Natural resources provide land and environmental amenities for development, while serving as an integral component of sustainable development. The aesthetic and recreational appeal of natural resources can increase land development pressures. Therefore, the on-going challenge in natural resources planning is to achieve a balance between the productive use of land and resources, maintenance of critical ecological functions, and the protection of residents and property from natural hazards. A thorough assessment of the Kershaw County natural resources base and subsequent incorporation of this information into planning efforts is necessary to avoid depletion or destruction of sensitive, and often irreplaceable, assets. Valuing and investing in efforts to protect and improve the natural resource base supports the quality of life for all County residents.

The Natural Resources Element includes information on local geographic and geologic conditions, climate, agricultural and forest lands, plant and animal habitats, unique parks and open space, scenic areas, water resources, wetlands and flood plains, air quality, and other factors that can significantly impact the natural environment and shape the future development of Kershaw County.

A. CLIMATE

As part of the Midlands area of South Carolina, Kershaw County enjoys a warm and temperate climate, with an average annual temperature of 61.6 degrees (Table 5-1). Winters are mild, with the earliest freeze generally occurring in late-October and the latest freeze in early April *(Clemson Cooperative Extension, 2016)*. However, summers in Kershaw County can be quite warm. When combined with an average humidity of 77.7%, the heat index can rise substantially in mid-to-late summer. The highest recorded temperature in the County was 111° on June 28, 1954.

Table 5-1. Temperature Summary for Kershaw County

Type	Data and Rank Statewide
Average Temperatures	Annual: 61.6° F *(28th highest)*[1] January Avg. Low: 29° F[2] July Avg. High: 88° F[2]
Average Humidity	77.7% *(13th highest)*[1]
Average Annual Precipitation	43.0 inches *(3rd lowest)*[1]
Average Growing Season	219 days (60% of every year)[3]

Sources: [1]World Median Group - USA.com, 2017; [2]The Weather Channel, 2017
[3]Kershaw County Economic Development, 2016

Average yearly precipitation in Kershaw County is 43 inches. Snowfall and ice are not frequent occurrences, with only 12 winter storm events recorded since 1997 *(National Climatic Data Center, 2016)*. Ice storms in 1969 and 1973 produced record accumulations. Kershaw County is considered moderately at risk for future winter storms, ranking 25th statewide in future probability of winter storm occurrence *(2013 SC Hazard Mitigation Plan, SC Emergency*

Management Division). More recently, the County experienced two major rain events in 2015 and 2016, both in October. The October 2015 event was one of the most prolific rainfalls in modern State history, with the highest totals recorded in the Midlands area. Rain gauges in Lugoff and at the Wateree dam recorded 12.48 and 8.62 inches of rain during the event, which fell from October 2nd through the morning of October 4th *(National Weather Service, 2016)*. Nearly one year later, Hurricane Matthew made landfall on the coast of South Carolina, bringing winds and heavy rain of between six and ten inches inland to Kershaw County. The heaviest rain was recorded in the eastern area of the County.

The South Carolina Department of Natural Resources (SCDNR) reports that there is a one in four probability of a drought somewhere in the State at any time. Drought is defined as a period of time with less-than-normal rainfall. Three of the State's driest years since 1895 were recorded in 2001, 2007, and 2011. As of October 2016, Kershaw County was considered to be a moderate risk for drought, with drought status determined to be incipient (there is a threat for drought as demonstrated by drought indices) by the South Carolina Drought Response Committee. Possible impacts from more severe drought conditions include likely crop or pasture losses, water shortages, and the imposition of water restrictions. In addition to local impacts, severe drought conditions can have widespread impacts statewide. Drought management activities enacted by inland areas that experience severe and prolonged drought can significantly alter lake levels, public intake, and downstream flows.

Severe weather can also occur in Kershaw County in the form of thunderstorms and tornadoes. Thunderstorms are common in the summer months. The more violent storms generally accompany squall lines and the active cold fronts of late-winter or spring. Strong thunderstorms usually bring high winds, hail, considerable lightning, and, on rare occasions, spawn tornadoes. Hail falls most often during spring thunderstorms, with 61 hail events recorded in the County since 1997. There is more than a 271% chance of severe storms and a 144% chance of hail annually in Kershaw County *(Santee-Lynches Hazard Mitigation Plan, 2015-2020)*.

May and August are the peak months for tornadoes in the region. The May peak is primarily due to squall lines and cold fronts, while the August peak is due to tropical cyclone activity. There were five tornadoes reported in Kershaw County from 1997 through July of 2016, resulting in 3 injuries *(NCDC Storms Database, 2016)*. A tornado in March 1984 caused $4 million in damage and injured 25 people in Kershaw County. The annual probability of a tornado event in the County is estimated at 44%.

B. AIR QUALITY

Air quality affects the public health, weather, quality of life, and economic potential of a community. One of the primary air quality concerns in South Carolina is ozone. In 1997, the Environmental Protection Agency (EPA) revised the National Ambient Air Quality Standard (NAAQS) for Ozone from a one-hour standard to an 8-hour standard to reflect the greater understanding of the effects of ozone exposure and the need to increase the margin of public

health protection. The NAAQS was most recently revised in 2015. Based on long-term monitoring data, the EPA designates areas as attainment (*meeting the air quality standard*) or nonattainment (*not meeting the standard*).

Should an area be designated as nonattainment, the SC Department of Health and Environmental Control (SCDHEC) and local governments must prescribe specific actions for reaching attainment within a specified time period. These requirements can significantly impact existing industry, economic recruitment efforts, and transportation in nonattainment and surrounding areas. For instance, the Nonattainment New Source Review requirement for areas lapsing into nonattainment status mandates a required level of emission reductions for new and modified industrial facilities. The expansion or improvement of local transportation infrastructure to support development can also be impacted under the *Clean Air Act* requirement that transportation plans, programs, and projects cannot create new violations to air quality standards, increase the severity or frequency of existing violations, or delay attainment of standards.

SCDHEC maintains a State Implementation Plan (SIP) that outlines the State's strategies for meeting NAAQS standards for six common pollutants as set forth by the Clean Air Act. Most of South Carolina, including Kershaw County, remains below the current threshold for ambient air quality standards. However, increased urbanization in the nearby Midlands metropolitan area may have future impacts on the air quality in Kershaw County. As part of the larger region, it is important that local leaders analyze and monitor the factors related to ozone levels and develop local solutions that manage ozone within acceptable levels that ensure the health of its residents, as well as the economic health and potential of the County. Ultimately, air pollution can have adverse economic effects on a community. Specific economic effects of air pollution include: damage to vegetation; reduced crop yields; increased corrosion of metals; and deterioration of stone and paint on buildings, cars and cultural landmarks. These potential impacts are of particularly concern in Kershaw County, where the success of the tourism sector of the economy is largely dependent on the preservation of scenic historic and natural resources. In addition, air quality problems can impede recruitment of new industries and businesses to the area, resulting in reduced investment and employment opportunities.

In 2007, Kershaw County and the City of Camden participated as stakeholders in the Midlands Air Quality Forum and the development of the *2007 Regional Air Quality Report*. The forum was designed to provide an opportunity for all stakeholders to take proactive steps toward improving air quality in the region. For example, in Kershaw County a permit is required to burn yard debris and the burning of items such as garbage, cardboard/paper, construction debris, treated wood, demolition debris, and tires is prohibited.

C. LAND RESOURCES

Kershaw County is located in central South Carolina, bordered by six counties - Lancaster to the north, Chesterfield and Lee to the east, Sumter to the south, Fairfield to the west, and Richland to the southwest. The County covers more than 740 square miles, ranking 19th largest among

the 46 counties of South Carolina. Nearly 14 square miles of the County are comprised of water, primarily Lake Wateree and the Wateree River, along with numerous rivers and streams.

South Carolina is comprised of four major physiographic provinces – the Atlantic Coastal Plain, the Upper Coastal Plain, the Piedmont, and the Blue Ridge provinces. Kershaw County spans two of these regions – the Upper Coastal Plain and the Piedmont *(S.C. Geological Survey, 2017)*. The Fall Line, a narrow zone of transition between the Piedmont and the Upper Coastal Plain physiographic regions, bisects the County just north of the City of Camden. The larger area south of the Fall Line lies within the Upper Coastal Plain, with topography that ranges from fairly level to gently undulating and moderately rolling hills. The City of Camden and the Towns of Bethune and Elgin are all within the Upper Coastal Plain, while the northwestern area of the County lies within the Piedmont Province. The Piedmont is characterized by irregular plains and open hills with numerous rivers and streams.

1. Soils

In planning for future development, it is important to examine local soil conditions. Soil properties directly influence building construction and costs, roads and other improved areas, agricultural activities, the prevalence of prime agricultural lands, and the location and design of septic tanks and drain fields. Both the suitability and stability of soils should be taken into consideration when considering the feasibility of new development or major redevelopment. The existing soils on individual sites will determine the suitability of development for specific types of development such as low density residential (single-family), high density residential (multi-family), commercial, and industrial. This level of detail can only be determined by an individual soil survey for the particular site. However, large-scale soils data from the SC Department of Natural Resources (SCDNR) may be useful in an examination of future development potential for broader areas and districts within a community.

Information provided by the *USDA Soil Data Mart* for Kershaw County indicates that the major soils in Kershaw County are very deep, upland soils of varying slope (Table 5-2). Deep, well-drained soils are predominant, with slow to medium runoff. Permeability ranges from moderate to rapidly permeable. Much of the soil is not well suited to cropland, so vigilant crop management is needed to maintain and increase production. However, the soils are generally well suited for pastureland. Soil erosion is a major concern for about 50% of the land in Kershaw County, primarily on soils with slopes of more than two percent. Soils with slow permeability have limitations affecting septic tank absorption fields.

Lakeland is the dominant soil series in Kershaw County, comprising more than 19% of County soils (90,428 acres). More than 9% of the soils in the County (42,946 acres) are of the Blanton series, 7.2% are of the Ailey series, and 5.2% are of the Wagram and Pelion series. All of these soils are sandy, with Pelion classified as loamy sand. The major soil types present within Kershaw County are characterized in Table 5-2.

Table 5-2. Major Soil Types within Kershaw County

Soil Name	Soil Type	Slope Range	Percentage (Acres)	Characteristics
Lakeland	sand	0 to 6%	19.1% (90,428)	Very deep, excessively drained, rapid to very rapidly permeable soils on broad to narrow uplands in the Southern Coastal Plain.
Blanton	sand	0 to 10%	9.1% (42,946)	Very deep, somewhat excessively drained to moderately well drained, moderately to slowly permeable soils on uplands and stream terraces of the Coastal Plain.
Ailey	sand	0 to 10%	7.2% (33,897)	Moderately deep, well drained or somewhat excessively drained, slowly permeable soils on marine terraces and low hills in the middle and upper coastal plain and sandhills.
Wagram	sand	0 to 6%	5.2% (24,679)	Very deep, somewhat excessively drained, moderately slow or slowly permeable soils on uplands in the upper and middle coastal plain.
Pelion	loamy sand	0 to 10%	5.2% (24,383)	Very deep, moderately well drained, on marine terraces and uplands of the middle and upper coastal plain and sandhills.
Alpin	sand	0 to 10%	4.8% (22,515)	Very deep, excessively drained, moderately rapidly permeable soils on uplands and river terraces of the Coastal Plain.
Chewacla	loam	0 to 2%	4.3% (20,329)	Very deep, somewhat poorly drained, moderately permeable soils in floodplains in the Piedmont and Coastal Plain river valleys.
Nason	loam	6 to 25%	3.8% (17,854)	Deep, well drained, moderately permeable soils on nearly level to very steep uplands in the Piedmont.
Madison	sandy clay loam	2 to 60%	3.7% (17,448)	Very deep to moderately deep, well drained, moderately permeable soils on gently sloping to steep uplands in the Piedmont.
Norfolk	loamy sand	2 to 6%	3.7% (17,351)	Very deep, well drained, moderately permeable soils on uplands or marine terraces in the lower, middle or upper coastal plain.
Georgeville	loam	2 to 10%	3.2% (15,146)	Very deep, well drained, moderately permeable soils on gently sloping to moderately steep Piedmont uplands.
Johnston	loam	0 to 2%	3.2% (15,010)	Very deep, very poorly drained, moderately rapidly permeable soils in flood plains and swamps in the lower to upper coastal plain.
Pantego	loam	0 to 2%	2.4% (11,273)	Very deep, very poorly drained, moderately permeable soils in nearly level and slightly depressional areas of the Southern Coastal Plain and Atlantic Coast Flatwoods.
Herndon	loam	2 to 10%	2.2% (10,488)	Very deep, well drained, moderately permeable soils on gently sloping to moderately steep Piedmont uplands.

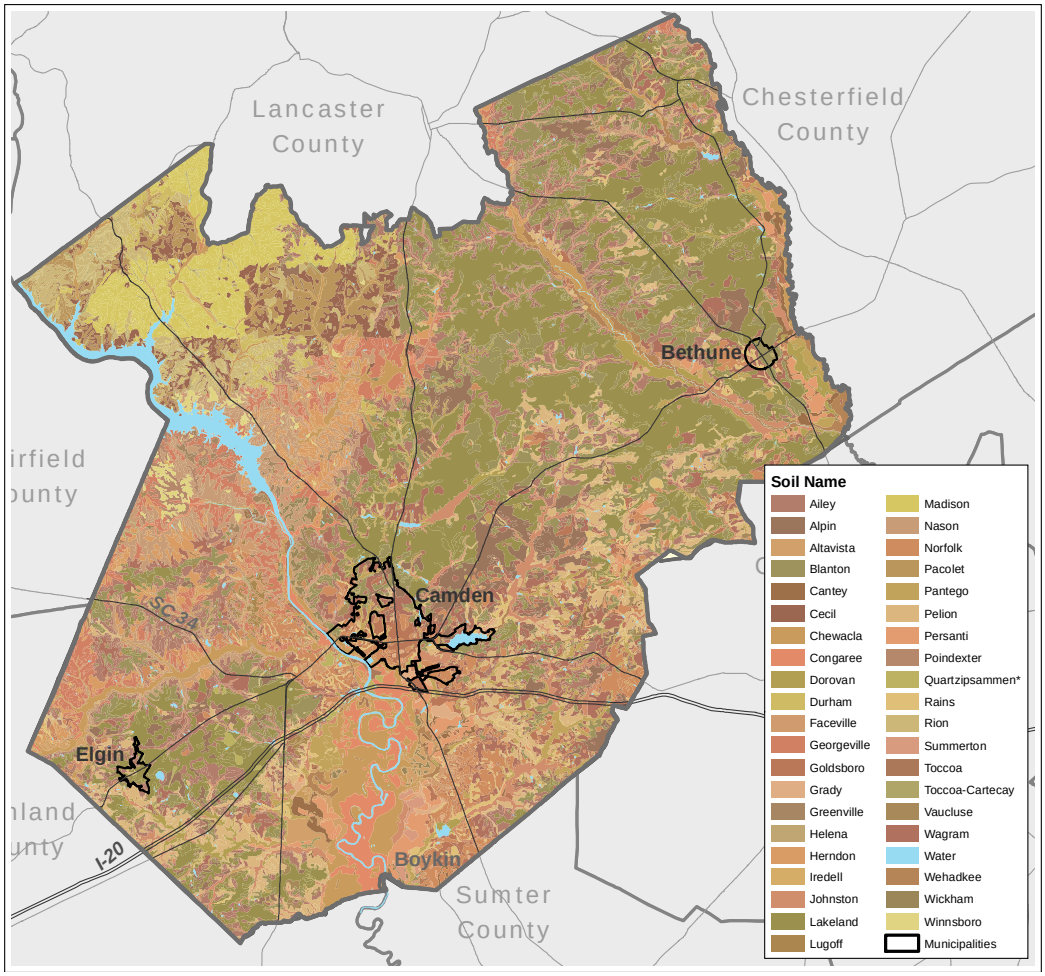
Sources: USDA NRCS Soil Data Access, 2016; USDA NRCS Official Soil Series Descriptions, 2016

Soil scientists examine a wide range of information in the development of soil survey maps, including soils and subsoils; the steepness, length and shape of slopes; the size of streams and the general pattern of drainage; the variety of native plants or crops; and the kinds of rocks

present. In addition to the major soils present in Kershaw County, minor soil series that each comprise less than 5% but more than 2% of the County's area include Alpin, Chewacla, Nason, Madison, Norfolk, Georgeville, Johnston, Pantego, and Herndon.

Map 5-1 illustrates the distribution of various soil series throughout Kershaw County, as well as the predominance of the Lakeland series. A map unit typically consists of one or more major soils and some minor soils, but is named for the major soils. The general soil map shows broad areas that have a distinctive pattern of soils, relief and drainage. While the depicted soil data is valuable in assessing the suitability of large areas for general land uses, it reflects only general limitations on urban development and should only be used for broad planning analysis. A detailed soil analysis should accompany site-specific development decisions.

Map 5-1. Soils



Source: USDA NRCS Soil Data Access, 2016

2. Slope

Slope characteristics have a direct impact on the types of land uses that have developed or may be developed in the future. Sites with slopes of less than 8% are typically most easily and cost

effectively developed and are appropriate for most types of land uses. As the percentage of slope increases, sites become more difficult and expensive to develop, with increased limitations on the types of land uses that are appropriate. Table 5-3 provides a general listing of land uses and their associated slope limitations.

Table 5-3. Suitable Slopes for General Land Uses

Land Use	Slope
All types of land use where there is no danger of periodic flooding	8% or less
Residential and light commercial development	9% to 16%
Low-density residential, not suited for commercial or industrial development	17% to 24%
Not suitable for any type of intense development	25% and greater

Elevation in Kershaw County ranges from an average of 225 feet above sea level on the water surface of Lake Wateree to approximately 630 feet in the northwestern corner of the County near SC Highway 97. The County's lowest elevations are found in the river and creek beds, and on Lake Wateree. The highest elevations are in the areas east of Lake Wateree, in the northwestern area of the County. Map 5-2 illustrates the topography of Kershaw County based on slope ranges provided in the most recent soil survey conducted by the US Geological Survey (USGS).

The topography of Kershaw County is largely conducive to many types of development. Based on the general slope range characteristics of Table 5-3, nearly 72% of the land area in Kershaw County (338,950 acres) has a slope of 6% or less and is suitable for all types of land uses. Development suitability is slightly more limited for 17% of the County (80,641 acres), where the slope range of 6% to 15% largely accommodates residential and light commercial development. Areas at the higher end of the slope range may not be suitable for a wide range of development. The slope range for an additional 6.1% of the County's land area (28,831 acres) is between 10% and 25%, with much of this land likely suitable for low density residential uses, but not for commercial or industrial development. However, areas with slopes in the lower end of the range may be suitable for higher density residential and light commercial development. Soils with no slope primarily include rivers and drainage basins.

The slope range for 2.7% of the County's land is between 15% and 40%. This land will accommodate low density residential development in the lower slope ranges, but includes areas with slopes that are not suitable for any type of intense development. Less than one percent of the land area of the County (2,379 acres) has a slope that is greater than 25% and is therefore not suitable for any type of intense development. Table 5-4 provides the acreage and percentage of total land area for major slope categories as determined by the most recent soil survey for Kershaw County.

