDINGS

Green Building Certification

- There are four levels of LEED: Certified, Silver, Gold, and Platinum. At the end of 2011, seven buildings in Forsyth County (all located in Winston-Salem) had received LEED certification: one building is Certified, three have Silver certification, and three are Gold-certified.
- Approximately 15 projects in Winston-Salem are registered to become LEED certified.
- Design professionals can also become LEED certified. In Forsyth County, more than 150 individuals have received a LEED designation.
- The ENERGY STAR certification was developed by the EPA and the US Department of Energy and is available for new construction. Since 2002, 33 non-residential, buildings and facilities have received an ENERGY STAR label in Forsyth County.

FIGURE 6. Location of Green Buildings in Forsyth County



LAND USE & THE BUILT ENVIRONMENT, continued

- In Forsyth County 23 builders have partnered with ENERGY STAR to build new homes that are ENERGY STAR qualified. Since the start of the ENERGY STAR program, nearly 800 new homes have qualified for an ENERGY STAR label.

Brownfields Redevelopment

- Brownfields sites are properties in need of redevelopment, but environmental contamination issues have made redevelopment a challenge.[1] The NC Brownfields Program provides developers (who did not cause the contamination) the opportunity to redevelop the site.

- As of September 2010 approximately 11 sites in Forsyth County have signed Brownfields agreement through the NC DENR's Brownfields Program, five sites are eligible for a Brownfields agreement, and one site is still pending eligibility.

LAND CONSERVATION & BIODIVERSITY

DESCRIPTION

The indicator Land Conservation & Biodiversity explores the state of two natural resources - land and wildlife. Maintaining these natural resources is a key feature of a healthy and sustainable ecosystem, creating a positive impact on the health and economic well being of Forsyth County residents.

TREND STATUS/MEASURES

Conservation efforts of natural areas and open spaces in Forsyth County occur at the local and state level, through government agencies and private organizations. The City of Winston-Salem and Forsyth County released the Parks & Open Space Plan in 2007 to assess and plan for park and open space areas.* In 2011, NC DENR also conducted an assessment of land managed for conservation and open space.

Private individuals, organizations and non-profits also assist with the conservation of natural areas and open space. The Piedmont Land Conservancy (PLC), a non-profit land trust that serves Forsyth County, has an inventory of areas protected by the Conservancy in Forsyth County.

Knowing where rare, unique or endangered natural habitats exist is one way to prioritize areas for conservation. In order to plan for natural resource conservation the NC DENR has assessed the location of important natural habitats. This assessment serves as a measure of biodiversity for the Making Progress Report.

State and local organizations, including the Audubon Society of Forsyth County and the North Carolina Butterfly Society, have tracked certain species in Forsyth County. The number of bird and butterfly species also serves as measures of biodiversity.

HOW WE MEASURED
Acres of Lands Conserved
Location of Important Natural Habitats
Number of Bird Species

TREND STATUS	HOW WE MEASURED
	Number of Butterfly Species

** While all parks located in Forsyth County are listed in the Parks & Opens Spaces Plan, the Making Progress Report focuses only on parks where the purpose of creating of the park was to protect environmental or historic resources. For more information on all parks in Forsyth County see the publications section on the City/County Planning Board website.*

1 "Program Background." Brownfields Program. N.C Division of Waste Management. NC Department of Environment and Natural Resources. http://portal.ncdenr.org/web/wm/bf/program Accessed 5 April 2012.

2 Chapter 4: Biodiversity/Wildlife Habitat Assessment, Conservation Planning Tool Detailed Report. One North Carolina Naturally. NC Department of Environment and Natural Resources. Accessed 11 April 2012.

LAND CONSERVATION & BIODIVERSITY, continued

KEY FINDINGS

Land Conservation

- To date, local municipalities have conserved nearly 1,700 acres of environmental and historical resources in Forsyth County. The majority of the conserved land (1,455 acres) is located at Salem Lake park. The remaining acreage consists of 145 acres at Historic Bethabara, and 64 acres of parks classified as open space or mini/ornamental.
- Forsyth County has also recognized the need for farmland preservation, and through the voluntary, Farmland Preservation Program the County has protected approximately 1600 acres of farmland.
- Through the NC DENR 67 acres were conserved as easements for ecosystem enhancements or water management.
- The Piedmont Land Conservancy has assisted the State of North Carolina with the facilitation of approximately 216 acres of historic site conservation or mitigation projects. PLC has also helped private landowners protect 144 acres of land through conservation easements. Under PLC ownership are 43 acres of protected wooded land and springs.

