

*Water
Pollution
Control*

Watershed Water Quality Management Strategy

Savannah-Salkehatchie Watershed



South Carolina
DHEC
Department of Health and Environmental Control

Technical Report No. 002-93

Watershed Water Quality Management Strategy

SAVANNAH-SALKEHATCHIE WATERSHED



Technical Report No.002-93

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*Thanks for help!
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Introduction

The South Carolina Department of Health and Environmental Control (SCDHEC) initiated its first watershed planning activities as a result of a U.S. Environmental Protection Agency (USEPA) grant in June of 1972. These activities were soon extended by §303(e), "Federal Water Pollution Control Act Amendments of 1972", U.S. Public Law 92-500. In 1975, the SCDHEC published basin planning reports for the four major basins in South Carolina. The next major planning activity resulted from §208 of the Federal Water Pollution Control Act, which required states to prepare planning documents on an areawide basis. Areawide plans were completed in the late 1970's for the five designated areas of the State and for the nondesignated remainder of the State. To date, these plans or their updated versions have served as an information source for water quality management.

During the past decade, special water quality initiatives and Congressional mandates have diverted attention and resources from comprehensive water quality assessment and protection. The Bureau of Water Pollution Control initiated watershed planning to reemphasize a coordinated approach to river basin development and water quality management. Watershed-based management allows the Department to address Congressional and Legislative mandates in a coordinated manner and to better utilize current resources. The watershed approach also improves communication between the Department, the regulated community, and the public on existing and future water quality issues (SCDHEC 1991a).

Purpose of the Watershed Water Quality Management Strategy

By definition, a watershed is a geographic area into which the surrounding waters, sediments, and dissolved materials drain, and whose boundaries extend along surrounding topographic ridges. Watershed-based water quality management recognizes the interdependence of water quality related activities associated with a drainage basin including: monitoring, problem identification and prioritization, water quality modelling, planning, permitting, and other activities. The Bureau of Water Pollution Control's Watershed Water Quality Management Program integrates these activities by watershed, resulting in watershed management plans and implementation strategies that appropriately focus water quality protection efforts. While an important aspect of the strategy is water quality problem identification and solution, the emphasis is on problem prevention.

Five major drainage basins divide the State along hydrologic lines and serve as management units. A Watershed Water Quality Management Strategy will be created for each of the five basins and will be updated on a five-year rotational basis. This will allow for effective allocation and coordination of water quality activities and efficient use of available resources. The watersheds described in this strategy document focus on the Savannah-Salkehatchie Basin, which will be updated in 1997.

The watershed-based strategy fulfills a number of USEPA reporting requirements including various activities under §303(d), §305(b), §314, and §319 of the Clean Water Act (CWA). Section 303(d) identifies waters located within a watershed which do not meet applicable water quality standards and indicates where total maximum daily load (TMDL) development is applicable. Section 305(b) requires that the State biennially submit a report that includes a water quality description and analysis of all navigable waters to estimate environmental impacts. The Clean Lakes section (§314) requires that the State submit a biennial report that identifies, classifies, describes and assesses the status and trends in water quality of publicly owned lakes. The watershed plan is a logical evaluation, prioritization, and implementation tool for nonpoint source (§319) requirements. Nonpoint source best management practices (BMPs) can be selected by identifying water quality impairments and necessary controls, while considering all the activities occurring in the drainage basin.

The strategy also allows for more efficient issuance of National Pollutant Discharge Elimination System (NPDES) and State wastewater discharge permits. Proposed permit issuances within a watershed will be consolidated and presented to the public in groups, rather than one at a time, allowing the Department to realize a resource savings, and the public to realize an information advantage.

Watershed Description

The **Savannah-Salkehatchie Basin** incorporates some 5 million acres and 60 watersheds within the State of South Carolina. The **Savannah River Watershed** incorporates areas within the States of North Carolina, Georgia, and South Carolina, approximately 10,000 square miles, thus ranking it among the major watersheds of the Southeast. Geographic regions included in the Savannah River Watershed range from the Blue Ridge (mountain) through the Piedmont, and the Upper and Lower Coastal Plains to the Coastal Zone.

The Tallulah River and Chattooga River, originating in Georgia and North Carolina, respectively, join to form the Tugaloo River on the South Carolina/Georgia State border. The Horsepasture River flows into the Toxaway River which flows over the North Carolina State boundary into South Carolina, where it merges with the Whitewater River and Thompson River to form Lake Jocassee, the Keowee River and eventually Lake Keowee. The Seneca River flows out of Lake Keowee to converge with the Tugaloo River and form the headwaters of the Savannah River, which serves as the physical boundary between the States of South Carolina and Georgia. The Savannah River then flows through Lake Hartwell, Lake Richard B. Russell, and Lake Thurmond and empties into the Atlantic Ocean at the port city of Savannah, Georgia.

The portion of the Savannah River Watershed within South Carolina as described in Watershed Management Units 0101, 0102 and 0103, encompasses 2,983,612 acres of which 4% is urban land, 15% is agricultural land, 14% is scrub land, 1% is barren land, 57% is forested land, 4% is forested wetland, 1% is nonforested wetland, and 4% is water (SCLRCC 1990). The urban land percentage is comprised chiefly of the Cities of Anderson, Aiken, and North Augusta.