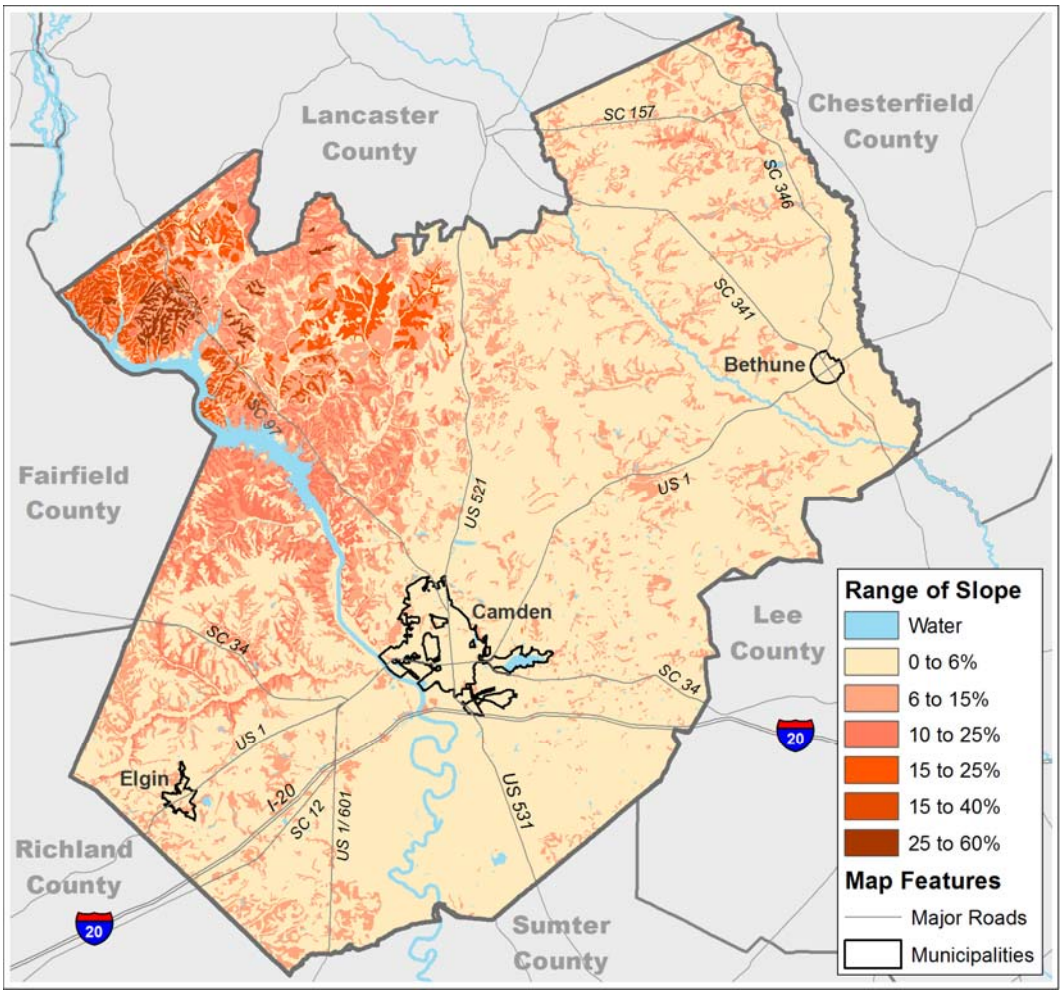
Table 5-4. Soil Slope Percentage in Kershaw County

Slope	Acres	Percentage
Water	9,614.1	2.0%
0 to 6%	338,949.9	71.6%
6 to 15%	80,640.8	17.0%
10 to 25%	28,831.0	6.1%
15 to 40%	12,900.4	2.7%
25 to 60%	2,379.1	0.5%
Total	**473,315.3**	**100.00%**

Source: USDA NRCS Soil Data Access, 2016

Because the slope ranges of many soils do not directly coincide with the slope ranges included in Table 5-3, it is possible that an even higher percentage of land falls in the most desirable category for all types of development. However, other soil limitations such as wetness, permeability, drainage, and flooding may be difficult and expensive to mitigate, or may fall under regulatory limitations.

Map 5-2. Slope Percentage



Source: USDA NRCS Soil Data Access, 2016

3. Mineral Deposits and Mines

The identification and location of mineral deposits can be important to the local economy. In South Carolina, these resources range from limestone, crushed stone, clay and sand to granite, marble, and vermiculite. According to the US Geological Survey's *2013 Minerals Yearbook for South Carolina*, a large majority of South Carolina's nonfuel mineral production results from the mining and production of construction minerals and materials. SCDHEC records indicate that there are 16 active mining operations in Kershaw County as of November 2015. Eight are sand extraction operations, four operations extract clay, and four operations extract granite.

4. Agricultural and Forest Lands

Agriculture and forestry are important components of both the landscape and the economy of Kershaw County. Agricultural and forested lands are home to many of the area's critical natural resources and provide valuable wildlife habitat, windbreaks, enhanced water quality, decreased ambient temperatures, groundwater recharge areas, mitigation of stormwater run-off and erosion, and open space. Eighty-two percent of the land area in Kershaw County is currently in use for agriculture or forestry.

Soil data provided by the USDA reveals that only 12.2% of the County land area (57,584 acres) is prime farmland. Prime farmland, as defined by the USDA, is "land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses." Prime farmland soils produce the highest yields with minimal inputs of energy and economic resources and the least damage to the environment. Soils that have a high water table or are subject to flooding may also qualify as prime farmland if protected from flooding or not frequently flooded during growing season. These soils comprise 6.2% of the land area in Kershaw County, encompassing 29,304 acres of land.

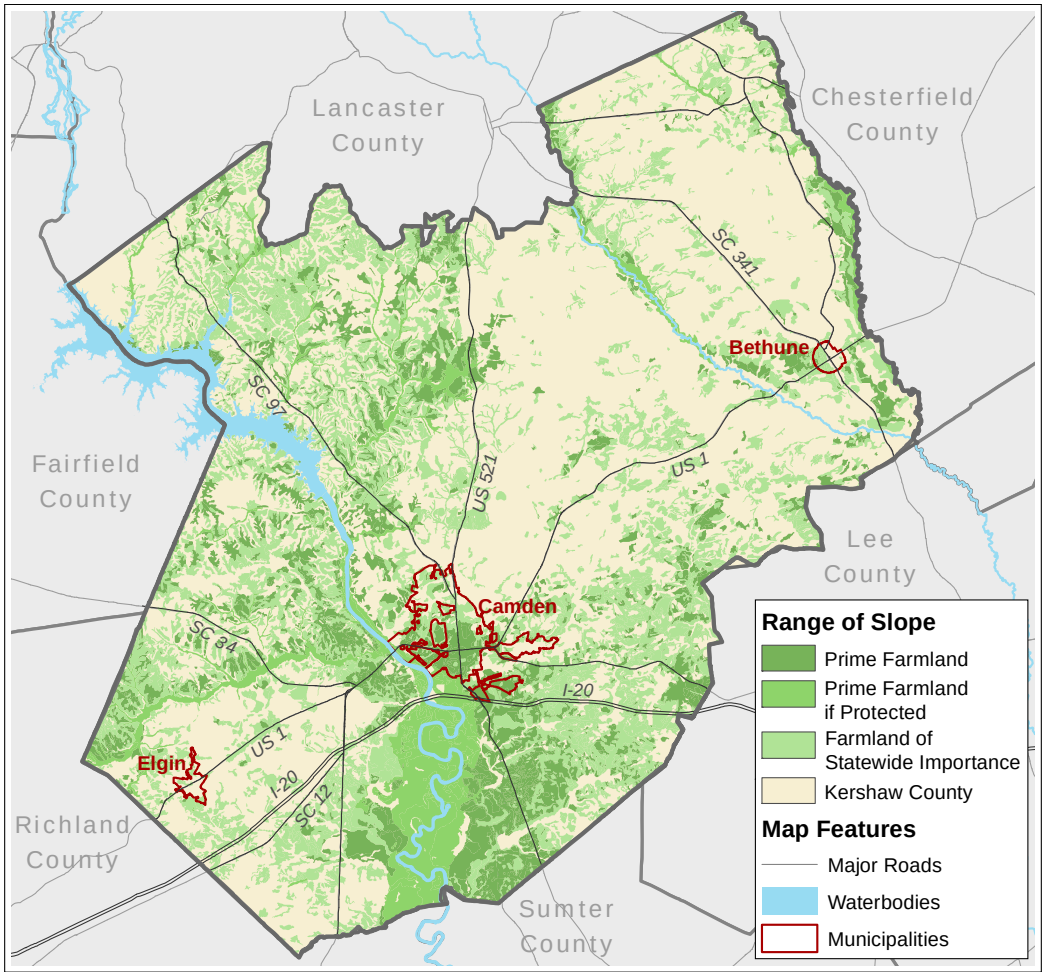
Unfortunately, the relatively low topography and deep fertile soils of land qualifying as prime farmland generally make such lands the most readily available and least expensive to develop for residential subdivisions and commercial uses. Between 1982 and 2012, an estimated 395,900 acres of South Carolina's prime farmland were developed *(Farmland Information Center, 2016).* Conversion of prime farmlands to non-agricultural use is a concern, as the farming industry is forced to bring more marginal agricultural land into production. Marginal farmland has less productive and erodible soil and irregular topography such as steeper slopes, resulting in greater labor, equipment and material costs.

It is possible for states to define and delineate soils that, while not designated as prime farmlands, may be farmlands "of statewide importance" for the production of food, feed, fiber, forage, and oilseed crops. In general this land includes soils that nearly meet the requirements for prime farmland and that economically produce high yields of crops – some as high as prime farmlands given favorable conditions – when treated and managed according to acceptable farming methods. Based on criteria set by the State of South Carolina, more than a quarter

(26%) of the land area of Kershaw County (123,388 acres) is considered to have soils of statewide importance to agriculture.

Map 5-3 illustrates the location of prime and other important farmlands in Kershaw County. Prime farmlands are located throughout the County, but are particularly abundant in southern Kershaw County, within and south of the City of Camden, and near water bodies, particularly along the Wateree River.

Map 5-3. Prime Farmlands



Source: USDA NRCS Soil Data Access, 2016

Kershaw County ranked 3rd statewide in total market value of agricultural products sold in 2012. While the County ranked 40th out of the State's 46 counties in crop value, it led in the value of livestock, poultry and related products with sales exceeding $142 million. Top crop items sold include forage crops such as hay and grass, corn for grain, soybeans, and wheat for grain. Turkeys are the top livestock sold, with the County leading the State in turkey sales at nearly $1.8 million, followed by other poultry including layers, broilers, pullets, and quail.

USDA Census of Agriculture data reveals that there were 483 farms in Kershaw County in 2012 – a decrease from 499 farms in 2007. The total area in farms also decreased during that time from 85,527 to 82,877 acres. The average farm size increased slightly from 171 acres to 172 acres during the same five-year period. More than 100 County residents are employed in agriculture, forestry and fishing and hunting support services, equating to a very small percentage of the 15,335 employed persons in all economic sectors countywide (*2014 Census County Business Patterns).* Forty-eight Kershaw County farms had more than $500,000 in sales in 2012, while 151 were smaller farms with sales between $1,000 and $9,999. Nearly 44% of the County's farms (218 farms) had sales of less than $1,000.

Nearly three-quarters (73%) of the County's land area is forested, totaling more than 343,300 acres (*SC Forestry Commission, 2011*). Southern pines and upland hardwoods are the dominant trees in Kershaw County, including longleaf, slash, loblolly, and shortleaf pines, and oak and hickory trees. Pines are generally found on hills, while hardwoods are dominant on the bottom lands along rivers and creeks *(USDA Soil Survey of Kershaw County, 1989)*.

Forests provide habitats for animals, protect watersheds, prevent soil erosion, absorb harmful greenhouse gasses, reduce ambient air temperatures, provide clean water, and serve as a buffer from flooding and high winds. In addition, forests are a key economic component. Statewide, the total annual economic impact of South Carolina's forest industry is $18.6 billion *(SC Forestry Commission, 2016).* In 2009, Kershaw County ranked 10th highest statewide in delivered value of timber sold, with cash receipts exceeding $2.5 million *(USDA National Agricultural Statistics Service, 2011).*

5. <u>Residential Development Limitations</u>

Access to wastewater treatment in the County is limited to areas served by three providers. The ***City of Camden*** has a network of sewer lines that serve more than 3,950 customers located within the City of Camden, as well as areas north and west of the City along S.C. Highway 97 and between U.S. Highways 1 and 521. The ***Kershaw County Utilities Department*** provides sewer service to 1,566 customers in the Elgin and Lugoff areas and along U.S. Highway 1. ***Palmetto Utilities, Inc.*** provides wastewater treatment services to three Kershaw County subdivisions located in the unincorporated area of the West Wateree area – Kelsney Ridge, Heath Pond, and Wood Trace.

Due to limited access to sewer service, residential development in much of Kershaw County must rely on septic tanks. The use of septic systems for sewage disposal places additional limitations on residential development, impacting both location and lot sizes. State law, enforced by SCDHEC, requires that a parcel of land proposed for septic service be capable of allowing proper operation of the individual system to include a drain field. Suitability criteria are based on factors including soil type and parcel size. In addition to SCDHEC residential septic tank requirements, Kershaw County requires a minimum lot size of three-quarters of an acre for all properties in the R-15, R-10, R-6, O-I, B-2, B-3, I-1, and GD zoning districts that do not have access to public water and sewer or community onsite sewage systems. For properties in

these zoning districts where public water is provided, but public sewer or an onsite community sewage system is not available, the minimum lot size is one-half acre.

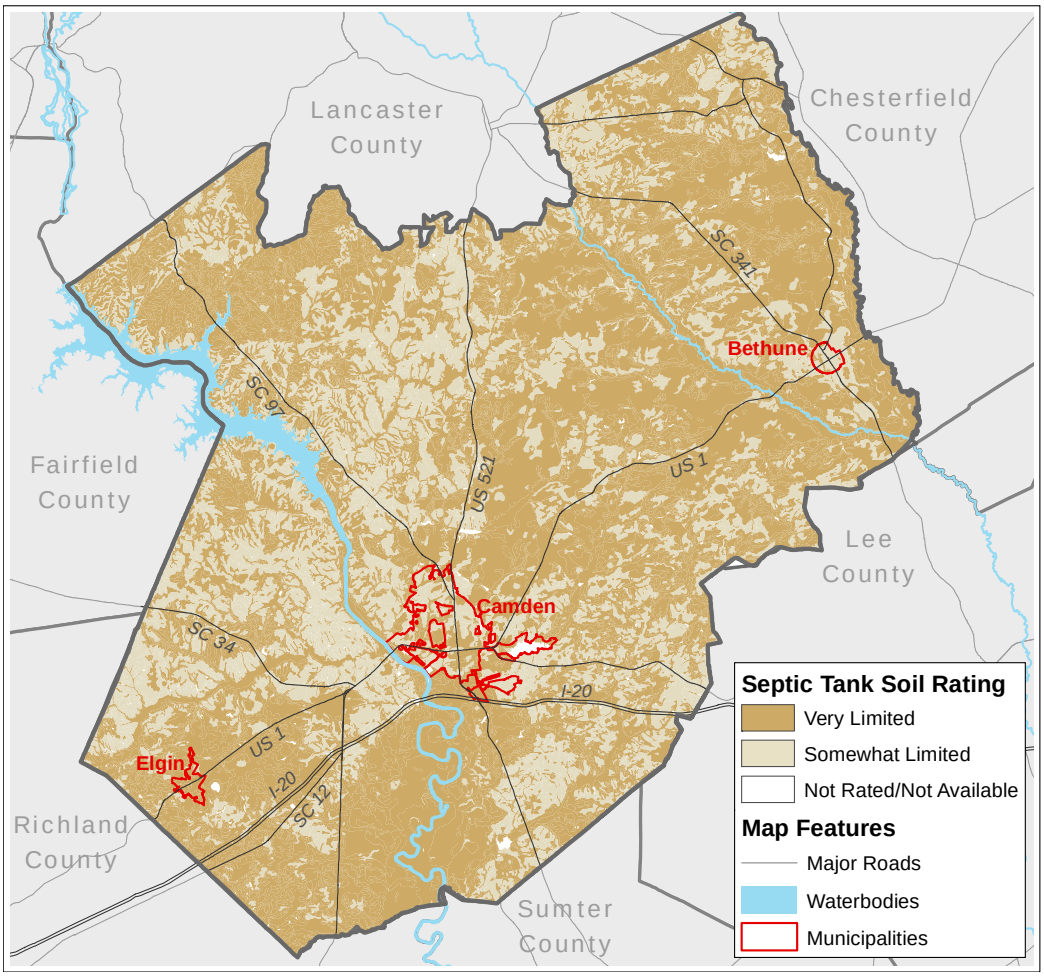
Improper site selection, design, or installation can cause contamination of groundwater, seepage to the soil surface, and contamination of stream systems from surface drainage or flood water. Potential contamination can be reduced or eliminated by installing systems designed to overcome or reduce the effects of the limiting soil properties. Percolation tests are conducted by SCDHEC on individual properties to evaluate the suitability of a soil for septic tank absorption fields as part of the permitting process for residential construction in areas where public sewer is not available.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed through subsurface tiles or perforated pipe. Soil properties and qualities that affect the effluent absorption include permeability; depth to a seasonal high water table; bedrock or a cemented pan; and susceptibility to flooding. Stones, boulders, ice, a shallow depth to bedrock or a cemented pan interfere with the installation of septic tanks. Excessive slope may cause lateral seepage and surfacing of effluent in down-slope areas. Soil erosion is a hazard when absorption fields are installed in steep soils. When soils are underlain by loose sand and gravel or fractured bedrock at a depth of less than four feet below the distribution lines, the absorption field may not actively filter the effluent and can cause groundwater contamination.

Septic Tank Soil Absorption Field Ratings of the USDA Natural Resources Conservation Service are used to guide site selection for safe disposal of household effluent. The ratings are based on the soil properties that affect absorption of the effluent, impact construction and maintenance of the system, and that may affect public health. While the ratings provide general information on soil suitability for septic tanks, onsite evaluation is required before final site selection. In addition, the ratings apply to the soils in their present condition and do not consider potential impacts on soil quality by current and future land uses.

Map 5-4 illustrates areas in Kershaw County with soils rated as “very limited” or “somewhat limited” under the *Septic Tank Soil Absorption Field Ratings* of the USDA Natural Resources Conservation Service. More than two-thirds (69.4%) of County land, encompassing over 328,505 acres, have been rated as “very limited” for septic tank soil absorption. A “very limited” rating indicates that the soil has one or more features that are unfavorable for the specified use. Such limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected on septic systems installed in such soils. An additional 28.6% of the County’s soils are rated as “somewhat limited,” indicating that the soils have features that are moderately favorable for use as a septic system absorption field.

Map 5-4. Septic Tank Soil Absorption Ratings



Source: USDA NRCS Soil Data Access, 2016

6. Plant and Animal Habitats

Wildlife habitat is comprised of an interrelated and often complex combination of land and soil properties, food sources and vegetative cover, water, and other physical factors that contribute to the survival of a species population. The number, quality and scope of animal and plant species are directly dependent on the quality and size of their habitat. In turn, habitats are affected directly by natural and man-made factors that include agricultural, residential, industrial and commercial development, as well as fires and other natural disasters. Habitats declared critical to species identified as endangered or threatened are protected under federal and State laws to safeguard and promote recovery of the species. Endangered species are those for which there is a danger of extinction throughout all or a significant portion of its range, while threatened species are those identified to likely become endangered within the foreseeable future throughout all or a significant portion of its range.

Protective measures for endangered plant and animal species include the development of recovery plans, the acquisition of habitat, and protection from disturbance for listed species.

The definition of protection from disturbance differs between endangered plant and animal species. No penalties are incurred if endangered plant species are harmed in the course of legal land management practices. However, the intentional or negligent taking of an endangered animal species or destruction of its critical habitat is subject to prosecution under the *Endangered Species Act*. Destruction of an endangered plant is subject to prosecution under the *Act* if the plant is on federal lands including private land under management practices that require federal permits, or if the destruction occurs during the course of another illegal act such as trespassing.

All states must maintain lists of rare, threatened and endangered species under the National Heritage program. Species can be included on state lists, while not appearing on the national list, due to declining species populations in certain regions. The South Carolina Heritage Trust program of the SCDNR has identified plant and animal species at risk in South Carolina. The rare, threatened and endangered species inventory for Kershaw County includes 12 animal species, one animal assemblage consisting of a waterbird colony, and 13 plant species (Table 5-5). Seven species, including a bat, a sunfish, the Bald Eagle, a tree frog, a woodpecker, and a freshwater mussel are considered to be endangered or threatened and vulnerable to extirpation in South Carolina. Most of these species were placed on the endangered species list because of the direct alteration or loss of habitat. The majority of the adverse impacts are man-made – including pollution, urbanization, poorly planned timber harvests, wetlands drainage, and conversion of land to agricultural uses.