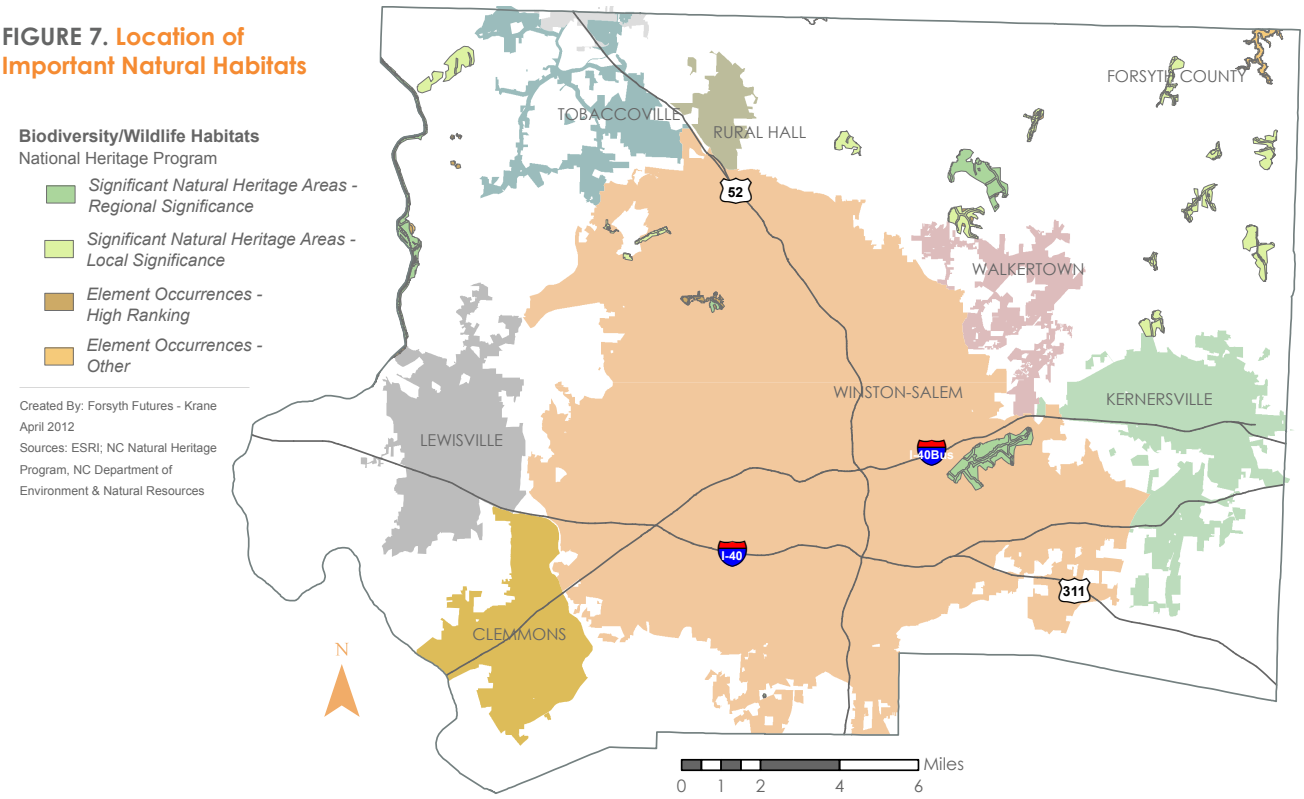
Biodiversity

- Figure 7. shows areas in Forsyth County that the NC DENR has identified as important natural habitats for native species that should be a focus for conservation efforts. Most areas of importance are located in northeast Forsyth.
- In Forsyth County, most of the important natural habitat areas are designated as Significant Natural Heritage Areas (SNHAs) with a local significance. These areas contain locations of the best examples, in the County, of certain rare species, rare or high quality occurrence of natural species, and/or are sites for colonial nesting waterbirds.[2]
- There are also a few occurrences of rare species, significant natural communities, or animal assemblages in areas not considered SNHAs, but that are still important. DENR has designated these areas as Element Occurrences.
- Birds are tracked on a regular basis in Forsyth County and are one indicator of changes in habitats and the natural environment. The number of bird species sighted between 2009 and 2011 has remained stable. In spring of 2009 there were sights of 127 different species, and in spring 2011 there were 125 species sighted.
- Butterfly species are also tracked in Forsyth County. Since 2001 the number of butterfly species sighted in Forsyth County has increased by close to 24 percent: from 55 species sighted to 68 in 2011.