Table 5-5. Rare, Threatened, and Endangered Species Inventory for Kershaw County, 2016

Scientific Name	Common Name	USESA Designation and Global Rank	State Rank
Invertebrate Animals			
Corynorhinus rafinesquii	Rafinesque's Big-eared Bat	Vulnerable, at moderate risk of extinction	Endangered - Imperiled statewide, rare or vulnerable
Elassoma boehlkei	Carolina Pygmy Sunfish	USESA Species of Concern - Imperiled, at high risk of extinction	Threatened - Critically imperiled, extremely rare or especially vulnerable to extirpation
Etheostoma brevispinum	Carolina Fantail Darter	Apparently secure, some cause for long-term concern	Critically imperiled, extremely rare or especially vulnerable to extirpation
Haliaeetus leucocephalus	Bald Eagle	Secure	Threatened - Imperiled statewide, rare or vulnerable
Hyla andersonii	Pine Barrens Treefrog	Apparently secure, some cause for long-term concern	Threatened - Imperiled statewide, rare or vulnerable
Myotis austroriparius	Southeastern Bat	Vulnerable, at moderate risk of extinction	Critically imperiled, extremely rare or especially vulnerable to extirpation
Picoides borealis	Red-cockaded Woodpecker	USESA Endangered - Vulnerable, at moderate risk of extinction	Threatened - Imperiled statewide, rare or vulnerable
Puma concolor	Mountain Lion	Secure	Presumed extirpated, virtually no likelihood it will be rediscovered
Sciurus niger	Eastern Fox Squirrel	Secure	Apparently secure, uncommon but not rare, cause for long-term concern
Semotilus lumbee	Sandhills Chub	Vulnerable, at moderate risk of extinction	Imperiled statewide, rare or vulnerable

Table 5-5. Rare, Threatened, and Endangered Species Inventory of Kershaw County

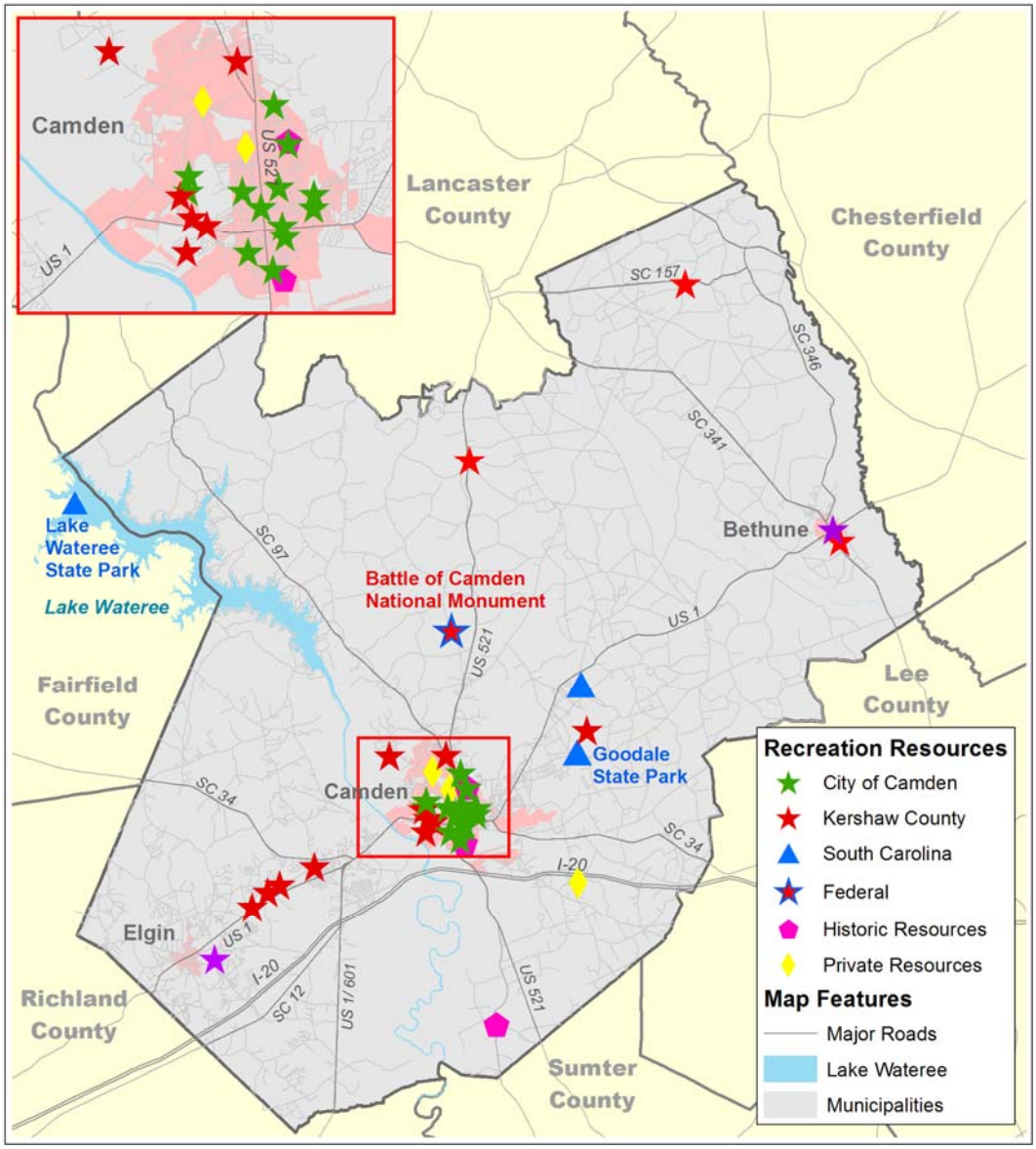
Scientific Name	Common Name	USESA Designation and Global Rank	State Rank
Invertebrate Animals, *continued*			
Elliptio congaraea	Carolina Slabshell	Vulnerable, at moderate risk of extinction	Vulnerable to extirpation
Lasmigona decorata	Carolina Heelsplitter	USESA Endangered - Critically imperiled, at high risk of extinction	Threatened - Critically imperiled, extremely rare or especially vulnerable to extirpation
Animal Assembly			
Waterbird Colony		Global rank not yet assessed	Conservation status not yet assessed
Vascular Plants			
Anemone berlandieri	Southern Thimble-weed	Apparently secure, some cause for long-term concern	Critically imperiled, extremely rare or especially vulnerable to extirpation
Anemone caroliniana	Carolina Anemone	Secure	Possibly extirpated, some possibility it may be rediscovered
Draba aprica	Open-ground Whitlow-grass	Vulnerable, at moderate risk of extinction	Critically imperiled, extremely rare or especially vulnerable to extirpation
Isoetes piedmontana	Piedmont Quillwort	Apparently secure, some cause for long-term concern	Imperiled statewide, rare or vulnerable
Kalmia cuneata	White-wicky	Vulnerable, at moderate risk of extinction	Imperiled statewide, rare or vulnerable
Litsea aestivalis	Pondspice	Vulnerable, at moderate risk of extinction	Vulnerable to extirpation
Minuartia uniflora	One-flower Stitchwort	Apparently secure, some cause for long-term concern	Vulnerable to extirpation
Myriophyllum laxum	Piedmont Water-milfoil	Vulnerable, at moderate risk of extinction	Imperiled statewide, rare or vulnerable
Nestronia umbellula	Nestronia	Apparently secure, some cause for long-term concern	Vulnerable to extirpation
Nolina georgiana	Georgia Beargrass	Vulnerable, at moderate risk of extinction	Vulnerable to extirpation
Portulaca umbraticola	Wing-podded Purslane	Secure	Critically imperiled, extremely rare or especially vulnerable to extirpation
Quercus georgiana	Georgia Oak	Vulnerable, at moderate risk of extinction	Critically imperiled, extremely rare or especially vulnerable to extirpation
Rhus michauxii	Michaux's Sumac	USESA Endangered - Imperiled, at high risk of extinction	Presumed extirpated, virtually no likelihood it will be rediscovered

Source: S.C. Department of Natural Resources, November 2016

7. Parks, Open Space and Scenic Areas

Kershaw County residents and visitors are fortunate to have access to numerous and diverse opportunities for outdoor recreation that include a state park, abundant water resources, nature and historic trails, and a number of smaller parks and recreation facilities. According to the national *2016 Outdoor Participation Report* developed by the Outdoor Foundation, the most popular outdoor activities include running/jogging, fishing, cycling, hiking, and camping – all activities that are available in Kershaw County.

Map 5-6. Federal, State, County, Private and Historic Recreation Resources



Sources: Kershaw County Building Planning and Zoning and Information Services Departments, February 2017

a. State Parks

N.R. Goodale State Park is located to the east of the City of Camden, off of Old Stagecoach Road, in Kershaw County (Map 5-6). Developed in 1973, the 763-acre park offers two picnic shelters, a community building that accommodates up to 60 people, a playground, volleyball courts, and canoe rental. Included on the property is the 140-acre Civil War era Adams Mill Pond, where visitors can fish for bass, bream and catfish. The Park's 1.5 mile Goodale Canoe/Kayak Trail begins on Adams Mill pond and continues on Pine Tree Creek through a forest of bald Cyprus trees. In addition, the Park includes a 1.7 mile hiking/walking trail that

winds through a forest of pine, oak, and rhododendron. Both trails provide opportunities to see a variety of birds and wildlife in a wilderness setting.

Lake Wateree State Park is located nearby and to the east of Winnsboro in adjacent Fairfield County (Map 5-6). The Park provides access for fishing and boating on Lake Wateree, as well as 50 camp sites with water and electricity and restroom facilities with hot showers. The Park also includes a playground, store and gift shop, a swimming area, and trails for walking and biking. Fishing is a popular activity at the Park, which hosts numerous fishing tournaments each year. An access ramp, tackle shop, and a refueling dock are also provided.

b. Other Outdoor Recreation Opportunities

Lake Wateree is 13,864 acres in size, with 181 miles of shoreline that includes access to Lake Wateree State Park, the Shaw Air Force Base Recreation Center on Baron Dekalb Road, and a bird refuge *(SCDNR, 2016)*. There are nine public boat ramps on the Lake, including three located in Kershaw County – Beaver Creek boat ramp on Becca Lane, Buck Hill boat ramp on Buck Hill Landing Road, and Clearwater Cove on Baron Dekalb Road. The S.C. Department of Natural Resources manages the diverse fish population of the Lake, which includes black crappie, striped bass, largemouth bass, and catfish.

The ***Wateree River*** flows south from Lake Wateree, touching the westernmost border of the City of Camden as it bisects the western area of Kershaw County. Public access for fishing and watching wildlife is available to Kershaw County residents at boat landings located at the U.S. Highway 1/U.S. Highway 601 bridge and at the U.S. Highway 378/U.S. Highway 76 bridge. A key feature is the ***Wateree Blue Trail***, which travels the length of the river, beginning near Camden and winding 75 miles to its convergence with the Congaree River Blue Trail at Congaree National Park. One of the highlights of the trail is considered to be the upper section that travels along the southwestern edge of the City of Camden and includes numerous historic sites and burial mounds. The trail segment downstream from Camden includes miles of undisturbed wilderness.

The ***Lynches River*** forms the northeastern border between Kershaw County and Chesterfield County. The 111 miles of the river that extends from Lee County to its confluence with the Great Pee Dee River was designated as a South Carolina Scenic River, the upper 54-mile section in 1994 and the lower 57-mile segment in 2008. The State's ten Scenic Rivers are essentially free flowing and possess shorelines that are largely undeveloped, with limited road access. The goal of the Scenic Rivers program is the conservation of South Carolina's river heritage through the protection of the unique or outstanding scenic, recreational, geologic, botanical, fish, wildlife, historic, and cultural values of the State. River corridor protection is a voluntary, cooperative process that allows landowners, communities and the SCDNR to work together toward common river conservation goals. Opportunities for fishing, boating, camping, and wildlife observation are available at a number of locations along the River, with public access points primarily located along the Scenic River sections south of Kershaw County.

c. Unique Sites and Views

The ***Historic Camden Revolutionary War Park*** is a 107-acre outdoor museum complex located on South Broad Street in Camden that offers a view of life during the Colonial and Revolutionary War periods in Camden and Kershaw County. Included on the site are two circa-1800 log houses, the restored and refurbished 1785 John Craven house, the 1830 Cunningham house that also serves as offices and a gift shop, a blacksmith shed with a working traditional forge, the 1795 McCaa house, and reconstructions of fortifications built by the British. Also on the site is the reconstructed colonial Georgian home, now called the Kershaw-Cornwallis house, built by Joseph Kershaw that was commandeered as headquarters by Lord Charles Cornwallis during the British occupation of Camden from 1780 to 1781. The Park also includes a 0.7 mile nature trail and picnic area. Self-guided, guided, and school tours are available. Special events include the *Revolutionary War Field Days* held the first full weekend in November, which attracts more than 500 re-enactors and includes a daily battle, living history demonstrations, traditional craftsmen, a period fashion show, and children's activities.

The ***Battle of Camden National Historic Landmark*** located on Flat Rock Road north of Camden is the site of an important Revolutionary War battle in August of 1780 (Map 5-6). The site was designated as a National Historic Landmark in January 1961 and listed in the National Register in October 1966. The Palmetto Conservation Foundation now owns the 476-acre core area of the battlefield, which is open to the public and offers three miles of walking trails with interpretive signage. An accompanying podcast shares battle stories and commentary.

The important Revolutionary War Battle of Hobkirk's Hill (sometimes referred to as the Second Battle of Camden) was fought north of the City of Camden at the ***Hobkirk's Hill Battle Site*** in April 1781. Although now a private residential area, wayfinder signs enable visitors to follow in the footsteps of the soldiers who participated in the conflict.

One of the State's newest wildlife management areas, the ***Liberty Hill Wildlife Management Area*** opened in 2015 along the Kershaw and Lancaster County border. The 8,000 acre preserve runs from Singleton Creek on Lake Wateree to the Cedar Creek boat access on the Catawba River. Liberty Hill stretches 17 miles along the northeastern shore of Lake Wateree and the Catawba River, providing diverse habitat for numerous wildlife species, including white-tailed deer, turkey, bobwhite quail and songbirds, bald eagles, ospreys, and wading birds. The site is managed to provide quality natural resources based recreational opportunities such as hunting, hiking, and wildlife observation.

The ***Savage Bay Heritage Preserve***, located on Drakeford Road near Cassatt, includes Savage Bay - one of the few remaining undisturbed Carolina Bays. Owned and managed by SCDNR, the 106-acre site is open to the public during daylight hours, with unmarked hiking trails that allow viewing of the Bay and area wildlife.

Built in 1898, the ***Camden Polo Field*** is the second oldest field in the nation and has been designated as a National Landmark. The beginnings of the equine industry in Kershaw County

can be traced to the development of Camden as a winter resort, with polo as the chief attraction. Although the sport declined during the second half of the 20th century, the Fine Arts Center of Kershaw County and the Camden Polo Club teamed to revive the sport in 2001. Today the Polo Field site on Polo Lane is held in perpetual trust by the Palmetto Conservation Foundation and is used for a variety of local events, including the Camden Cup polo match.

The 60-acre ***South Carolina Equine Park*** is a state-of-the-art facility designed to accommodate a full range of equine activities, breeds, and users. Located on Cleveland School Road near Interstate 20, the Equine Park includes three show rings, two covered arena areas, two schooling areas, nine barns with 288 stables, 100 RV sites, concessions, and restrooms. The Park opened in September 2009 and is owned and maintained by the South Carolina Equine Promotion Foundation.

The ***Springdale Race Course*** is a 600-acre European style, Thoroughbred racehorse training center located on Knights Hill Road in Camden. Acquired by Marion duPont Scott in the 1940s, the course was deeded to the State of South Carolina upon her death with the caveat that the land remain solely for equine use in perpetuity. She also bequeathed a million dollar endowment for maintenance of the facility, which now includes both the Race Course and the National Steeplechase Museum. Springdale Race Course is home to the Carolina Cup, which is held each spring and is attended by more than 70,000 fans from throughout the Southeast.

Camden Hunt Country is a privately-owned site that offers well-maintained and safe riding trails for horse owners. The property provides a mix of lush swamps, hardwood forests and mature pine woods. Annual riding passes are available to members through the *Friends of the Camden Hunt*, along with a day riding option for guests who ride less than five times a year. Riding trails are accessed through two designated areas for parking trucks and trailers. The property is also the site of the ***Camden Hunt***, the second oldest hunt in South Carolina. Dedicated to perpetuating the sport of fox hunting, the Hunt supports the Master of Foxhound Association (MFHA) and maintains a professional huntsman and kennel. Game consists of red and gray foxes as well as coyote in a completely natural environment to meet MFHA guidelines. The annual formal hunt season begins with an opening hunt and the blessing of the hounds on Thanksgiving Day.

d. Public Parks and Open Space

There are 30 outdoor public parks and outdoor recreation facilities encompassing 475.3 acres in Kershaw County. Thirteen of the parks and facilities are owned and maintained by Kershaw County, 15 by the City of Camden, and the towns of Bethune and Elgin each own and maintain one park. Recreation resources in the County accommodate a range of outdoor activities such as picnicking and enjoying the outdoors; fishing and non-motorized boating; tracks and trails for walking or jogging; fields for baseball, softball and soccer; courts for basketball, tennis, and volleyball; as well as a disc golf course and a park that accommodates flying model planes and launching model rockets. Table 5-8 lists the parks and associated resources within the County and Map 5-6 provides locations for each recreation facility.

Table 5-6. County and City Parks and Outdoor Recreation Facilities

Facility Name	Acres	Facilities
Kershaw County	**325.25**	**Total Acres**
Boyd Young Park *3030 Youngs Park Dr., Westville*	5.0	1 lighted ball field, tot lot, restroom, concession stand, meeting building
Conifer Acres *1099 Ridgeway Rd., Lugoff*	2.0	1 unlighted ball field, tot lot
Copeland Park *334 Brown St., Bethune*	2.75	1 lighted ball field, 1 unlighted ball field
Kershaw County Aquatic Center *196 Battleship Rd., Camden*	4.3	Outdoor swimming pool and facility – open seasonally
Kershaw County – West Complex *519 Whitehead Rd., Lugoff*	100.0	4 tennis courts, 3 lighted soccer fields, 4 lighted baseball fields, walking track, 2 picnic shelters, playground, restrooms
Knights Hill Park 521 Knights Hill Rd., Camden	4.0	1 unlighted ball park, 1 basketball court, 1 picnic shelter, restrooms
Larry Doby Complex 3 Competition Dr., Camden	70.6	4 lighted softball fields, 7 soccer fields, 4 tee-league fields, concession stand, restrooms
Mt. Pisgah 5193 Mount Pisgah Rd., Kershaw	5.7	1 lighted ball field, 1 football/soccer field, walking trail, concession stand
Science Park *730 Park Rd., Camden*	30.0	Model airplane landing strip, rocket launching pad, restroom
Seaboard Park *1226 Laurens St. Ext., Camden*	17.9	1 softball field, playground, restrooms, recreation center
West Wateree Park *422 Smith Rd., Lugoff*	14.5	3 lighted ball fields, concession stand, restrooms
Wildwood Youth Complex *424 Wildwood Ln., Lugoff*	30.0	2 lighted and 2 unlighted ball fields, concession stand, restrooms
Woodward Park *82 Ballpark Rd., Camden*	38.5	1 lighted soccer field, 5 baseball/softball fields, disc golf course, picnic shelter, restrooms
City of Camden	**144.9**	**Total Acres**
Boykin Park *1615 Campbell St., Camden*	5.5	Basketball court, playground
Burndale Park *1134 Fairlawn Dr., Camden*	1.7	Playground
City Arena Park *502 Bull St., Camden*	1.0	Basketball court, playground
City Hall Park *921 Fair St., Camden*	1.7	Playground
Edgewood Park *803 Elmore St., Camden*	0.8	Playground
Groom Park *20 Five Bridges Rd., Camden*	2.8	Open space
Hampton Park *309 East DeKalb St., Camden*	5.7	Playground
Kendall Lake Park *Lakeshore Dr., Camden*	51.0	42-acre lake, boat ramp, club house
Kendall Park *1500 Park Cir., Camden*	10.3	½ mile walking trail
Kirkwood Common 210 Kirkwood Ln., Camden	13.9	Open space

Table 5-6. County and City Parks and Outdoor Recreation Facilities, *Continued*

Facility Name	Acres	Facilities
Kirkwood Park *192 Stowers St., Camden*	6.3	2 basketball courts, playground, baseball field
Monument Square *1400 East Dekalb St., Camden*	4.8	Open space
Rectory Square 310 Rectory Sq., Camden	5.7	Playground
Scott Park *36 Ball Park Rd., Camden*	30.6	4 lighted tennis courts, ¼ mile running track, 1 mile walking trail, 4 sand volleyball courts, playground, picnic shelter, restrooms
Camden Tennis Complex *823 Campbell St., Camden*	3.1	16 tennis courts, 12 pickleball courts
Towns of Bethune and Elgin	***5.14***	
Bethune Town Park *102 King Street East, Bethune*	1.2	Passive recreation
Potter Community Park *2427 Main St., Elgin*	3.94	Picnic shelter, planning to install ¼ mile walking trail, playground and 1,800 sq. ft. community center
Total all Facilities	**475.3**	

Sources: Kershaw County Recreation and City of Camden Planning Departments, November 2016

e. ***Kershaw County Bicycle, Pedestrian, and Greenways Plan***

Eat Smart Move More Kershaw County (ESMMKC) developed a *Kershaw County Bicycle, Pedestrian, and Greenways Plan* in 2012 with funding support provided by Healthy South Carolina. The Plan combines past planning efforts with new research and analysis and public input. The development of the plan was guided by a citizen committee that included citizen advocates and representatives from multiple stakeholder organizations and local groups. Outreach included public workshops, an online comment form, and progress updates provided on ESMMKC and Kershaw County websites. The resulting Plan envisions "a connected network of on- and off-street bikeways, walkways, and trails that provide safe and family-friendly access between neighborhoods and community destinations for all ages and abilities." To accomplish this vision, Plan goals include capitalizing on existing natural resources; improved safety of existing bicycle and walking routes; making bikeways, walkways and trails clean and inviting; establishing a connected network of bicycling and walking routes that link community destinations; promotion of bicycling and walking for recreation and transportation; and improving bicycle and pedestrian access between neighborhoods and outlets for healthy foods. The Plan recommends the addition of 420.5 miles of new on-street bikeways and walkways and 165.5 miles of new off-street greenways along with increased bicycle parking, to create a comprehensive and safe network. Also included are recommendations for implementation, project management, and maintenance best practices.

f. Tree and Landscaping Requirements

Landscaping and tree requirements are included in the *Kershaw County Unified Code of Zoning* and *Land Development Regulations* adopted in February 2010. Landscaping is required between proposed uses and the adjacent street and along the perimeter of proposed uses to obscure or

exclude visual contact between uses, with requirements based on the proposed use as well as the existing adjacent use. A residential street buffer is also required for all new major residential subdivisions and residential planned development districts. The buffer type, including required trees, shrubs, and groundcover, is dependent on the type of proposed use and the type of existing adjacent uses, and varies in buffer width and the number and types of trees and the number of shrubs required. Required buffers are wider between less compatible uses, which in turn require larger numbers of trees and shrubs. Landscaping is also required within off-street parking areas with screening required between such parking areas and public streets. The landscaping requirements apply to all proposed new land uses and land uses proposed to be enlarged by 50% or more.

The use of existing trees and shrubs to satisfy perimeter landscaping requirements is strongly encouraged and existing trees and shrubs that are preserved may be credited towards the standards for perimeter landscaping. Although the County maintains a list of approved tree and shrub species that can be used to meet landscaping requirements, the Planning Official can also approve alternate species as appropriate. All planted areas must be served by an irrigation system or a readily available water supply to ensure plant health.

Existing healthy pine trees greater than 20 inches in Diameter Breast Height (DBH) and all other tree species of 8 inches or greater DBH are considered “significant trees” and must be flagged and noted on the required plat, site plan, and phased clearing plan for a building permit, grading permit, or land development permit. The County has established several types of significant tree protection zones that include a 15 foot area along front property lines (minimum 75% of significant trees must be preserved), areas within the public rights-of-way (all significant trees must be preserved), required side and rear yards (minimum 50% of significant trees must be preserved), and any required buffer, open space, screening, or other landscaped area – where the significant trees must be used to meet tree planting requirements to the extent practicable. There are exemptions to tree removal due to severe or imminent threat to public safety or property, or where existing land use, lot sizes or configurations, topography, or other circumstances make it difficult to preserve all significant trees on a property. In most cases removal of significant trees beyond the minimum requires replacement planting of new trees that where possible must be integrated into required landscaping.

Undisturbed, natural buffers are required along the banks of Lake Wateree, perennial and intermittent streams, and smaller ponds and lakes in Kershaw County. These requirements are detailed in section *(D)(8) – Kershaw County Water Quality Buffer*s.

Common open space – reserved for active or passive recreation – is required within new major residential developments at approximately three acres for every 100 one-acre residential lots. Fifteen percent of townhouse developments, 20% of manufactured home parks and multi-family residential developments, and 60% of residential cluster developments must be provided as common open space. The types of common space allowed include natural areas, active recreation areas, greenways, and landscaped areas.

D. WATER RESOURCES

Water quality and availability are key factors in future county and regional development efforts. Kershaw County relies on both surface and ground water from local sources to provide water resources for residential, commercial and industrial uses.

1. Public Water Supply Treatment

Water is provided to Kershaw County residents by five *community water systems* (Table 5-7). Community water systems serve the same customers in residences or businesses year-round. More than 11.2 million gallons of water are withdrawn in Kershaw County each day by water suppliers and conveyed for uses including domestic, commercial, industrial and public water use. Of the water withdrawn, 7.12 million gallons were drawn from surface water sources and 4.09 million gallons from groundwater sources *(Water Use in South Carolina, 2010)*.

Water is also provided by several private water systems. Three *non-transient, non-community water systems* provide water for uses that serve the same people, but not year-round, such as schools that have their own water systems. Four *transient, non-community water systems* provide water for uses that do not consistently serve the same users year-round such as rest stops, campgrounds, and gas stations. Both of these system types are considered to be private water systems.

Table 5-7. Water Systems in Kershaw County

Water System Name	Primary Water Source Type	Public/Private
Community Water Systems		
Bethune Rural Water	Groundwater	Public
Bethune, Town of	Groundwater	Public
Camden, City of	Surface water	Public
Kershaw-Lee County Rural Water Authority (Cassatt Water)	Surface water (purchased)	Public
Lugoff-Elgin Water Authority	Surface water	Public
Non-Transient Non-Community Water Systems		
Ahlstrom Nonwovens	Groundwater	Private
Invista May	Surface water	Private
New South Inc.	Groundwater	Private
Transient Non-Community Water Systems		
Boykin Mill Pond Restaurant	Groundwater	Private
Nosoca Pines Ranch	Groundwater	Private
Wright Way Store 9	Groundwater	Private

Source: U.S. EPA, Envirofacts, November 2016

The ***Bethune Rural Water Company, Inc.*** is a not-for-profit, membership-owned corporation that provides water to customers in the northeastern area of Kershaw County. Bethune Rural Water uses four deep wells drawn from the Middendorf Aquifer, with water treated onsite and

distributed to its 1,085 customers. Bethune Rural Water Company's *2015 Water Quality Report* indicates the levels of key contaminants are below the maximum amounts set by the EPA.

The ***Town of Bethune*** provides water to 265 customers within the Town. The water is also drawn from the Middendorf Aquifer and treated onsite before distribution. Findings from the Town's *2015 Annual Drinking Water Quality Report* indicate that the levels of key contaminants found in the water are below maximum amounts set by the EPA. Construction of a major upgrade that will include a state-of-the-art chemical monitoring system is expected to begin in 2018.

The ***City of Camden*** provides water to approximately 6,900 customers within the City and immediate areas. The City sells water at wholesale to the Kershaw County and Lee County Regional Water Authority. Raw surface water from Lake Wateree is treated at the City's Water Treatment Plant, which has a capacity of six million gallons per day (MGD), with an average daily demand of 2.5 MGD. The *2015 Water Quality Report* prepared by the City of Camden indicates that the levels of contaminants found in water treated by the City's Water Treatment Plant are below the maximum amounts allowed by the U.S. Environmental Protection Agency (EPA).

The ***Kershaw County and Lee County Regional Water Authority***, also known as Cassatt Water, is a special purpose district providing water to approximately 24,300 customers. The 764 square mile service area stretches from the north central area to the south central area of Kershaw County. The Authority purchases water from the City of Camden for distribution to its customers. The Authority's *2015 Annual Drinking Water Quality Report* indicates that it meets or exceeds the requirements of the federal *Safe Water Drinking Act*.

The ***Lugoff-Elgin Water Authority*** is a special purpose district that provides water to more than 7,300 customers in Kershaw, Fairfield, and Richland Counties. Water for the system is drawn from Lake Wateree and treated at the Authority's water treatment plant, which has a design capacity of 6 MGD. Findings from the Authority's 2015 *Water Quality Report* indicate that the levels of key contaminants found in their water are safely below EPA maximum amounts.

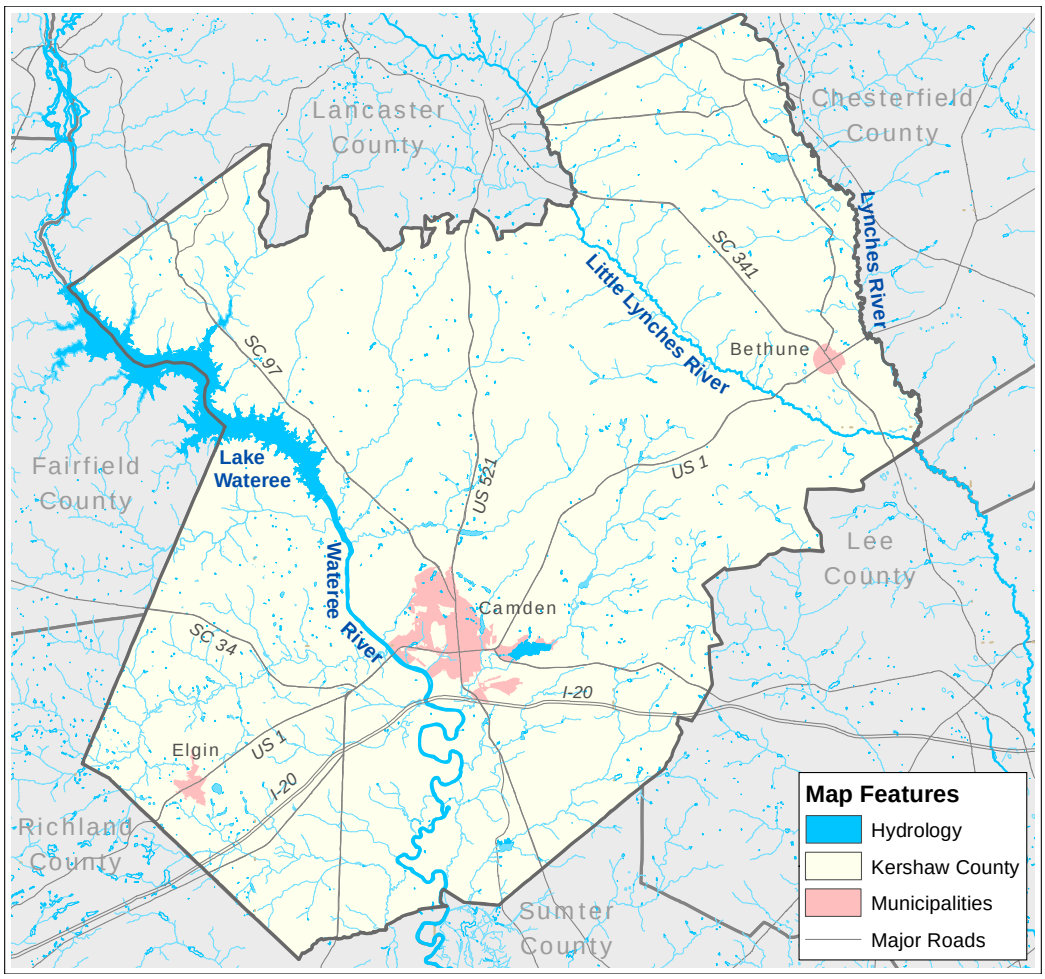
2. <u>Surface Water</u>

Kershaw County has an abundance of surface water, generally sustained by ample rainfall, that includes several major water bodies as well as numerous creeks, ponds and streams. An average of 5.72 million gallons a day (MGD) of publicly supplied water was used in Kershaw County in 2010 *(USGS National Water Information System, 2016)*. More than three-fourths of the publically supplied water was drawn from surface water and 22% from groundwater sources.

The availability of all water resources, particularly surface water, is strongly influenced by seasonal variations in precipitation and evapotranspiration. Evapotranspiration is the process by which water re-enters the atmosphere through evaporation from the ground and

transpiration by plants. Evapotranspiration is generally high during the warm summer and fall months and low during the cool winter months. As a result, stream flows and lake levels tend to be highest in the winter and lowest in the summer and fall. Map 5-7 illustrates the surface water in Kershaw County.

Map 5-7. Surface Water



Sources: Kershaw County Information Services Department; SCDNR GIS Data Clearinghouse, 2016

At 13,864 acres, ***Lake Wateree*** is the largest water body in Kershaw County. The Lake was created by the damming of the Wateree River in 1920 for the operation of the Wateree Hydroelectric Station. Full pond elevation for Lake Wateree is 284.4 feet above sea level. Both the Lake and the Wateree Hydroelectric Station are owned and managed by Duke Energy. Duke Energy monitors and manages lake levels, water quality, and shoreline development to balance and protect fish habitat, public water systems, industrial and power generation intakes, recreation access, and scenic value. While Lake Wateree was constructed for the primary purpose of hydroelectric power generation, it also provides some flood control by reducing the severity of peak flood flows, along with recreational opportunities for area residents and visitors. In addition, the Lake is a water source for the Lugoff-Elgin Water Authority and the City of Camden, which in turn provide water to a significant portion of the County population.

Kershaw County is bordered to the northeast by the ***Lynches River***. The Lynches River originates in North Carolina near Waxhaw, flowing 140 miles south to join the Great Pee Dee River near Johnsonville, South Carolina. The County is generally bisected north to south just west of the City of Camden by the ***Wateree River***, which originates in the Blue Ridge Mountains of western North Carolina as the Catawba River. The name changes at the point where the Wateree Creek empties into Lake Wateree and flows generally southward through Kershaw County and along the shared boundary of Richland and Sumter Counties before joining the Congaree River and forming the Santee River approximately 35 miles southeast of Columbia. The ***Little Lynches River*** flows into Kershaw County at the border with Lancaster County, just south of S.C. Highway 341, before merging with the Lynches River near the shared border with Chesterfield County.

There are also a number of creeks and smaller water bodies of various sizes throughout Kershaw County. Two streams of note are ***Spears Creek*** to the southwest of I-20, and ***Twentyfive Mile*** Creek, which flows from Richland County north of U.S. Highway 1 to the Wateree River. ***Kendall Lake*** in Camden is a 42-acre former mill pond that has been a popular local recreational resource for more than 200 years. Included among the County's larger ponds are ***Adams Mill Pond***, ***Boykin Mill Pond***, ***Colonial Lake, Hermitage Mill Pond***, ***Raley Mill Pond***, and ***White Pond***.

3. <u>Groundwater</u>

Groundwater is a significant source of drinking water, particularly in rural areas, and is an important source of water for manufacturing, irrigation, and power generation. Groundwater is also vital for maintaining aquatic ecosystems by recharging streams, lakes and wetlands and sustaining surface water supplies during droughts. It is estimated that about 60% of the water in South Carolina streams originates as groundwater *(S.C. Water Plan, 2004)*.

Groundwater accounts for a 22% of the public water supply in Kershaw County, with an average of 1.25 MGD withdrawn for public use in 2010 *(USGS, National Water Information System, 2016)*. An additional 1.83 million gallons of the County's groundwater were withdrawn for self-supplied uses including domestic and industrial uses, mining, livestock, and crop and golf course irrigation during that time period. Of those self-supplied withdrawals, 1.13 MGD of water was withdrawn for domestic uses.

Groundwater supplies are subject to seasonal variation and decline due to prolonged drought, but usually to a lesser degree than surface water supplies. Groundwater levels are lower during the summer due to increased pumping and reduced recharge, but usually recover during the winter and spring because of increased aquifer recharge and reduced pumping. Multi-year droughts lower aquifer water levels by limiting the recharge that normally occurs during the wet winter and spring months.

SCDHEC, SCDNR, and the South Carolina Water Science Center (SCWSC) of the U.S. Geological Survey (USGS) have cooperatively developed and are maintaining groundwater level monitoring

networks within the major aquifers of the State. SCDNR routinely collects groundwater level data for 115 wells statewide. Collected data is used to identify short and long-term changes in groundwater levels and storage due to changes in withdrawals, recharge rates, and climatic conditions; to calibrate groundwater flow models; to produce potentiometric maps for the major aquifers in the Coastal Plain Province; and to determine regional hydraulic gradients, groundwater flow rates, and flow directions of the major aquifers. Several of the monitored wells are located in Kershaw County, with two located near Lake Wateree and a third in the northeastern area of the County.

4. River Basins

The precipitation that falls in South Carolina is drained by four major river systems – the Pee Dee, Santee, Ashley-Combahee-Edisto, and Savannah River Basins. The streams and rivers that drain each region are collectively called drainage basins. These basins generally traverse the State from the northwest to the southeast. The distribution of these systems is a key factor in the geographic disparity in water supply and demand that exists among regions.

Kershaw County is located within two major river basins of the Catawba and the Pee Dee Rivers (Map 5-8). The ***Catawba River Basin*** originates in North Carolina and flows into South Carolina, where it encompasses 1.48 million acres and eleven watersheds. The Catawba River Basin is further divided into the Catawba River and the Wateree River Basins.

The ***Wateree River Sub-Basin*** extends through Fairfield, Kershaw, Sumter, Richland, Lancaster, and Lee Counties and encompasses 1,257 square miles, including 2,729 stream miles and 15,947 acres of lake waters. The Catawba River joins Big Wateree Creek to form the Wateree River, which flows through Lake Wateree. Grannies Quarter Creek and Sawneys Creek flow into the Wateree River downstream of Lake Wateree. Twentyfive Mile Creek and Big Pine Tree Creek enter the river near the City of Camden, followed by Swift Creek, Spears Creek, and Colonels Creek before it merges with the Congaree to form the Santee River Basin. The Basin is the largest in Kershaw County and encompasses much of the central and eastern areas of the County. The Wateree River Basin is subdivided into four watersheds, with portions of all four within Kershaw County.

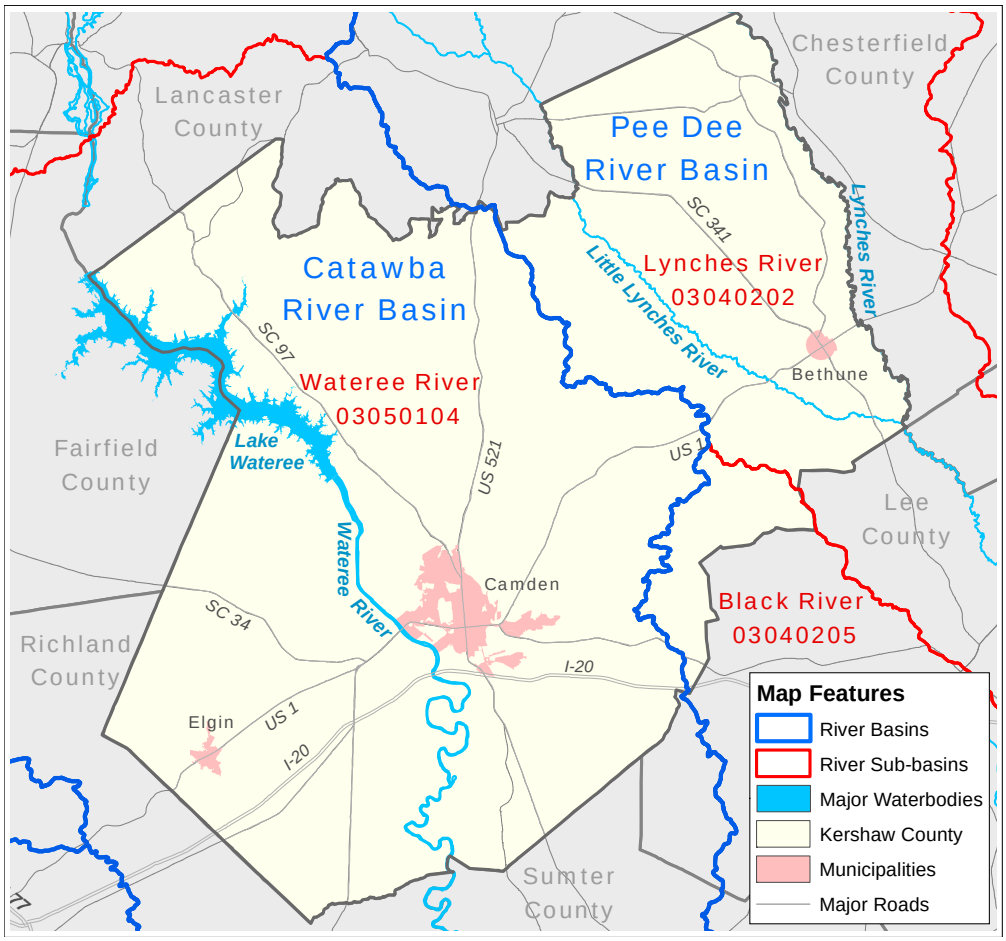
The ***Pee Dee River Basin*** extends from North Carolina through South Carolina and encompasses 5.5 million acres, including 9,495 stream miles, 17,034 acres of lake waters, and 44,870 acres of estuarine areas. The Basin is further subdivided into eight basins that include the Lynches River, Black River, Waccamaw River, Pee Dee Coastal Frontage, the Great Pee Dee River, and four additional sub-basins. The Lynches River sub-basin includes the northeastern area of Kershaw County, while the Black River sub-basin includes a small area between U.S. Highway 1 and I-20 at the border with Lee County.

The ***Lynches River Sub-Basin*** encompasses 1,387 square miles among Lancaster, Chesterfield, Kershaw, Lee, Darlington, Sumter, Florence, and Williamsburg Counties. The sub-basin includes 1,807 stream miles and 1,310 acres of lake waters. The Lynches River originates in North

Carolina and receives drainage from the Little Lynches River, Sparrow Swamp, and Lake Swamp before flowing into the Great Pee Dee River. The basin is subdivided into seven watersheds, of which portions of two are within Kershaw County.

The ***Black River Basin*** encompasses 2,061 square miles in Kershaw, Lee, Sumter, Clarendon, Florence, Williamsburg, and Georgetown Counties. The Basin includes 2,143 stream miles, 2,332 acres of lake waters, and 763 acres of estuarine areas. The Black River originates near the City of Bishopville and receives drainage from Rocky Bluff Swamp, the Pocotaligo River, Pudding Swamp, Kingstree Swamp Canal, and Black Mingo Creek before merging with the Great Pee Dee River. The basin is subdivided into nine watersheds, with only a small portion of one of the watersheds within Kershaw County.

Map 5-8. River Basins and Sub-basins



Source: USGS, The National Map, November 2016

5. Watersheds

A watershed is a geographic area into which the surrounding waters, precipitation, sediments, and dissolved materials drain and flow to a single outlet. Watershed resources include both groundwater and surface water, making watershed protection vital to preserving water quality.

As water flows across or under a watershed on its way to a lake, river or stream, it is exposed to potential contaminants in the form of stormwater runoff and other pollutants. Development of natural areas can adversely impact water quality through the replacement of vegetation and forests with impervious surfaces.