HOW DO WE MAKE PROGRESS?

Local and state assessments of natural areas and wildlife show a need for the continued conservation of Forsyth County's natural resources. In an effort to continue this work, the Winston-Salem/ Forsyth County Planning Board, through the *Parks & Open Space Plan*, has recommended the creation of an Open Space System.

FIGURE 7. Location of Important Natural Habitats



DEFINITIONS

BIODIVERSITY: The degree of variation of life forms within a given ecosystem. Source: "Chapter 4: Biodiversity/Wildlife Habitat Assessment." *One NC Naturally Conservation Planning Tool - Detailed Report.* One NC Naturally. http://www.onencnaturally.org/pages/CPT_Detailed_Report.html

BROWNFIELDS SITE: An abandoned, idled, or under used property where the threat of environmental contamination has hindered its redevelopment. Source: "Program Background." Brownfields Program. NC Department of Environment and Natural Resources. http://portal.ncdenr.org/web/wm/bf/program

CARBON MONOXIDE: An odorless, colorless gas formed when carbon in fuels does not completely burn, sources of CO_2 include vehicle exhaust, fuel combustion in industrial processes, and natural sources such as wildfires. Source: *EPA Air Quality Index: A Guide to Air Quality and Your Health*. Environmental Protection Agency. http://www.epa.gov/airnow/aqi_bw.pdf

CONSERVATION EASEMENTS: An agreement between a landowner and a private land trust or government that limits certain uses on all or a proportion of a property for conservation purposes. Agreement applies to present and future landowners. Source: "Glossary." Conservation Tools, Pennsylvania Land Trust Alliance. http://conservationtools.org/glossary?starts_with=C

ENERGY STAR CERTIFICATION: A joint program of the US Environmental Protection Agency and the US Department of Energy promoting energy efficient products, and building practices. Source: ENERGY STAR, www.energystar.gov

GREENFIELD DEVELOPMENT: Development on previously undeveloped lands. Source: "Greenfield Development: Overview." Sustainable Cities Institute, www.sustainablecitiesinstitute.org/view/page.basic/class/feature.class/Lesson_Greenfield_Devt_Overview

GREENHOUSE HOUSE GAS: Gases that trap heat in the atmosphere. Source: "Greenhouse Gas Emissions." Climate Change. Environmental Protection Agency. http://www.epa.gov/climatechange/emissions/

GREENWAYS: Linear open space corridors that can be managed for recreation, conservation, and/or transportation. Source: *Greenway Plan Winston-Salem and Forsyth County 2015*. Winston-Salem/Forsyth County Planning Board. http://www.cityofws.org/Assets/CityOfWS/Documents/Planning/Publications/Parks_Greenways/GreenwayPlan.pdf

GROUND WATER: Water that seeps underground, into pores between sand, clay and rock formations called aquifers. Water moves through aquifers much like a glass of water poured onto a pile of sand. Source: "Ground Water." Environmental Protection Agency. http://water.epa.gov/type/groundwater/

LAND TRUST: An organization that, as all or part of its mission, actively works to conserve land, in the public interest, through land transactions - primarily the purchase or acceptance of donations of land or conservation easements. Source: "Glossary." Conservation Tools, Pennsylvania Land Trust Alliance. http://conservationtools.org/glossary?starts_with=C

LEED CERTIFICATION: Leadership in Energy and Environmental Design (LEED) is a rating system developed by the U.S. Green Building Council for independent, third-party verification that a building, home, or community was designed and built using strategies aimed at achieving high performance in key areas of human and environmental health: sustainable site development, water savings, energy efficiency, materials selection and indoor environmental quality. Source: "What LEED is." USGBC, www.usgbc.org/DisplayPage.aspx?CMSPageID=1988