As depicted in Map 5-9, Kershaw County is impacted by seven watersheds – four located in the Wateree River Basin, two in the Lynches River Basin, and one in the Black River Basin. While a few of the watersheds have only small areas within the County, many of the watersheds comprise substantial portions of the County. Detailed watershed data including the impacted counties, primary water bodies, area, stream miles and area of lake/pond waters is included in Table 5-8. Also included is additional information for each watershed including major wastewater and water treatment plants and monitoring stations.

Table 5-8. Kershaw County Watersheds

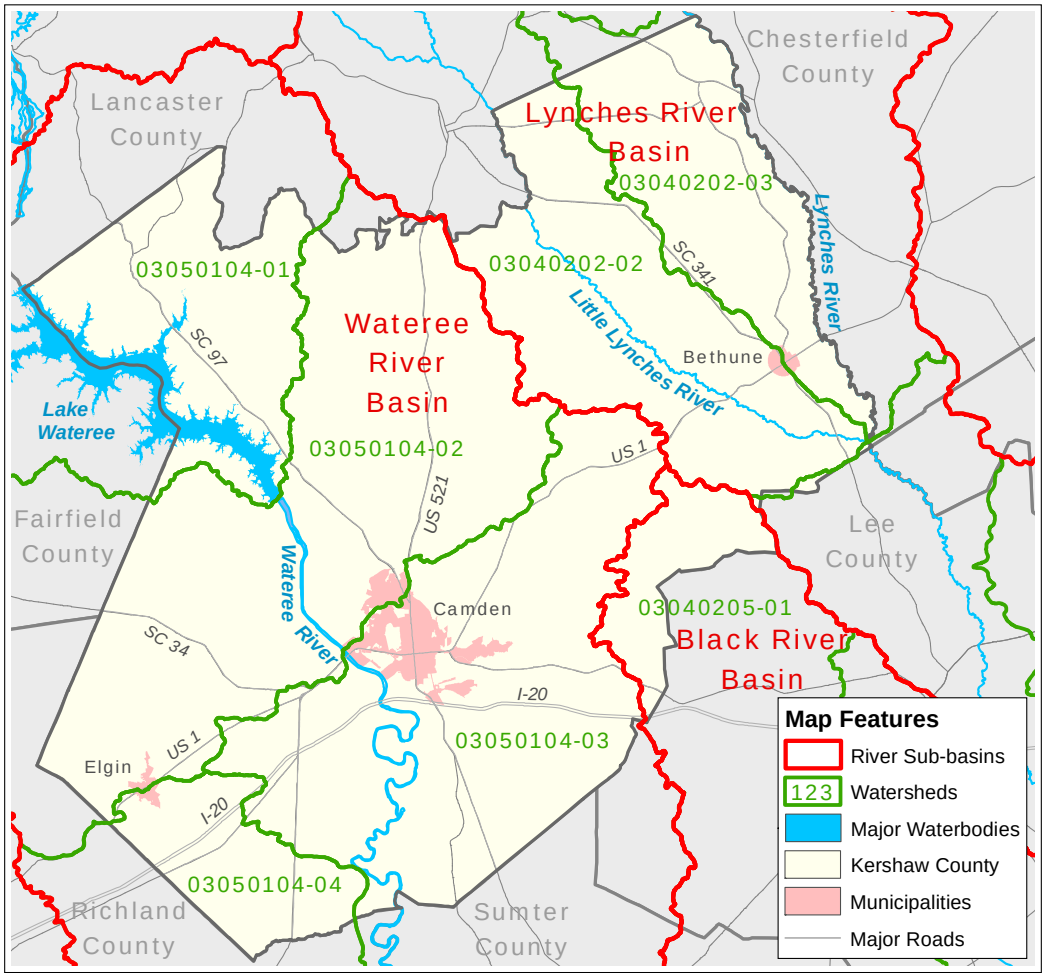
Watershed	County	Primary Waterbodies	Area (acres)	Stream Miles	Lake Waters (acres)	Additional Information
Wateree River Basin (03050104)						
Wateree River/Lake Wateree (03050104-01)	Fairfield, Lancaster, Kershaw	Wateree River and its tributaries from Big Wateree Creek to the Lake Wateree dam	246,371	971.7	12,085.2	Lugoff-Elgin Water Authority and City of Camden draw water from Lake Wateree
Upper Wateree River (03050104-02)	Kershaw, Lancaster, Fairfield, Richland	Wateree River and its tributaries from Lake Wateree dam to Twentyfive Mile Creek	202,806	749.0	1,261.1	Kershaw County/Lugoff WWTP discharges into Wateree River
Middle Wateree River (03050104-03)	Kershaw, Lee, Sumter, Richland	Middle section of Wateree River and its tributaries from Twentyfive Mile Creek to Swift Creek	175,248	546.3	1,288.6	City of Camden WWTP and Palmetto Utilities Spears Creek WWTP discharge into Wateree River
Lower Wateree River (03050104-04)	Sumter, Richland, Kershaw	Lowest portion of Wateree River and its tributaries from Swift Creek to confluence with the Congaree River Basin	179,948	461.9	1,311.8	---
Lynches River Basin (03040202)						
Little Lynches River (03040202-02)	Lancaster, Kershaw	Little Lynches River and its tributaries	126,933	257.5	171.9	---
Lynches River (03040202-02)	Lancaster, Kershaw, Chesterfield	Lynches River and its tributaries from Flat Creek to the Little Lynches River	145,383	273.8	466.9	---

Table 5-8. Kershaw County Watersheds, *Continued*

Watershed	County	Primary Waterbodies	Area (acres)	Stream Miles	Lake Waters (acres)	Additional Information
Black River Sub-basin (03040205)						
Rocky Bluff Swamp (03040205-01)	Lee, Kershaw, Sumter	Rocky Bluff Swamp and its tributaries	179,089	339.7	441.1	---

Source: SCDHEC, Watersheds, November 2016

Map 5-9. Watersheds



Sources: USDA-NRCS, Geospatial Data Gateway, Nov. 2016; USGS, The National Map, Nov. 2016

The S.C. Department of Health and Environmental Control (SCDHEC) began watershed planning activities in 1972 per the requirements of the *Federal Water Pollution Control Act* and subsequent amendments. The State's overall water quality management plan consists of a continuing planning process, watershed assessments, and 208 Plans. Watershed-based planning enables SCDHEC to address federal mandates in a coordinated manner and to better utilize available resources. The process also improves communication among SCDHEC, those who are regulated, and the public on existing and future water quality issues.

A *Watershed Water Quality Assessment* is available for each major river basin in South Carolina and is updated by the SCDHEC Bureau of Water. Included in each assessment is an in-depth description of the watershed and its resources, an analysis of surface water quality, an analysis of groundwater quality, a listing of National Pollutant Discharge Elimination System (NPDES) permits, the Nonpoint Source (NPS) pollution management, water quantity and usage, growth potential within each watershed related to wastewater needs, watershed protection and restoration strategies, and available state and citizen-based watershed stewardship programs.

6. <u>Water Quality</u>

South Carolina's abundant water supply has been a key resource in the development and growth of the State's economy. The quantity of this water supply is integral to future community and regional development efforts, while the health and safety of residents depends on the quality of these resources. Although overall water quality is good in most parts of the State, increased urbanization and a growing population have contributed to rising levels of point source and non-point source pollution. Sustained growth will place greater demand on the water supply and make the protection of water resources a long-term priority.

Section 208 of the *Federal Clean Water Act*, as passed in 1972 and amended in 1987, established an area-wide approach to addressing surface water quality protection. This comprehensive and integrated approach to water pollution abatement provides criteria for designing local plans within a regional context. The State of South Carolina continues to use regional planning agencies throughout much of the State as a means of administering these requirements. In 2001, the Santee-Lynches Council of Governments (SLCOG) was designated as the water quality management planning agency for its multi-county planning region. Although originally part of the water quality management program of the Central Midlands Council of Governments, Kershaw County was transferred to the SLCOG program in 2006.

As the designated planning agency, the SLCOG is responsible for updating and amending the *Water Quality Management Plan* (WQMP), which identifies policy priorities and provides recommendations for water quality management across the four-county region. In order to successfully implement the WQMP, the SLCOG relies on designated Management Agencies to implement the Plan within its designated management area. Within Kershaw County, the City of Camden is the designated Management Agency for its jurisdiction and Kershaw County is the designated Management Agency for the remainder of the County.

The most recent update of the *208 Water Quality Management Plan* for the Santee-Lynches Region was developed and adopted by the Council in April 2003 and updated in November 2010. SCDHEC produced and regularly updates the *Watershed Water Quality Assessments* for the Catawba and Pee Dee River Basins. Detailed updates to Watershed Water Quality Assessments for South Carolina river basins can be found online in the SCDHEC *SC Watershed Atlas*. While more complete assessments of local water quality are included in the SCDHEC documents, pertinent findings for Kershaw County water quality within the watersheds depicted in Map 5-9 are summarized in this section.

All waters within the Kershaw County watersheds are classified as *Fresh Water* by SCDHEC. Fresh waters are suitable for primary and secondary contact recreation (swimming, water skiing, boating, and wading), for industrial and agricultural uses, and as sources of drinking water supply after conventional treatment. Fresh waters are also suitable for fishing and provide a suitable environment for the survival and propagation of a balanced aquatic community of flora and fauna. Statewide standards have been established to protect the suitable uses indicated in each classification, serving as the foundation of stream water quality goals designed to maintain and improve water quality. The standards determine permit limits for treated wastewater dischargers and any other activities that may impact water quality.

a. NPDES Permitted Activities

As authorized by the *Clean Water Act* of *1972*, the National Pollutant Discharge Elimination System (NPDES) permit program reduces water pollution by regulating point sources that discharge pollutants into waters. Point sources are discrete conveyances such as pipes or man-made ditches. Individual homes that are connected to a municipal system, use a septic system, or do not have a surface discharge are exempt from NPDES permitting. However, industrial, municipal, and other facilities must obtain permits to discharge directly into surface waters. Accordingly, discharges from wastewater treatment systems owned by governments, private utilities and industries are required to obtain NPDES permits.

Wastewater facilities are monitored by SCDHEC regional offices of Environmental Quality Control for compliance with NPDES permits. SCDHEC issues permits for *municipal* facilities (municipal utilities), *domestic* facilities (private utilities) and *industrial* facilities (industrial pump and haul operations that generate non-hazardous process wastewater and domestic wastewater generated at industrial facilities). Facilities are further defined through the permitting process as either *major* or *minor*. For municipal permits a facility is considered major if it is a public facility and has a permitted flow of one million gallons per day (MGD) or more. Determination for industrial facilities is based on facility and stream characteristics including toxicity, amount of flow, oxygen load, proximity of drinking water source, potential to exceed stream standards, and potential effect on coastal waters. Table 5-11 provides a list of permitted NPDES facilities in Kershaw County, sorted by type of activity.

Public wastewater management in Kershaw County is provided by three facilities. The ***City of Camden*** provides wastewater treatment to more than 3,950 customers within the City, as well as areas outside of the City northward along S.C. Highway 97 and eastward between U.S. Highways 1 and 521. Collected wastewater is treated at the City's Wastewater Treatment Plant (WWTP) before being discharged into the Wateree River. The City's WWTP is classified as a major municipal facility and has a permitted capacity of 4.0 MGD. ***Kershaw County*** provides wastewater treatment for 1,739 customers in the West Wateree area that includes the Town of Elgin, the Lugoff community, and the U.S. Highway 1 corridor. Collected wastewater is treated at the Kershaw County/Lugoff Wastewater Treatment Plant before discharge into the Wateree River. The Plant is classified as a minor municipal facility and has a permitted capacity of 2.0 MGD.

Palmetto Utilities, Inc. is authorized under the 2006 Upper Wateree Agreement with SCDHEC, Central Midlands COG, Santee-Lynches COG, Richland County, the City of Camden, and Kershaw County to provide wastewater treatment services to a large portion of the Midlands. The Palmetto Utilities service area includes three Kershaw County subdivisions located in the unincorporated area of the West Wateree area – Kelsney Ridge, Heath Pond, and Wood Trace. Collected wastewater from these customers is treated at the Spears Creek Wastewater Treatment Plant before being discharged into the Wateree River. The Spears Creek WWTP is classified as a minor domestic facility with a permitted capacity of 6.0 MGD.

Table 5-9. NPDES Permitted Facilities, Kershaw County, 2016

Facility Name	Watershed	Type
City of Camden WWTP	305010403	Municipal Wastewater
City of Camden WTP	305010402	Municipal Water
Kershaw County/Lugoff WWTF	305010402	Municipal Wastewater
Lugoff-Elgin Water Authority WTP	305010402	Municipal Water
Nosoca Pines Ranch	305010401	Domestic
Palmetto Utilities WWTP	305010404	Domestic
Rolling Meadows/Heritage Financial	305010403	Domestic
Smith's Mobile Home Park	305010403	Domestic
Spears Creek WWTP	305010403	Domestic
Ahlstrom Nonwovens LLC/Bethune	304020203	Industrial
C Ray Miles Const/Lugoff Sand	305010403	Industrial
C Ray Miles Const/Turtle Creek	305010403	Industrial
Callahan Grading/1401 Cheraw Rd Mine	305010403	Industrial
Cantey Const/Butternut	305010402	Industrial
Carolina Ceramics/Dry Br Mine	305010404	Industrial
Carolina Ceramics/Koon Mine	305010404	Industrial
Carolina Gas Transmission Corp	304020501	Industrial
Clariant LSM (America) Inc	305010403	Industrial
Cogsdill Tool Products Inc	305010403	Industrial
Deroyal Textiles Inc (2 permits)	305010403	Industrial
Eastern Land & Timber/Ind Pk Mn	305010403	Industrial
Georgia Stone Industries/Kershaw Pink	305010402	Industrial
Georgia Stone Industries/Kershaw Quarry	305010401	Industrial
Hanson Brick East/Gadson	305010404	Industrial
HBD Industries Inc/Elgin	305010402	Industrial
Kendall Co/Wateree Plant (2 permits)	305010403	Industrial
Loamy LLC/Kershaw Sand Mine (4 permits)	304020203	Industrial
Loveless & Loveless Inc	305010404	Industrial
Martin Marietta-Loamy Sand and Gravel Mine	304020203	Industrial
Mildred R Porter/Porter Pit	305010404	Industrial
New South Lumber Co/Camden Plant (2 permits)	305010402	Industrial
Praxair Inc. (3 permits)	305010403	Industrial

Table 5-9. NPDES Permitted Facilities, Kershaw County, *Continued*

Facility Name	Watershed	Type
TB Kawashima USA	305010403	Industrial
Unimin Corp/Lugoff Plant	305010403	Industrial
USAF/Wateree Recreation Facility	305010401	Industrial
Willow Oak Quarry/Willow Oak Mine (2 permits)	305010402	Industrial

Source: SCDHEC GIS Clearinghouse, November 2016

b. Water Quality Monitoring

SCDHEC evaluates water quality through the collection of data from a statewide network of primary and secondary ambient monitoring stations supplemented by flexible, rotating watershed monitoring stations. The network provides data used to determine long-term water quality trends and attainment of water quality standards, identify locations in need of additional attention, and plan and evaluate stream classifications and standards. Network data is also used to formulate permit limits for wastewater discharges in accordance with State and Federal water quality standards and the goals of the *Clean Water Act*.

The *State of South Carolina Monitoring Strategy* establishes the overall goals and objectives for the SCDHEC water quality monitoring program to implement the *South Carolina Pollution Control Act*, the *Federal Clean Water Act*, and applicable State and Federal regulations. SCDHEC is delegated certain water quality monitoring responsibilities under these regulations, including water quality assessment, regulatory monitoring, and program evaluation. Detailed and regularly updated assessments of water quality monitoring data for watersheds are published on the Department's *SC Watershed Atlas* website.

Multiple water quality monitoring stations are located within Kershaw County watersheds along major and secondary waterbodies. Two impaired waterbodies are identified in Kershaw County as of December 2016. Twentyfive Mile Creek and Spears Creek/Kelly Creek are both considered impaired due to high fecal coliform levels. Because Kershaw County is permitted as a municipal storm sewer system (MS4), it is required to sample water at several stormwater discharge points into these watersheds to determine if the discharges provide significant bacterial loads. Since the watershed for Twentyfive Mile Creek spans both Richland and Kershaw Counties, the counties have partnered in the successful submission of two grant proposals to SCDHEC to address the reduction of potential bacterial sources within the watershed. The first grant addresses potential agricultural sources of bacterial loads and is administered by Richland County, with a portion of grant matching funds provided by Kershaw County. The grant provides financial assistance and best management practices to farmers to keep livestock out of streams and waterways. The second grant will provide financial assistance to replace or repair failing septic systems within the Twentyfive Mile Creek watershed. Kershaw will administer the grant, with a portion of grant matching funds provided by Richland County.

c. Nonpoint Source Pollution

Nonpoint source (NPS) pollution cannot be traced back to a single origin or source. Such pollution includes fertilizers, herbicides and pesticides, animal waste, sediment, pathogens, household wastewater from failing septic systems, and contaminants such as street litter carried into water sources by urban runoff. Runoff occurring after a rain event moves pollutants across the land to the nearest waterbody or storm drain where they may impact the water quality of creeks, rivers, lakes, estuaries, and wetlands. NPS pollution may also impact groundwater when it is allowed to seep or percolate into aquifers. Adverse effects of NPS pollution include physical destruction of aquatic habitat, fish kills, limitations or elimination of recreational uses of a waterbody, closure of shellfish beds, reduced water supply, taste and odor problems in drinking water, and increased potential for flooding when waterbodies become choked with sediment.

In fulfillment of the federal *Clean Water Act*, the State of South Carolina, in conjunction with federal agencies and local governments, manages several programs which reduce the impact of non-point source pollution. The State's Non-point Source Management Program provides a framework for addressing the major causes and sources of nonpoint source pollution and outlines the state's goals and objectives for mitigating nonpoint source pollution and the strategies, management measures, partnerships, funding sources, and evaluation tools necessary to achieve these goals. SCDHEC is the responsible agency for nonpoint source monitoring and is required to assess and report on the condition of the State's waters biannually. Surface waters that do not meet water quality standards are placed on a list of impaired waters with the source of impairment and corrective actions identified.

Types of nonpoint sources monitored by SCDHEC include mining operations, livestock operations, agriculture, landfills, and land applications of effluent from wastewater treatment facilities. Multiple facilities are monitored under the SCDHEC Nonpoint Source Management Program within Kershaw County watersheds. Up-to-date mapping and information for these facilities are found in the online *SC Watershed Atlas* published by SCDHEC.

The County has developed a Stormwater Management Program (SWMP) to ensure compliance with NPDES permit requirements. Kershaw County adopted a *Stormwater Management Ordinance* in 2015 in accordance with the federal Clean Water Act and the South Carolina Pollution Control Act. SCDHEC designated the County as a review authority in 2007 for the unincorporated urbanized area of the County that includes the Lugoff area and the U.S. Highway 1 corridor. As a delegated review authority, the County issues permits for stormwater and land disturbance activities within its jurisdiction. The County later entered into an agreement with the Town of Elgin to assume permitting responsibilities on the municipality's behalf. SCDHEC regulates stormwater activity in the areas of the County that are outside of the urbanized area and within the City of Camden. The *Kershaw County Stormwater Management Ordinance* reflects the requirements for stormwater discharges per the National Pollutant Discharge Elimination System (NPDES) and the *South Carolina Stormwater Management and Sediment Reduction Act* for certain land disturbing activities.

The *Stormwater Management Ordinance* protects, maintains, and enhances the environment of Kershaw County and the public health, safety, and general welfare of Kershaw County citizens by establishing requirements and procedures that control the potential adverse effects of increased stormwater runoff associated with both future development, redevelopment, and existing developed land. The ordinance also reduces pollutant discharges into State and County waters. The County requires that the requirements of the Ordinance be followed for land development; engagement in any industry or enterprise; the construction, operation or maintenance of any landfill, hazardous waste treatment, disposal or recovery facility, or any other industrial or related facility; disposal of any hazardous or toxic substance or other pollutant; or the promotion and/or allowance of transport of sediment and other pollutants associated with stormwater runoff beyond property boundaries. Such activities must also be conducted in accordance with plans, permits, and regulations of the County Stormwater Management Program, as well as all other applicable State and Federal regulations.

Under the Ordinance, a Land Disturbance Permit is required for all applicable, non-exempt activities and must include a Storm Water Pollution Prevention Plan to control stormwater and pollutants. Compliance is also required with associated components of the County's *Zoning and Land Development Regulations*. Applicants must adhere to the submitted plan and the relevant guidance provided in the S.C. Stormwater Management BMP Handbook. Exempt development activities include construction of single-family residences and their accessory buildings, not within a subdivision, that will disturb an area of less than 5,000 square feet; agricultural land disturbances of less than one acre, or those of more than one acre that do not create new impervious surfaces; and land disturbing activities on forestland for the production and harvesting of timber and timber products and conducted per best management practices and minimum erosion protection measures provided by the S.C. Forestry Commission.

In addition to developing, maintaining, and implementing the County's Stormwater Management Program and design guidelines for the County's stormwater system, the Kershaw County Stormwater Manager enforces the Ordinance, maintains and implements best management practices for the reduction of pollutants in stormwater runoff, implements an illicit discharge detection and elimination program, and provides public education on potential stormwater impacts. The use of best management practices (BMPs) is central to controlling NPS pollution at the local level. Examples of BMPs include the use of vegetated buffer strips along streams, rivers, and lakes and the restriction of the amount of impervious surface area in new developments to less than 10% of the total land area. Stormwater retention, preserving green space, and retaining natural stream channels and buffers are also effective pollution control aids. Local conservation districts within each county also address non-point source pollution. Kershaw County Soil and Water Conservation District staff regularly conducts demonstrations related to nonpoint source pollution, watersheds, and wetlands at local elementary schools.

Local and regional water quality management efforts recognize that the quality of the water supply is directly linked to development activities, demand, and land use practices within the watershed. When considering water quality in the comprehensive planning process, it is important to incorporate measures that protect valuable water resources from excessive runoff

and discharge that may create unsafe levels of dangerous chemicals or bacteria. Attention to stormwater retention, percentage of impervious surfaces within developments, and industrial discharge are critical to ensuring water quality in Kershaw County.

7. Lake Wateree Shoreline Management

Construction of the Wateree Hydroelectric Project was completed in 1920. The Lake Wateree hydroelectric reservoir is located primarily within Kershaw and Fairfield Counties. Duke Energy is the Federal Energy Regulatory Commission (FERC) licensee for the project that generates clean renewable energy, provides a dependable water supply for the Lugoff-Elgin Water Authority and the City of Camden, and maintains Lake Wateree as a popular fishing and recreation destination for residents and visitors to the area.

The Wateree site is part of the extensive Catawba-Wateree Hydroelectric Project that spans more than 225 river miles and encompasses approximately 1,795 miles of shoreline in nine counties in North Carolina and five counties in South Carolina. The system includes 13 hydropower plants, 11 developments, and 11 reservoirs. The Wateree portion is located in Lancaster, Kershaw, and Fairfield counties and includes a reservoir (Lake Wateree), dam, and powerhouse. Lake Wateree is the second largest reservoir in the Catawba-Wateree system, with a surface area of 13,025 acres, a full pond elevation of 284.4 feet, and approximately 214.9 of shoreline miles, including islands.

The application for license renewal is submitted every ten years and includes consultation with and review by the U.S. Fish and Wildlife Service, the North Carolina Department of Environmental Quality; the North Carolina Wildlife Resources Commission; the South Carolina Department of Parks, Recreation and Tourism (SCPRT) and SCDNR; local governments including Kershaw County; and other interested stakeholders. Renewed in October 2016, the license addresses hydro station and reservoir operation and maintenance, flowage, public recreation and access, protection of environmental resources, and shoreline control, as well as specific requirements associated with the project operation.

A key responsibility outlined in the license is the supervision and management of shoreline development to ensure the protection and enhancement of the project's scenic, recreational, cultural, and other environmental values. The Shoreline Management Plan (SMP) is a comprehensive tool for managing requests for shoreline activities in a manner consistent with project purposes and includes shoreline classifications, lake use restrictions, shoreline management guidelines, and public marina requirements. The primary goal of the SMP is to provide for public and private access to project lands and waters while appropriately managing the project's natural and cultural resources and protecting its primary function of electricity production.

Through the SMP, Duke Energy classifies the Lake Wateree shoreline to reflect current shoreline uses, identifies areas of importance for wildlife, fish spawning and rearing, and cultural resources, and provides guidance for consideration of future lake use requests. Future

use classifications are also designated for the most intensive potential future use suitable for each segment of shoreline. Uses can range from future commercial or residential marina and public recreation, to residential and impact minimization zone. Nearly 45% of the Lake Wateree shoreline is classified as residential and 22.4% as environmental. Residential shoreline includes project lands and waters occupied by private facilities for single-family landowners, with marinas not allowed. Environmental shorelines are vegetated areas or cove heads with stream confluence that provide spawning, rearing and nursery habitat for fish and rearing, nursery and adult habitat for amphibians, reptiles, and birds. Construction, excavation, vegetation removal, and shoreline stabilization are not permitted in environmental shoreline areas.

Duke Energy allows public and private access to project shoreline lands, as long as such access is consistent with the overall objectives of the SMP. Adjacent property owners may request privileges such as construction of private residential docks and access steps, shoreline stabilization, removal of vegetation in compliance with stabilization management guidelines, and installation of erosion control measures. However, application for a lake use permit must be submitted to Duke Energy and written approval granted before starting any such activities.

Duke Energy has developed Shoreline Management Guidelines (SMGs) to define allowable uses such as vegetation management, structure specifications, and shoreline stabilization and erosion practices within the reservoirs owned or managed by the company. The SMGs set forth the rights and limitations for the use of shoreline lands, provide criteria and procedures for the various permitting programs, and encompass general policies and vegetation management requirements. Permitting programs regulated by the SMGs include marina facilities (for public use, including multi-family housing), conveyance structures (roadways, causeways, bridges, water lines and intakes), excavation (removal of soil, sand, silt or rock materials), private facilities (project-front access for single-family homes), shoreline stabilization, and miscellaneous reservoir uses (such as signs, inflatable recreation equipment, fish attractors, special events, and minor water withdrawals for irrigation). Duke Energy routinely monitors shoreline activities to ensure compliance with the SMP, including inspections of completed facility construction and periodic inspections of work in progress for larger projects.

The SMP also incorporates requirements for the management and maintenance of vegetated terrestrial and riparian areas that filter runoff, help to reduce shoreline erosion, provide wildlife corridors and habitat, and enhance recreational opportunities. Duke Energy property must be maintained in a vegetated forested condition that is typical of forested areas of the region. No clearing, thinning, spraying, planting, or sowing of any vegetation, except for the removal of hazardous trees or non-native invasive or poisonous plants, may be undertaken without written permission from the company. When protection and enhancement of habitat areas is needed, vegetation may be planted if it is native to the region. Access to the Lake and its viewsheds can be accommodated by limited clearing and selective pruning/limbing, but the use of mechanical clearing using heavy equipment is generally prohibited.

8. Kershaw County Water Quality Buffers

The Kershaw County Unified Zoning and Land Development Ordinance includes requirements for water quality buffers to protect the County's rivers, streams, lakes and ponds by reducing the conveyance of sediment and pollutants in stormwater runoff from developed sites. An undisturbed, natural buffer of at least 50 feet from the 225.5 foot contour of Lake Wateree is required. While disturbance of the existing terrain or removal of existing vegetation within required water quality buffers is prohibited, removal of smaller or diseased trees and clearing of underbrush to allow for view corridors, access corridors, stream bank stabilization, stream crossings and utilities easements, stream re-location, and public recreational facilities may be approved by the Planning Official.

Shoreline buffers must be protected during site development and construction, including the implementation of sediment and erosion control measures. Buffers that have been disturbed prior to the effective date of the Zoning Ordinance must be restored through the planting of trees, shrubbery and groundcover prior to obtaining a land development or building permit for an undeveloped lot. The use of heavy equipment other than chainsaws for tree removal or brush clearing is not allowed. In addition, septic tanks must be maintained in good operating condition to protect the water quality of the Lake.

Undisturbed natural water quality buffers are also required for perennial and intermittent streams and smaller lakes and ponds in Kershaw County. For individual lots of three acres or larger in size, a 100-foot natural buffer is required along the length of a perennial stream. A 50-foot buffer is required along the length of an intermittent stream and the shoreline of smaller ponds and lakes contained within or adjacent to the lot. For individual lots smaller than three acres, a 50-foot natural buffer is required along the length of perennial streams, while a 25-foot buffer is required along the length of intermittent streams and the shorelines of smaller ponds and lakes contained within or adjacent to the lot. Buffer requirements are similar to those for Lake Wateree in terms of protection during development and construction, removal of small or diseased trees, and clearing for view corridors, access, and public access.

9. Wetlands

Wetlands are among the most productive ecosystems in the world, comparable to rain forests and coral reefs, with profound ecological, aesthetic, and economic value. As a natural resource, wetlands provide a natural filtration system for sediment and pollution, while serving as critical habitat for numerous species. Socio-economic benefits of wetlands include flood protection, erosion control, groundwater recharge, pollution abatement, sediment filtering, and the provision of a variety of harvestable natural products. There are also recreational values to wetlands in that they provide opportunities for boating, fishing, hunting and nature watching.

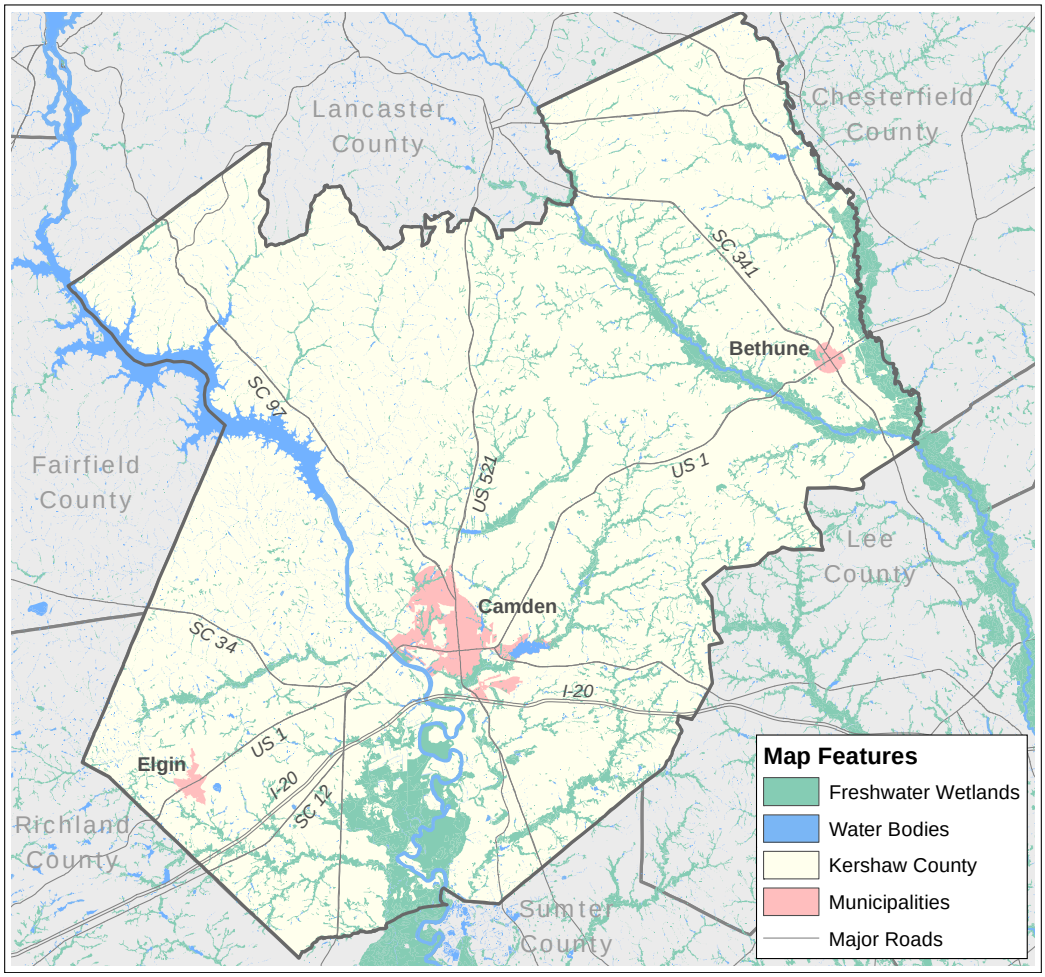
Wetlands generally include swamps, marshes, bogs and similar areas. Approximately 90% of the State's wetlands and all Kershaw County wetlands are classified as freshwater. Freshwater wetlands are areas that are inundated or saturated by surface or groundwater at a frequency

and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Freshwater wetlands store excess stormwater to reduce flooding impact, purify water by holding and breaking down pollutants, and trap silt and soil in the wetlands instead of clogging up nearby streams. Some wetlands store water in the rainy season and release the water later into nearby aquifers or underground streams. This cycle recharges the groundwater that supplies many South Carolinians with drinking water.

Wetlands are susceptible to many negative factors. In addition to naturally occurring changes, the human impacts of urban development – such as pond construction, filling, draining of lands for farming, and pollution – have resulted in wetland loss or degradation. The loss of wetlands, especially through filling, increases runoff and impairs beneficial wetland functions of flood control, groundwater recharge, and water quality improvement. Freshwater wetlands decreased at an annual average of 458,000 acres from the 1950s through the 1970s nationwide. This trend was reversed from 1998 to 2004 as wetlands increased at a rate of 32,000 acres per year. From 2004 to 2009, the nation experienced annual average losses of 13,800 acres. (*EPA's Report on the Environment, 2011)*. Total wetlands acreage in South Carolina has declined by one-quarter since the late 1700s, primarily as a result of human activities *(USGS National Water Summary on Wetlands Resources, 2016)*. Freshwater, forested wetlands comprise approximately 80% of the State's wetlands.

National Wetlands Inventory (NWI) data provided by the U.S. Fish and Wildlife Service indicates the presence of significant wetlands along the Wateree, Lynches, and Little Lynches rivers. Wetlands are also present along smaller creeks and streams throughout the County (Map 5-10). NWI data is generated on a large scale, necessitating the exact location of any wetlands be determined on a parcel-by-parcel basis. Factors considered in wetlands designation include the presence of hydric soils, hydrophytic vegetation, and hydrological conditions that involve a temporary or permanent source of water that can cause soil saturation. Kershaw County provides a *Wetlands Fact Sheet* that includes educational information about the importance of wetlands, where wetlands can be found, and how wetlands are regulated at: http://www.kershaw.sc.gov/Index.aspx?page=350.

Map 5-10. Wetlands



Source: U.S. Fish and Wildlife Service, National Wetlands Inventory, 2016

E. REGIONAL GREEN INFRASTRUCTURE ASSET INVENTORY AND PLAN

Santee-Lynches Regional Council of Governments (Santee-Lynches) received a 2015 *Urban & Community Forestry Financial Assistance Grant from the South Carolina Forestry Commission* to develop a regional *Green Infrastructure Asset Inventory and Plan*. The $20,000 grant was matched with $20,000 in cash and in-kind volunteer hours. The Asset Inventory and Plan is intended to assist communities in Clarendon, Kershaw, Lee, and Sumter Counties in better identifying, utilizing, protecting, and restoring natural assets to create healthy ecosystems, communities and economies. Green infrastructure is defined as "the interconnected network of waterways, wetlands, woodlands, wildlife habitats, and other natural areas; greenways, parks, and other conservation lands; working farms, ranches and forests; and wilderness and other open spaces that support native species, maintain natural ecological processes, sustain air and water resources and contribute to the health and quality of life" for communities and people. The green infrastructure network contributes to healthy environments and access to breathable air, clean drinking water, and productive agricultural soils.

By incorporating green infrastructure strategies, communities can preserve and connect open spaces, watersheds, wildlife habitats, parks, and other critical landscapes. The benefits include protecting the health and diversity of wildlife; maintaining natural systems; increasing property values; lowering health care costs; helping people connect with nature; providing access to clean air and water; and helping communities make smarter investments in "grey" infrastructure.

Santee-Lynches utilized a recommended six-step process in the development of the plan that began with goal setting, review of available data, and mapping the region's ecological and cultural assets. This was followed by a determination of the assets most at risk and potential losses if no action is taken. Assets were then prioritized and opportunities for restoration or improvement determined. The final step will be the implementation of identified opportunities through incorporation in both short and long-range planning. To ensure the long-term maintenance and preservation of the region's green infrastructure, the Plan stresses the need to balance planning for growth and development while maintaining the natural elements critical for a healthy environment.

The Green Infrastructure Asset Inventory includes analyses of agricultural and silvicultural resources; recreational, historic and cultural assets; wildfire ignition density; water quality; land cover change; species richness; protected lands; and intact habitat cores. A core is an area large enough to support more than one individual of a species, which is generally 100 acres or larger of intact habitat. Stakeholder engagement was a key component of the Inventory and Plan development and included input from a wide range of groups representing local governments, conservation groups, state parks, and public utilities. The process yielded a series of objectives and strategies intended to help local governments and organizations assess progress in conserving the region's valued assets and enhancing the long-term health of the community. The five objectives proposed in the Inventory and Plan are supported by strategies and indicators and are listed below.

1. Conserve significant contiguous habitat and enhance habitat connectivity.
2. Protect a network of riverine, lake, and land-based opportunities to enhance human enjoyment.
3. Improve assessment, management, protection, and/or restoration of natural assets to create healthy ecosystems, communities, and economies.
4. Increase public awareness of and support for green infrastructure.
5. Provide water quality planning that efficiently manages resources and protects human and environmental health.
6. Effectively manage natural resources that protect and provide for economic prosperity.

F. NATURAL HAZARDS

Natural hazards endanger the health and safety of the populations of the communities, jeopardize their economic vitality and imperil the quality of their environment. The Federal Emergency Management Agency (FEMA) encourages local governments to initiate mitigation actions designed to reduce or eliminate the risks to humans and property from natural hazards. The *Santee-Lynches Hazard Mitigation Plan* was prepared in 2015 by the Santee-Lynches Council of Governments (SLCOG) to assist each of the four participating counties (Clarendon, Kershaw, Lee, and Sumter) and their municipalities in avoiding or minimizing vulnerabilities to natural hazards. In Kershaw County, participating jurisdictions include the City of Camden and the Towns of Bethune and Elgin.

The *Santee-Lynches Hazard Mitigation Plan* identifies the hazards that threaten the Region's jurisdictions and provides estimates of the relative risks posed to each community by these hazards. Kershaw County is vulnerable to a number of natural hazards, ranking 12th highest among the State's 46 counties in terms of both the number of past natural hazards and future probability of natural hazards *(South Carolina Hazard Mitigation Plan, 2013)*. The Plan ranks wildfires as the top hazard faced by Kershaw County, followed by severe storms, hail, hazardous materials, and winter storms. While the County's inland location keeps it safe from the direct force of hurricanes, the State's location on the Atlantic increases the probability of heavy rains and flooding generated by hurricanes and tropical storms that can impact inland communities.

1. Flooding

Floods are broadly classified as either general floods that are usually long-term events or flash floods that are caused by locally heavy rains in areas where water runs off quickly, moving at very high speeds. Floods in the Midlands of South Carolina are generally the result of excessive precipitation over a span of days, intense rain in a short period of time, river overflow due to debris jam, or failure of water structures such as dams. While flooding can happen almost anywhere given atmospheric conditions or lack of proper maintenance to flood control and drainage systems, flooding typically occurs in floodplains. Floodplains are areas that consist of a stream or river (floodway) and the adjacent areas that have been or can be covered by water (floodway fringe). Floodplains perform a critical function by temporarily storing and carrying floodwaters, reducing potential flood peaks, recharging groundwater supplies, and providing plant and animal habitats. Development within a floodplain expands the floodplain boundary and increases the volume of runoff, making more areas and properties susceptible to flooding. Local development review processes should ensure that new construction and activity will not increase flooding on adjacent and nearby properties.

In 1968, Congress passed the *National Flood Insurance Act*, which created the National Flood Insurance Program (NFIP). The Act called for identification and publication of all floodplain areas that have special flood hazards and the establishment of flood-risk zones in all such areas. Flood Insurance Rate Maps (FIRM) are prepared and updated by FEMA to delineate the boundaries of each community's special flood hazard areas using available data or other

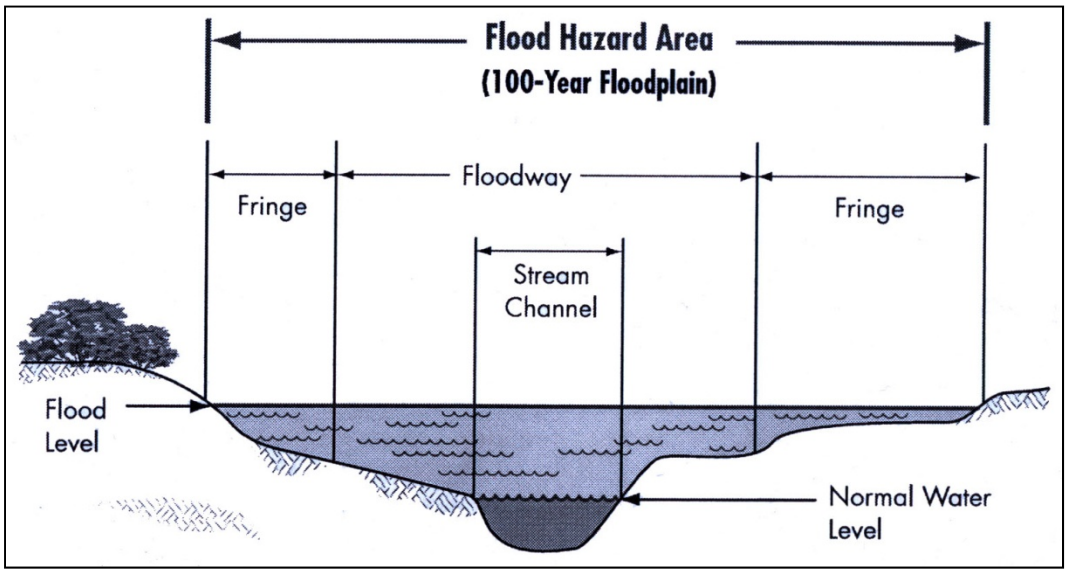
approximation methods. The maps are intended to assist communities in managing floodplain development, as well as assisting insurance agencies and property owners in identifying those areas where the purchase of flood insurance is advisable.