MONITORING & REPORTING SCHEDULES: Part of the reporting requirements established by the Safe Drinking Water Act to make certain that states supervise the drinking water systems within their jurisdictions. Source: "Basic Information." Safe Drinking Water Information System. Environmental Protection Agency, http://water.epa.gov/scitech/datait/databases/drink/sdwisfed/basicinformation.cfm

NITROGEN DIOXIDE: A highly reactive gas which forms quickly from emissions from cars, trucks and buses, power plants, and off-road equipment. Nitrogen Dioxide is linked with a number of adverse effects on the respiratory system. "Health - Nitrogen Dioxide." Environmental Protection Agency, http://www.epa.gov/airquality/nitrogenoxides/health.html

OPEN SPACE: Land that is preserved and protected by environmental regulations or by purchase, conservation easements, dedication and/or donation to a public agency or land trust. Source: *Parks & Open Space Plan Winston-Salem and Forsyth County 2015.* Winston-Salem/Forsyth County Planning Board. http://www.cityofws.org/Assets/CityOfWS/Documents/Planning/Publications/Parks_Greenways/Parks_Plan_07.pdf

OZONE: A colorless gas found in the air we breathe, particularly on hot, sunny days. At ground-level, ozone is an air pollutant that can harm human health, formed when volatile organic compounds and nitrogen oxides emitted by cars, power plants, industrial boilers, refineries, chemical plants, and other sources react in the presence of sunlight. Source: "Air Quality Guide for Ozone." AirNOW. US Environmental Protection Agency. http://www.airnow.gov/index.cfm?action=pubs.aqiguideozone

PARTICULATE MATTERS: A complex mixture of extremely small particles and liquid droplets made up of a number of components, including acids (such as nitrates and sulfates), organic chemicals, metals, and soil or dust particles. The smaller the diameter of the particulate the more likely it is to cause health issues. $PM_{2.5}$ is particulate matter with a diameter of 25 micrometers or less, and PM_{10} has a diameter between 2.5 and 10 micrometers. Source: "Particulate Matter." Environmental Protection Agency. http://www.epa.gov/pm/

PUBLIC NOTIFICATION RULE: Part of the Safe Drinking Water Act, intended to ensure that consumers will always know if there is a problem with their drinking water. Source: "Public Notification Rule." Safe Drinking Water Act. Environmental Protection agency. http://water.epa.gov/lawsregs/rulesregs/sdwa/publicnotification/index.cfm

SANITARY SEWER OVERFLOWS (SSO): Occurs when sewer lines are obstructed or have reduced capacity due to inflow or infiltration of ground or surface water. Source: *2008 Annual Report of the City/County Utility Commission*. Winston-Salem/Forsyth County Utilities. http://www.cityofws.org/Assets/CityOfWS/Documents/Utilities/CCUC%20Annual%20Report%2007-08%20Final%20Report%20CMS.pdf

SURFACE WATER: Water present at the earth's surface. Surface water includes rivers, lakes, oceans, ocean-like water bodies, and coastal tidal waters. Source: Glossary of Terms and Acronyms Superfund. Environmental Protection Agency. http://www.epa.gov/superfund/training/hrstrain/htmain/glossmz.htm

SULFUR DIOXIDE: A colorless, reactive gas produced when sulfur-containing fuels such as coal and oil are burned. Major sources include power plants and industrial boilers. Source: *EPA Air Quality Index: A Guide to Air Quality and Your Health*. Environmental Protection Agency. http://www.epa.gov/airnow/aqi_bw.pdf