FIRMs denote the portion of the floodplain that is subject to inundation by the base flood and/or flood-related erosion hazards. Flood hazard areas identified on FIRMs are denoted as Special Flood Hazard Areas (SFHA). An SFHA is defined as the area that will be inundated by the flood event having a 1% chance of being equaled or exceeded in any given year – also known as the base flood or 100-year flood. SFHAs are considered as high risk areas for flooding and are denoted on Kershaw County FIRMs as Zone A and Zone AE. Moderate risk flood hazard areas labeled as Zone X on the Kershaw County FIRM are the areas between the limits of the base flood and the 0.2% annual chance of being equaled or exceeded in any given year – also known as a 500-year flood. All other areas outside of the SFHA and higher than the elevation of the 0.2% annual chance of flood are considered to have minimal chance of flood hazard.
Regulatory floodways are also delineated on FIRMs. A floodway is a channel of a river or other watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than a designated height. Communities are required to regulate development in these floodways to ensure that there are no increases in upstream flood elevations.

The goal of the NFIP is to reduce the impact of flooding on private and public structures by providing affordable insurance for property owners. Recognizing that local planning is a crucial tool for minimizing future flood damage, the program encourages communities to adopt and enforce floodplain management regulations to mitigate the effects of flooding on new and improved structures. Local governments determine and supervise the use of land within their jurisdictions, making them the frontline of comprehensive floodplain management. The primary requirement for community participation in the NFIP is the adoption and enforcement of floodplain management regulations that meet the minimum NFIP regulatory standards. The impetus for obtaining financial and technical assistance from the state and federal levels also originates with the local community. Managing development can reduce losses by avoiding encroachment into flood-prone areas, protecting floodplain resources, and building with flood-resistant measures.

Floodplain management minimizes the potential for flood damages to new construction and avoids aggravating existing flood hazard conditions that could increase potential flood damage to existing structures. To protect structures in flood-prone areas, NFIP regulations require that the lowest floor of all new construction, and substantial improvements of residential structures, be elevated to or above the Base Flood Elevation (BFE). Figure 5-1 illustrates the various aspects of a floodplain using a cross-section of a 100-year floodplain.

Figure 5-1. Floodplain Diagram



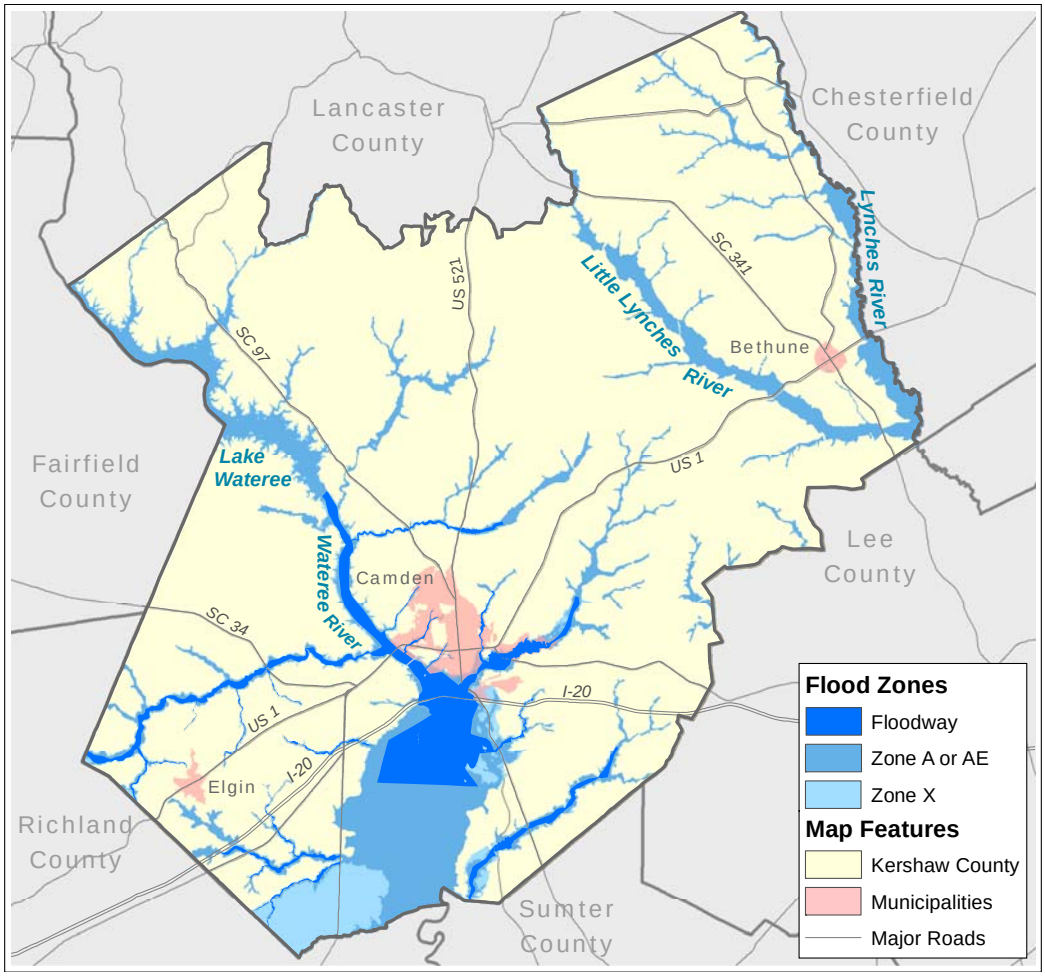
Source: Floodplain Management in South Carolina, Quick Guide, SCDNR, 2004

Kershaw County is bordered on the northeast by the Lynches River and Lake Wateree on the northwest. The Little Lynches River runs through the northeastern potion of the County west of Bethune. The County is also bisected by the Wateree River west of Camden. While these major water bodies and their tributaries are the primary drainage outlets for water flowing into and through the County, they can overflow when inundated by heavy rains, causing flooding in low lying areas. Kershaw County ranks 27th highest statewide in the percentage chance of a flood event each year, with an estimated recurrence interval of 2.37 years *(South Carolina Hazard Mitigation Plan, 2013)*. The National Climatic Data Center lists four major flood events for the County in the last two decades, including three in May and June of 2013 and one in May 2016. The Santee-Lynches Hazard Mitigation Plan also includes floods in 2010 and 2012 in the list of flood occurrences from 2010 through April 2014. More recently, a rain event in October 2015 was one of the most prolific in modern state history, with the highest rain totals recorded in the Midlands area. Rain gauges in Lugoff and at the Wateree Dam recorded 12.48 and 8.62 inches of rain, respectively, from the morning of October 2, 2015 through the morning of October 4, 2015 *(National Weather Service, 2016)*. Kershaw County was included in the President's federal disaster declaration for the flood event, which provided funding and relief services for housing, transportation, furnishings, and medical needs to individuals, as well as assistance to local governments for emergency work to reduce or eliminate immediate threat to life, protect public health and safety, protect improved properties, and restore damaged facilities.

The latest FIRM maps are dated 2006 and depict the general portions of the County within flood zones (Map 5-11). Special Flood Hazard Areas (SFHA) denoted as "A" or "AE" zones, also known as 100-year flood zones, are located along the shores of Lake Wateree and the Wateree, Lynches, and Little Lynches Rivers, as well as many of the County's major creeks and tributaries. Areas denoted as "X" zones, or 500-year flood zones, are located on the fringe of major water bodies, including the lakes, rivers, and creeks, with the largest zone located at the

southernmost area of the County east of the Wateree River. Floodways are located within floodplains along the Wateree River and its tributaries. However, it is important to note that specific floodplain determinations are made by the Kershaw County Floodplain Manager in consultation with FEMA mapping. FEMA is in the process of updating the Kershaw County flood maps, with release of the new maps anticipated in late 2017. Preliminary drafts were made available for public review in the fall of 2016 and are also available on the FEMA website (www.floodfind.com/south-carolina-flood-maps).

Map 5-11. Flood Zones



Source: Kershaw County Information Services Department, 2016

Kershaw County adopted a *Flood Damage Prevention Ordinance* in 2006 to address special flood hazard areas that are "subject to periodic inundation which results in loss of life, property, health and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures of flood protection and relief, and impairment of the tax base, all of which adversely affect the public health, safety, and general welfare." The purpose of the ordinance is to protect human life and health, minimize property damage, and encourage appropriate construction practices to minimize public and private losses due to flood conditions by requiring that uses vulnerable to floods, including facilities which serve such uses, be protected against

flood damage at the time of initial construction. The Ordinance applies to all areas of special flood hazard as identified by the FEMA Flood Insurance Rate Maps (FIRM) for Kershaw County.

The Kershaw County Planning and Zoning Director is responsible for implementing the Flood Damage Prevention Ordinance. No structure may be located, extended, converted or structurally altered in the County without full compliance with the regulations. All permit applications for development activities within special flood hazard areas must include: 1) a plot plan depicting the 100-year floodplain contour and floodway (certified and prepared by or under the supervision of a registered land surveyor or professional engineer) or a statement that the entire lot is within or appears to be within the flood plain; and 2) elevation of the lowest floor of all new or substantially improved structures with evidence that the structure will be flood-proofed in accordance with non-residential construction requirements. If a water-course will be altered or relocated as a result of proposed development, the application for the development permit must include a description of the watercourse alteration or relocation; an engineering report on the effects of the proposed project on the flood-carrying capacity of the affected watercourse and the effects to properties located both upstream and downstream of the alteration; and a map showing the location of the proposed watercourse alteration or relocation.

While buildings often cannot be removed from harm's way, they can be protected on site. In areas of low flood threat such as those subject to infrequent low velocity or shallow flooding, flood-proofing in the form of barriers (floodwalls, berms, levees) or dry flood-proofing (sealing a building against floodwaters) can effectively prevent flood damage. The *Flood Damage Prevention Ordinance* requires certification from a registered, professional engineer or architect that a non-residential, flood-proofed structure meets flood-proofing criteria for the lowest floor elevation to which the structure will be protected. Upon completion of the development, additional certification is required by a registered professional engineer, land surveyor or architect that the structure was built in accordance with submitted plans and previous certifications.

The following provisions are required by the County in areas of special flood hazard:

- Applicant must demonstrate that development cannot be located outside of the floodplain.
- New construction and substantial improvements must be anchored to prevent flotation, collapse or lateral movement of the structure.
- New construction and substantial improvements must be constructed with flood-resistant materials and utility equipment.
- New construction and substantial improvements must be constructed by methods and practices that minimize flood damage.

- Electrical, heating, ventilation, plumbing, air conditioning equipment (including ductwork) and other service facilities must be designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding.
- New and replacement water supply systems and sanitary sewage systems must be designed to minimize or eliminate infiltration of floodwaters into the systems and discharges from the sewage systems into floodwaters.
- On-site waste disposal systems must be located and constructed to avoid impairment or contamination from them during flooding.
- Any alteration, repair, reconstruction or improvement to a structure which is in compliance with the provisions of the flood regulations must meet the requirements of "new construction."
- Nonconforming buildings or uses may not be enlarged, replaced or rebuilt unless accomplished in conformance with the provisions of the flood ordinance.
- In addition to requirements for floodplain construction, all buildings must meet all applicable *Americans with Disabilities Act* (ADA) requirements, with the exception of one and two-family dwellings.
- Critical development must be elevated to the 500-year flood elevation or to the highest known historical flood elevation, whichever is greater. Critical developments are those that are critical to the community's public health and safety; or essential to the orderly functioning of the community; or stores or produces highly volatile, toxic or water-reactive materials; or houses occupants that may be insufficiently mobile to avoid loss of life or injury in an emergency. Examples include detention centers, jails, hospitals, schools, nursing homes, and wastewater treatment and water plants.
- Gas or liquid storage tanks, either located above ground or buried, must be anchored to prevent flotation or lateral movement resulting from hydrodynamic and hydrostatic loads.
- Swimming pool equipment rooms must either be built above the base flood elevation or housed in a structure designed to prevent water from entering or accumulating with the components during a base flood and within which the utility equipment is anchored to prevent flotation.

The lowest floors of new construction or substantial improvement of residential structures in SFHAs must be elevated no lower than one foot above the base flood elevation (BFE). For new construction or substantial improvement of non-residential structures, the lowest floor must be elevated no lower than one foot above the base flood elevation. No encroachments, including fill, new construction, substantial improvements or new development, are allowed within 100 feet of the stream bank in areas where no BFE has been determined, unless a professional engineer certifies that such encroachment will not result in any increase in flood levels during base flood discharge. If the BFE data is available from other sources, all new construction and

substantial improvements must meet the same standards as those where base flood elevation has been determined. Where BFE is not available from any source, the Ordinance provides alternate methods to determine BFE.

Basements are not permitted and any solid foundation perimeter walls must include openings sufficient to facilitate the unimpeded movement of flood waters. Similar requirements apply to commercial, industrial and other nonresidential structures. However, nonresidential structures located in "A" zones may be flood-proofed in lieu of being elevated provided the areas of the structure below the required elevation are watertight with walls substantially impermeable to the passage of water. Satisfaction of such standards must be certified by a registered professional engineer or architect. Flood-proofing is not allowed for residential structures.

No encroachments, fill, new construction, substantial improvements, additions and other developments are allowed within floodways unless hydrologic and hydraulic analyses performed in accordance with standard engineering practice demonstrate that the proposed encroachment will not result in increased flood levels during a base flood. Manufactured homes are not permitted in floodways except in an existing manufactured home park or subdivision. The replacement home must also meet anchoring and elevation standards for new or improved construction. Uses such as general farming, pastures, outdoor plant nurseries, forestry, play areas and picnic grounds are allowed provided they do not include structures or require fill.

Kershaw County also participates in FEMA's Community Rating System (CRS). The CRS is a voluntary program for NFIP participating communities that provides incentives in the form of premium discounts to go beyond the minimum floodplain management requirements to develop extra measures to provide protection from flooding. Class ratings range from 10 to 1, with a classification of 10 indicating that the community does not apply for CRS or does not obtain the minimum number of credit reports and receives no discount. Eighteen activities organized into four main categories - public information, mapping and regulation, flood damage reduction, and flood preparedness - are recognized as measures for eliminating floods, with credit points assigned to each activity. FEMA sets the CRS classification based on these credit points, with associated flood insurance premium discounts ranging from 5% to a maximum of 45%. Kershaw County has a current CRS classification of 9, with a 5% discount applying to flood insurance premiums for properties in Special Flood Hazard Areas as well as those in other identified flood hazard areas.

Kershaw County ranks 27th highest statewide in future probability of flooding, with an annual frequency interval of 2.36 events *(2013 S.C. Hazard Mitigation Plan).* The *Santee-Lynches Hazard Mitigation Plan* identified five flood events in Kershaw County between 2010 and 2013, with three of the five recorded in June and May of 2013. In general, Kershaw County has experienced moderate flood events in recent history, which is attributed in part to the presence of Lake Wateree and the Wateree River basin. While most of the areas within the 100-year floodplain of the river basin are undeveloped, the vulnerable area south of Camden near the intersection of U.S. Highway 521 and I-20 includes both commercial and industrial development.

2. Wildfires

The *South Carolina Hazard Mitigation Plan* defines a wildfire as "any type of forest, grass, brush or outdoor fire that is not controlled or managed." Fire probability depends on a number of factors including: local weather conditions; the prevalence of outdoor activities such as camping; debris burning and construction; and the degree of public cooperation and support of fire prevention measures. Weather is one of the most significant factors in the severity of wildfires, with wind speed, temperature and humidity impacting the intensity of fires and the rate with which they spread. Drought increases the probability of wildfires by creating dry conditions, resulting in additional fuel loads. Other natural disasters such as tornadoes and hurricanes produce additional fuel loads through downed trees and vegetation, block access, produce lightning, and create sparks from damaged electric and other utilities. The forest fire hazard potential is generally highest in late winter and early spring, when more vegetation is dead or dormant.

More than 80% of forest fires statewide are caused by "negligent human behavior" such as discarded cigarette butts or improperly extinguished campfires. State Forestry Commission (SCFC) data indicates that burning debris is a major contributor to more than 41% of wildfires in the State. An average of 3,000 fires occur annually statewide, with an average of 18,000 acres burned each year (*2013 South Carolina Hazard Mitigation Plan)*. The *Santee-Lynches Hazard Mitigation Plan* denotes wildfires as the natural hazard with the greatest percentage chance of occurring each year in Kershaw County at 582%. According to Plan data, there were 2,412 wildfire events in the County between 1988 and fiscal year 2012, affecting 7,564 acres of land. Kershaw County ranks 16th highest statewide in annual probability of future wildfires.

3. Severe Storms

Severe storms include thunderstorms and the effects from strong storms such as wind, hail, and lighting. While severe storms are fairly common in South Carolina and the Midlands, only a small percentage of these storms actually cause significant damage. According to NOAA's Storm Events Database there were 155 thunderstorm and wind events recorded in Kershaw County from 1988 through August 2016, resulting in one death and 16 injuries and a total property damage that exceeded $2 million. There were also 106 hail events and two lightning events reported during that time period, with $1 million in property damage and no injuries or deaths.

Severe storms are ranked as the natural hazard with the second highest annual chance of occurrence in Kershaw County at 223%, followed by hail at 173%, and lightning at only 37.5% *(2016 Santee-Lynches Hazard Mitigation Plan).* The County ranks 21st highest statewide in future probability of severe storms, with a frequency interval of 0.32 per year *(2013 S.C. Hazard Mitigation Plan).*

4. Severe Winter Storms

Winter storms include snow, sleet, freezing rain, ice or a mixture of these elements, and can range from moderate precipitation lasting only a few hours to blizzard conditions with blinding, wind driven snow that continue for several days. Larger winter storms may affect several states, while smaller storms may be localized to a single community. Many winter storms are accompanied by low temperatures, some resulting in temperatures below freezing (32° Fahrenheit). Agricultural production can be seriously impacted when temperatures remain below the freezing point for an extended period of time.

Sleet is comprised of raindrops that freeze before reaching the ground. While sleet does not stick to surfaces or objects, it can accumulate and cause a hazard to motorists. Freezing rain falls onto a surface that has a temperature below freezing, forming a glaze of ice. Ice storms occur when freezing rain falls and freezes immediately upon impact. Even small accumulations of ice cause a significant hazard, especially on sidewalks and roads, power lines, and trees. Transportation, communications, and power can be disrupted for days in an ice storm.

Kershaw County has a comparatively low annual chance of winter storms at only 9.6% *(2016 Santee-Lynches Hazard Mitigation Plan)*. Based on data provided in the *2013 South Carolina Hazard Mitigation Plan*, the County ranks 17th highest out of 46 counties statewide in future probability of winter storms, with a frequency level of one per year. NOAA's Storm Events Database reports that 12 winter storm events impacted Kershaw County from 1988 to August 2016. Winter storms were recorded in January and February of 2014, with the first producing accumulations of snow and sleet of from one to three inches and the second producing one-third an inch of ice and three to six inches of snow and sleet, resulting in power outages in the southern half of the County. The most recent winter event occurred in February 2015, producing snow accumulations between one and two inches in the County.

5. Tornadoes

Tornadoes are violent windstorms characterized by a twisting, funnel shaped cloud that extends to the ground. They are often generated by thunderstorm activity, when cool, dry air intersects and overrides a layer of warm, moist air, forcing the warm air to rise rapidly. However, tornadoes can also be spawned by hurricanes and tropical storms. The National Weather Service reports that tornado wind speeds typically range from 40 miles per hour to more than 300 miles per hour. While tornado damage is generally the result of high winds and wind-blown debris, tornadoes are often accompanied by potentially damaging lightning or large hail. South Carolina has been affected by more than 840 tornadoes since 1960 *(NOAA Storm Events Database, 2016)*.

Tornadoes are more likely to occur during the spring and early summer months of March through June. While they can occur at any time of day, tornadoes are most likely to form in the late afternoon and early evening. Although most tornadoes are a few dozen yards wide and touch down briefly, some can carve a path more than a mile wide and several miles long.

The destruction caused by tornadoes depends on the intensity, size, and duration of the storm. Typically, tornadoes cause the greatest damage to structures of light construction such as manufactured homes, with impacts typically localized. The Fujita-Pearson Scale for Tornadoes (F-scale) was originally developed in 1971 to rate tornado intensity based on the damage inflicted on man-made structures and vegetation. It was replaced by the Enhanced Fujita scale in 2007 (Table 5-10).

SCEMD data shows that Kershaw County ranks 13th highest statewide for tornado activity probability, with an estimated recurrence interval of only 2.48 years. The Santee-Lynches Hazard Mitigation Plan estimates the annual chance of a tornado in the County at 48%. Fifteen tornadoes were reported in Kershaw County between 1988 and August 2016, resulting in $262,500 in property damage and four injuries. The most recent events were reported on March 15, 2008, when four tornados touched down in the County, downing trees and power lines and damaging homes. An EF1 tornado touched down in Liberty Hill, an EF2 tornado was reported in Elgin that resulted in two injuries, and two tornadoes touched down in Lugoff – an EF2 followed by an EF0 a few minutes later.