SOURCES

INDICATOR	HOW WE MEASURED	SOURCE OF TARGET GOAL	CURRENT DATA SOURCE
Clean & Plentiful Water	Per Capita Residential Water Withdrawls	Healthy People 2020	Local Water Supply Plans 2007 - 2011, Division of Water Resources, NC Department of Environment and Natural Resources. http://www.ncwater.org/Water_Supply_Planning/Local_Water_Supply_Plan/index.php
	Number of Drinking Water Violations	Environmental Protection Agency	Safe Drinking Water Information Systems, Envirofacts, US EPA. http://water.epa.gov/scitech/datait/databases/drink/sdwisfed/pivottables.cfm
	Number of Sanitary Sewer Overflow Events	City/County Utility System Commission	Wastewater Collection and Treatment System Performance Report for FY 2009 - 2010, Winston-Salem/Forsyth County Utility Commission. http://ci.winston-salem.nc.us/Assets/CityOfWS//Documents/Utilities/FY10%20Wastewater%20Annual%20Report.pdf
Clean Air	Percent of Days Air Quality Index is Good or Moderate	Healthy People 2020	2002 - 2011 Air Quality Index Report, AirData, US Environmental Protection Agency. http://www.epa.gov/airquality/airdata/ad_reports.html
	Percent of Days Air Pollutants are Good or Moderate	N/A	2002 - 2011 Air Quality Index Daily Values Report, AirData, US Environmental Protection Agency. http://www.epa.gov/airquality/airdata/ad_reports.html
Energy Consumption & Clean Energy	Amount of Electricity and Natural Gas Consumed	N/A	Duke Energy. Personal communication with Shawn Handy, Winston-Salem Sustainability Resource Center. 5 April 2012
	Amount of Carbon Dioxide Produced	City of Winston-Salem	Duke Energy. Personal communication with Shawn Handy, Winston-Salem Sustainability Resource Center. 5 April 2012
	Number of Clean Energy Firms	N/A	2011 NC Clean Energy Data Book. NC Sustainable Energy Association. June 2011. www.energync.org
Alternative Transportation	Public Transportation Ridership	N/A	Peidmont Authority for Regional Transportation. Personal communication with Mark Kirstner, Project Manager/Planning Program Manager. 21 March 2012 Winston-Salem Transit Authority. Personal Communication with Tomeka Cockerham, Operations Analyst. August 2011
	Count of Pedestrian and Bicyclists	N/A	Winston-Salem Department of Transportation. Personal communication with Matthew Burczyk, Transportation Project Planner. 12 April 2012
	Miles of Bike Lanes & Greenways	N/A	"Bike Routes." Biking. Winston-Salem Department of Transportation. http://cityofws.org/Home/Departments/Transportation/Biking/Articles/BikeRoutes The Greenway Plan Update (Draft) March 2012, City-County Planning Department, City Engineering Department, WS Department of Transportation. http://cityofws.org/default.aspx?mod=Article&id=228
Generation of Waste & Recycling	Amount of Waste Generated Per Capita	N/A	Forsyth County FY2010 - 2011 Solid Waste Annual Summary Report, Division of Waste Management, NC Department of Environment and Natural Resources. Personal communication with Wayne Turner, Assistant Solid Waste Adminstrator. 16 February 2012
	Percent of Waste Recycled	Forsyth County 10 Year Solid Waste Management Plan	Forsyth County FY2010 - 2011 Solid Waste Annual Summary Report, Division of Waste Management, NC Department of Environment and Natural Resources. Personal communication with Wayne Turner, Assistant Solid Waste Adminstrator. 16 February 2012
Land Use & The Built Environment	Number of Buildings Registered/Received a Green Building Certification	N/A	LEED Certified Project Directory as of 2/28/2012 & LEED Professional Directory. Green Building Certification Institute. http://www.gbci.org/main-nav/building-certification/registered-project-list.aspx ENERGY STAR Certified Buildings and Plants & Find ENERGY STAR Builders. ENERGY STAR, US EPA and US Department of Energy. http://www.energystar.gov/index.cfm?fuseaction=labeled_buildings.locator
	Number of Brownfield Redevelopment Projects	N/A	"Project Inventory (as of 3/31/2010)." Brownfields Program. NC Division of Waste Management. NC Department of Environment and Natural Resources. http://portal.ncdenr.org/web/wm/bf/projectinventory
Land Conservation & Biodiversity	Acres of Land Conserved	N/A	MAREA (Managed Areas), Conservation Planning Tool Open Space and Conservation Lands, One NC Naturally, NC Department of Environment & Natural Resources. http://www.onencnaturally.org/pages/Conservation-PlanningTool.html Piedmont Land Conservancy. Personal communication with Mindy Mock, Land Protection and Outreach Specialist. 17 April 2012
	Location of Important Natural Habitats	N/A	Biodiversity & Wildlife Habitat Assessment. Conservation Planning Tool. One NC Naturally, NC Department of Environment & Natural Resources. http://www.onencnaturally.org/pages/ConservationPlanningTool.html
	Number of Bird Species	N/A	Audubon Society of Forsyth County. Personal communication with Phil Dickinson. 25 April 2012
	Number of Butterfly Species	N/A	Butterfly Count. Notes on the Butterflies of NC. http://149.168.1.196/nbnc/index.html