Table 5-10. Fujita Scale for Tornadoes

F-Scale Number	Wind Speed	Type of Damage
EF0	60-85 mph	Minor damage. Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees push over.
EF1	86-110 mph	Moderate damage. Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.
EF2	111-135 mph	Considerable damage. Roofs torn off well-constructed houses; foundations of frame houses shifted; mobile homes completely destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
EF3	136-165 mph	Severe damage. Entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance.
EF4	166-200 mph	Devastating damage. Well-constructed houses and whole frame houses completely leveled; cars thrown and small missiles generated.
EF5	>200 mph	Extreme damage. Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 m; steel reinforced concrete structure badly damaged; high-rise buildings have significant structural deformation.

Source: S.C. Hazard Mitigation Plan, SCEMD, 2013

6. Earthquakes

An earthquake is the motion or trembling of the ground caused by a sudden displacement of rock in the Earth's crust. Earthquakes can impact large geographic areas, causing devastating property damages, deaths and injuries, and the disruption of the social and economic function of the affected area. Most property damage and earthquake related deaths are caused by the failure and collapse of structures due to the shaking of the ground. The level of damage

depends on the amplitude and duration of the shaking. Earthquakes can spawn additional hazards such as landslides and liquefaction, in which the ground soil loses the ability to resist shear and flows, much like quick sand. Anything relying on the substrata for support can shift, tilt, rupture, or collapse during liquefaction (*S.C. Hazard Mitigation Plan, 2013*).

Earthquakes are measured in terms of their magnitude and intensity. The most widely known measure is magnitude. Magnitude is calculated using the Richter scale, a logarithmic scale that describes the energy release of an earthquake through a measure of the shock wave amplitude (Table 5-11). Intensity is commonly measured using the Modified Mercalli Intensity (MMI) Scale, based on direct and indirect measurements of seismic effects.

South Carolina experiences about 10 to 15 earthquakes each year, with only three to five felt by residents. Because of the low frequency of noticeable events, many people are unaware of the earthquake risk in the State. However, approximately 70% of earthquake activity in South Carolina is located in the Middleton Place-Summerville Seismic Zone located 12 miles northwest of Charleston and well south of Kershaw County.

Table 5-11. Richter Scale

Richter Magnitudes	Earthquake Effects
Less than 3.5	May or may not be detectable by people, recorded by instruments
3.5-5.4	Often felt, dishes break, doors and windows rattle
Under 6.0	Slight damage to buildings
6.1-6.9	Moderate damage to buildings
7.0-7.9	Serious damage, buildings may collapse, loss of life
8 or greater	A great earthquake that causes total damage and great loss of life

Source: S.C. Hazard Mitigation Plan, SCEMD, 2013

The Midlands region of South Carolina is considered at low risk for major earthquakes of a magnitude of 6 or more on the Richter scale. Under a *worst-case* scenario modeled by SCDNR and the S.C. Geological Survey (SCGS) using magnitudes similar to the 1886 and 1913 earthquakes in Charleston and Union County, the intensity in Kershaw County would likely register at Level VIII on the Modified Mercalli Intensity Scale. During a Level VIII earthquake, drivers have trouble steering, poorly built structures suffer severe damage, and ordinary buildings partially collapse. Tree branches break, houses not bolted down can shift on their foundations, and tall structures such as towers and chimneys can twist and fall.

Kershaw County has had very little history with earthquakes, with only three recorded between 1843 and 2011, including one of 2.9 magnitude in April 1843, one of 2.8 magnitude in November 1975, and the most recently recorded event in June 2011 with a magnitude of 2.3. The epicenter of the 2011 event was located six miles north of Camden. While earthquakes are rare, the County is bisected by the Pax Mountain fault system that runs from Elgin to Bethune. This system indicates the possibility of future earthquakes. While the ability to accurately predict when and where earthquakes will occur is not yet available, forecasts provided in the

S.C. Hazard Mitigation Plan estimate a 1.6% future probability (chance per year) of an earthquake occurring in Kershaw County.

7. Hurricanes and Tropical Storms

The majority of hurricanes and tropical storms occur during the official six-month Atlantic hurricane season that begins in June and lasts through November. The peak of the hurricane season generally occurs early to mid-September. Three types of tropical cyclones can occur and impact the State's coastal and inland communities. A *tropical depression* is an organized system of clouds and thunderstorms with a defined circulation and maximum sustained winds of 38 mph (33 knots) or less. A *tropical storm* is an organized system of strong thunderstorms with a defined circulation and maximum sustained winds of 39 to 73 mph (34-63 knots). A *hurricane* is an intense tropical weather system with a well-defined circulation and maximum sustained winds of 74 mph (64 knots) or higher. Hurricane intensity is further classified by the Saffir-Simpson Scale, which rates hurricane intensity on a scale of 1 to 5, with 5 being the most intense (Table 5-12). The Scale categorizes hurricane intensity based on a combination of maximum sustained winds, barometric pressure, and storm surge potential. Categories 3, 4, and 5 are classified as "major" hurricanes. While hurricanes within this range comprise only 20% of total landfalls, they account for more than 70% of the hurricane damage in the United States *(2013 SC Hazard Mitigation Plan)*.

The County's inland location does not eliminate its vulnerability to the secondary effects of hurricanes and tropical storms, as evidenced by the County's ranking of 24th statewide in future probability of a hurricane event *(2013 SC Hazard Mitigation Plan)*. The estimated frequency interval for hurricanes in Kershaw County is 2.36 years. The *2016 Santee-Lynches Hazard Mitigation Plan* reported that 15 hurricanes passed over Kershaw County during a time period that extended from the late 1800s through 2014, resulting in an annual chance of future hurricane events of 9.5%.

Hurricanes and tropical storm damage may also result from spawned tornadoes and inland flooding caused by associated heavy rainfall that usually accompanies these storms. While the threat exists for tornadoes to develop in all storm quadrants, they primarily develop in the northeast quadrant of the storm, as far as 200-400 miles from the storm's center of circulation. Widespread torrential rains, often in excess of six inches, can produce deadly and destructive floods. Long after winds have subsided, hurricanes can generate immense amounts of rain. For instance, in 1999 Hurricane Floyd produced high rainfall totals that resulted in massive inland flooding in South and North Carolina, including Kershaw County.

Hurricane Hugo made landfall in the Charleston area in September 1989 as a Category 4 hurricane with sustained winds of 140 mph and wind gusts exceeding 160 mph. Along its path more than 200 miles inland to Charlotte, North Carolina, the hurricane toppled trees and spawned tornadoes, causing extensive damage and power outages. Hugo was the costliest storm in South Carolina history, resulting in damages of more than $7 billion to property and crops. More recently, Hurricane Matthew made landfall as a Category 1 hurricane near

McClellanville, South Carolina in October 2016, bringing wind and heavy rain of between six and ten inches inland to Kershaw County, with the heaviest rain recorded in the eastern area of the County.

Table 5-12. Saffir-Simpson Scale

Category	Winds (MPH)	Damage Level	Description
1	74–95	Minimal	Very dangerous winds will produce some damage. Well constructed frame homes could have some damage to roof, shingles, vinyl siding and gutters. Large branches of trees will snap and shallowly rooted trees may be topples. Extensive damage to power lines and poles likely will result in power outages that could last a few to several days
2	96–110	Moderate	Extremely dangerous winds will cause extensive damage. Well constructed frame homes could sustain major roof and siding damage. Many shallowly rooted trees will be snapped or uprooted and block numerous roads. Near total power loss is expected with outages that could last from several days to weeks.
3 (major)	111–129	Extensive	Devastating damage will occur. Well-built framed homes may incur major damage or removal of roof decking and gable ends. Many trees will be snapped or uprooted, blocking numerous roads. Storm surges 9 to 12 feet above normal tide heights. Electricity and water will be unavailable for several days to weeks after the storm passes.
4 (major)	130–156	Extreme	Catastrophic damage will occur. Well-built framed homes can sustain severe damage with loss of most of the roof structure and/or some exterior walls. Most trees will be snapped or uprooted and power poles downed. Fallen trees and power poles will isolate residential areas. Power outages will last weeks to possibly months. Most of the area will be uninhabitable for weeks or months.
5 (major)	157+	Catastrophic	Catastrophic damage will occur. A high percentage of framed homes will be destroyed, with total roof failure and wall collapse. Fallen trees and power poles will isolate residential areas. Power outages will last for weeks to possibly months. Most of the area will be uninhabitable for weeks or months.

Sources: S.C. State Climatology Office, 2016; NOAA, National Hurricane Center, 2016

8. Drought

A drought is a period of time with less than normal rainfall. A meteorological drought occurs when precipitation consistently falls short of average levels for periods of months or years. A hydrological drought occurs when the amount of water needed by crops for growth exceeds the amount available in the soil. Periodic droughts are documented throughout South Carolina's climate history, with every decade since 1900 including three or more years of below normal rainfall (SCDNR, December 2016). The most damaging droughts in recent history occurred in 1954, 1986, 1998 to 2002, and fall 2006 to spring 2009. Less severe droughts were reported in 1988, 1990, 1993, and 1995. Adverse drought-related impacts on the population and economy occurred in the areas of agriculture, forestry, tourism, power generation, public water supplies, and fresh water fisheries. More recently, a moderate drought was declared in seven upstate counties in August 2016, with the remainder of the state upgraded to incipient

status. A moderate drought status indicates an increasing threat of drought, while a status of incipient means that there is a threat of drought. As of December 2016, Kershaw County remained under an incipient drought status.

G. GOALS, OBJECTIVES AND STRATEGIES FOR IMPLEMENTATION

The goals, objectives and strategies for implementation (GOIS) table summarizes the actions that will be undertaken in the coming decade to achieve to achieve the goals and objectives identified in the element. Element goals are broad based ideals that are intended to guide the future of the community, while an objective is a more specific elaboration of a goal that also provides direction. Together the goals and objectives outline the framework for the element and provide the basis for the more detailed and specific plan strategies. Each implementation strategy includes a listing of the agencies that will be accountable for the implementation of the strategy, as well as a time frame for the completion of the strategy.

Goals/Objectives/Strategies	Accountable Agencies	Time Frame for Completion
Goal 5.1. Protect and improve air quality in Kershaw County.		
Objective 5.1.1. Continue to support local and regional plans and policies related to air quality.		
Strategy 5.1.1.1. Continue coordination and partnership with jurisdictions in the Midlands and Santee Lynches Regions in collaborative efforts to improve air quality.	Kershaw County Santee-Lynches COG (SLCOG) Central Midlands COG (CMCOG) SCDHEC Regional Partners	On-going
Strategy 5.1.1.2. Continue to provide information to the public about air quality, particularly air quality alerts.	Kershaw County	On-going
Strategy 5.1.1.3. Continue to enforce open burning regulations.	Kershaw County	On-going
Strategy 5.1.1.4. Support, enable and promote alternative transportation such as ride-sharing, walking, and biking where feasible to reduce vehicular emissions.	Kershaw County Regional Partners	On-going
Objective 5.2.1. Protect and preserve prime agricultural and forest lands.		
Strategy 5.2.1.1. Explore partnerships to encourage and promote the preservation of prime agricultural and forest lands through methods such as location of compatible uses adjacent to such lands and buffering of incompatible uses.	Kershaw County Property Owners Clemson Extension Service USDA	On-going
Strategy 5.2.1.2. Review existing regulations and policies and update as needed to remove any obstacles to the protection and preservation of prime agricultural and forest lands.	Kershaw County	2020
Strategy 5.2.1.3. Provide incentives, technical assistance, and streamlined permitting to support sustainable farm and forestry practices.	Kershaw County Property Owners Clemson Extension Service SC Department of Agriculture USDA	On-going
Objective 5.2.2. Protect rare and endangered species habitat within the County.		
Strategy 5.2.2.1. Develop partnerships among local governments, SCDNR, property owners, and conservation organizations to inventory and map locations of rare and endangered species within the County.	Kershaw County Municipalities SCDNR Conservation Organizations Property Owners	2023
Strategy 5.2.2.2. Review existing regulations and policies to remove obstacles and support opportunities to protect rare and endangered species habitat such as development of greenways and protection of floodplains.	Kershaw County Municipalities	2020
Strategy 5.2.2.3. Support efforts by public and private organizations to protect critical habitats in Kershaw County through easements and other measures as appropriate.	Kershaw County Property/Business Owners Conservation Organizations SCDNR	On-going

Goals/Objectives/Strategies	Accountable Agencies	Time Frame for Completion
Goal 5.2. Protect and preserve the land resources of the County *(Continued).*		
Objective 5.2.3. Maintain and expand parks and recreation facilities for County residents and visitors.		
Strategy 5.2.3.1. Explore the development of a parks, recreation and open space plan for the County to include an inventory of all facilities, upgrades needed, survey of park and recreation needs, and plans for future growth and development of County park and recreation resources.	Kershaw County Municipalities School District	2023
Strategy 5.2.3.2. Work towards promotion and expansion of parks and recreation facilities countywide as part of a comprehensive park system.	Kershaw County Municipalities SCDNR SCPRT	2023
Strategy 5.2.3.3. Maintain public parks and green spaces to a uniform standard of excellence.	Kershaw County Municipalities	On-going
Objective 5.2.4. Establish, protect, and expand natural areas and open space throughout the County.		
Strategy 5.2.4.1. Explore ways to incorporate applicable and appropriate strategies from the Santee-Lynches *Green Infrastructure Plan* into plans, policies, and requirements to preserve, protect, and utilize natural resource assets.	Kershaw County Municipalities Neighboring Counties SLRCOG	2026
Strategy 5.2.4.2. Support and participate in regional *Green Infrastructure* education and implementation efforts, and revisions and updates as needed.	Kershaw County SLRCOG	On-going
Strategy 5.2.4.3. Provide annual updates of available County geospatial data for green infrastructure thematic areas to ensure continued accuracy and completeness of the regional inventory.	Kershaw County Municipalities Special Purpose Districts	On-going
Strategy 5.2.4.4. Review existing regulations and policies to identify additional opportunities and barriers to protecting existing natural areas and open space.	Kershaw County Municipalities	2020
Strategy 5.2.4.5. Continue to require open space in new major subdivisions, multi-family and high density residential development, cluster developments, and planned development districts, while exploring expanded requirements to apply to additional types of new developments and uses.	Kershaw County	On-going
Strategy 5.2.4.6. Support efforts by public and private organizations and property owners to conserve open space, natural areas and scenic vistas in Kershaw County through easements and other measures as appropriate.	Kershaw County Property Owners Conservation Organizations	On-going
Strategy 5.2.4.7. Encourage stewardship of rural landscapes and forests using public and private tools, including conservation easements.	Kershaw County Property Owners Conservation Organizations	On-going
Goal 5.3. Preserve and protect the water resources of Kershaw County.		
Objective 5.3.1. Continue expansion of sewer service to additional areas to reduce dependence on septic systems and risk of contamination of surface and groundwater sources.		
Strategy 5.3.1.1. Support wastewater treatment providers in the extension of sewer service to currently unserved or underserved areas to minimize the need for septic tanks where conditions are not suitable or water sources may be compromised.	Kershaw County City of Camden Public and Private Providers Other Potential Providers	On-going
Strategy 5.3.1.2. Support wastewater treatment providers in the expansion of existing wastewater treatment facilities to accommodate the expansion of water and sewer service.	Kershaw County City of Camden Public and Private Providers Other Potential Providers	On-going
Objective 5.3.2. Monitor, maintain and improve water quality and quantity to meet the needs of County residents, employers, and institutions.		
Strategy 5.3.2.1. Coordinate with water providers to develop a countywide approach to water conservation and protection.	Kershaw County City of Camden Lugoff/Elgin Water Authority Other Utility Providers	On-going
Strategy 5.3.2.2. Explore local and regional strategies to minimize non-point source pollution and institute Best Management Practices for the protection of water resources.	Kershaw County Municipalities Utility Providers SLRCOG SCDHEC	On-going
Strategy 5.3.2.3. Support and coordinate with SCDHEC to mitigate identified water quality impairments.	Kershaw County Municipalities Utility Providers NPDES Permitted Dischargers SCDHEC	On-going

Goals/Objectives/Strategies	Accountable Agencies	Time Frame for Completion
Objective 5.3.2. Monitor, maintain and improve water quality and quantity to meet the needs of County residents, employers, and institutions *(Continued)*.		
Strategy 5.3.2.4. Continue to administer and enforce water quality buffers and coordinate with SLCOG and neighboring counties to promote regional consistency.	Kershaw County Municipalities SLRCOG Duke Energy Neighboring Counties	On-going
Strategy 5.3.2.5. Utilize private and public incentives, technical assistance, and regulations to promote sustainable environmental best practices by individuals, businesses and developers.	Kershaw County Property Owners and Developers	On-going
Objective 5.3.3. Mitigate the impact of new development and redevelopment on water quality.		
Strategy 5.3.3.1. Review current zoning and land development regulations for possible obstacles to water quality perseveration and for opportunities to ensure the protection of water sources and quality.	Kershaw County Municipalities	2020
Strategy 5.3.3.2. Review impervious surface limitations to ensure minimal stormwater runoff and update if needed.	Kershaw County	2020
Strategy 5.3.3.3. Continue to regulate land-disturbance activities to control erosion and sedimentation.	Kershaw County	On-going
Strategy 5.3.3.4. Support regulatory authorities in their efforts to preserve water quality and habitat through shoreline management policies and regulation.	Kershaw County Duke Energy	On-going
Objective 5.3.4. Protect the existing wetland resources of the County.		
Strategy 5.3.4.1. Explore the incorporation of wetland protection in zoning and land development ordinances.	Kershaw County	2020
Strategy 5.3.4.2. Support efforts by public and private organizations to protect wetlands in Kershaw County through conservation easements and other measures as appropriate.	Kershaw County Property Owners SCDNR Conservation Organizations	On-going
Objective 5.3.5. Minimize flooding risk to County residents and business owners through the protection of floodplains and floodways.		
Strategy 5.3.5.1. Periodically review floodplain regulations and procedures to ensure protection per FEMA requirements and to evaluate conditions that may require more stringent standards.	Kershaw County	Every two years
Strategy 5.3.5.2. Review and update the Kershaw County Flood Damage Prevention Ordinance.	Kershaw County	2019
Goal 5.4. Enhance and promote access to natural resources and associated recreational activities for residents and visitors.		
Objective 5.4.1. Encourage coordination among County and municipal recreation and natural resource managers.		
Strategy 5.4.1.1. Consider the formation of a natural and recreational resources advisory committee to explore opportunities for coordination and cooperation in Kershaw County to include planning for and implementing public and private recreation and natural resource programs and activities.	Kershaw County Municipalities Kershaw County School District SCDNR SCPRT Duke Energy	2026
Objective 5.4.2. Strengthen awareness of the natural resources and recreational opportunities available in Kershaw County among residents and visitors.		
Strategy 5.4.2.1. Convene an advisory committee to determine the most effective approaches for raising awareness among County residents and visitors of the abundant natural resources and recreation opportunities in the County.	Kershaw County Municipalities Chamber of Commerce Kershaw County School District SCPRT and SCDNR Duke Energy Recreation Interest Groups	2026
Strategy 5.4.2.2. Develop promotional information on natural resource and recreational opportunities in the County in both digital and printed formats for distribution through a wide variety of media to include posting on web sites and social media applications, distribution of print materials, and inclusion in appropriate publications.	Kershaw County Municipalities Chamber of Commerce Kershaw County School District SCPRT and SCDNR Local and Regional Media Recreation Interest Groups	2023

Goals / Objectives / Strategies	Accountable Agencies	Time Frame for Completion
Objective 5.4.3. Enhance and promote access to Lake Wateree and the Wateree River.		
Strategy 5.4.3.1. Develop riverfront public use spaces such as walking paths at U.S. Highway 1 between Lugoff and the City of Camden.	Kershaw County SCDNR	2026
Strategy 5.4.3.2. Identify potential additional public access points along the Wateree River.	Kershaw County SCDNR Recreation Interest Groups	2020
Strategy 5.4.3.3. Acquire green spaces along the Wateree River and tributary basins to improve access to the Wateree River Blue Trail.	Kershaw County SCDNR Conservation Organizations	2026
Strategy 5.4.3.4. Work with public and private organizations to identify and develop public access points on Lake Wateree for camping, fishing, picnicking, boat access, and recreation.	Kershaw County Conservation Organizations Recreation Interest Groups Duke Energy	2023
Objective 5.4.4. Develop a comprehensive network of recreational trails, greenways and paths in the County.		
Strategy 5.4.4.1. Work with community partners and municipalities to implement, as appropriate and feasible, the recommendations of the Kershaw County Bicycle, Pedestrian, and Greenways Plan.	Kershaw County Municipalities Community Partners	On-going
Strategy 5.4.4.2. Research and develop the abandoned Norfolk Southern rail corridor as a greenway.	Kershaw County City of Camden	2023