The **Salkehatchie River Watershed** is contained within South Carolina and is described in Watershed Management Unit 0104. The Salkehatchie River Watershed originates in the Sandhills region and flows through the Lower Coastal Plain and Coastal Zone regions. The Salkehatchie River joins with the Little Salkehatchie River to form the Combahee River, which empties into St. Helena Sound and the Atlantic Ocean. Also included in the Watershed are drainages from the Ashepoo River, the Coosawhatchie River, Broad River, and the New River. The entire watershed encompasses 2,127,766 acres of which 3% is urban land, 15% is agricultural land, 14% is scrub land, 0.4% is barren land, 35% is forested land, 16% is forested wetland, 10% is nonforested wetland, and 7% is water (SCLRCC 1990). The urban land percentage is comprised chiefly of Hilton Head Island and the Beaufort area.

Program Area Descriptions

Water Quality

Monitoring Overview

In an effort to evaluate the State's water quality, the Department operates a permanent Statewide network of primary ambient monitoring stations and flexible, rotating secondary and watershed monitoring stations (SCDHEC 1992a). The ambient monitoring network is directed towards determining long-term water quality trends and identifying locations in need of additional monitoring efforts.

The monitoring data are also used in the process of formulating permit limits for wastewater discharges with the goal of maintaining State and Federal water quality standards and criteria in the receiving streams. These standards and criteria define the instream chemical concentrations which provide for protection and reproduction of aquatic flora and fauna, support the use classification of each waterbody, and serve as instream limits for the regulation of wastewater discharges or other activities. In addition, these data are used in the preparation of the biennial §305(b) report to Congress, which summarizes State waters with respect to use classification attainment by comparing the ambient monitoring network data to the State Water Quality Standards. The ambient monitoring network, as a program, involves sampling a wide range of media and analyzing them for the presence or effects of contaminants.

The SCDHEC Water Quality Monitoring Network is comprised of three station types: primary, secondary, and watershed stations. Primary stations are sampled on a monthly basis year round, and are located in high water-use areas or as background stations upstream of high water-use areas. The primary station network is operated statewide, and is very static from one year to the next. The primary network is best suited to detecting long term trends, and receives the most extensive parameter coverage.

Secondary stations are sampled monthly from May through October within the Target Basin, as well as selected areas outside the Basin. Secondary stations are located in areas where specific monitoring is warranted because of point source discharges, or areas with a history of water quality problems. Secondary station parameter coverage is less extensive and more flexible than primary or watershed station coverages. The number and locations of secondary stations have greater annual variability than do those in the primary station network.

Watershed stations are sampled on a monthly basis, year round, during the year of focus for that watershed; additional watershed stations may be sampled monthly from May through October to augment the secondary station network. Watershed stations are located to provide more complete and representative watershed coverage within the larger drainage basin for the identification of additional

monitoring needs. The parameter coverage of watershed stations is more extensive and consistent than secondary stations, but not as extensive as primary stations.

Ambient monitoring data from 59 primary stations and 46 secondary stations were reviewed for the Savannah-Salkehatchie Watershed. In addition, data were included from four inactive stations, which had extensive data for the time period reviewed. There were no watershed stations established for the current assessment; however, these stations will be established and included in the 1997 assessment update.

Monthly, quarterly or annual water column grab samples are used to establish representative physical conditions and chemical concentrations in the waterbodies sampled. This information is considered to represent "average" conditions related to the highly variable nature of flowing water situations. Water flows continuously and discrete inputs quickly proceed downstream. The immediate instream chemical concentrations resulting from nonpoint source inputs due to rain or from point source inputs of a variable nature are seldom measured. Routine sampling events rarely coincide with the time of the release; and the inputs may be undetectable by the monthly collection.

Many pollutants may be components of point source discharges, but may be discharged in a discontinuous manner, or at such low concentrations that water column sampling for them is impractical. Some pollutants are also common in nonpoint source runoff, reaching waterways only after a heavy rainfall; therefore, the best media for the detection of chemicals are sediment and fish tissue, in which they may accumulate over time. Their impact may also be manifested in the macroinvertebrate community.

Aquatic sediments represent a historical record of chronic conditions existing in the water column. Pollutants bind to particulate organic matter in the water column and settle to the bottom where they become part of the sediment "record". This process of sedimentation not only reflects the impact of point source discharges, but also incorporates nonpoint source pollution washed into the stream during rain events. As a result, contaminant concentrations originating from irregular and highly variable sources are recorded in the sediment. The sediment concentrations at a particular location do not vary as rapidly with time as do the water column concentrations. Thus, the sediment record may be read at a later time, unrelated to the actual release time.

Classified Waters, Standards, and Natural Conditions

The waters of the State have been classified in regulation based on the desired uses of each waterbody. State Standards for various parameters have been established to protect all uses within each classification. The water-use classifications (SCDHEC 1992b) are as follows.

Class ORW, or "outstanding resource waters", are freshwaters or saltwaters which constitute an outstanding recreational or ecological resource, or those freshwaters suitable as a source for drinking water supply purposes, with treatment levels specified by the Department.

Class FW, or "freshwaters", are suitable for primary and secondary contact recreation and as a source for drinking water supply, after conventional treatment, in accordance with the requirements of the Department. These waters are suitable for fishing, and the survival and propagation of a balanced indigenous aquatic community of fauna and flora. This class is also suitable for industrial and agricultural uses.

Class Trout Waters is comprised of three types of water:

trout natural waters, which are freshwaters suitable for supporting reproducing trout populations and a cold water balanced indigenous aquatic community of fauna and flora,

trout put, grow and take waters, which are freshwaters suitable for supporting the growth of stocked trout populations and a balanced indigenous aquatic community of fauna and flora,

trout put and take waters, which are protected by the standards of Class FW.

Class SA comprises "tidal saltwaters" suitable for primary and secondary contact recreation, crabbing and fishing. The waters are not protected for harvesting of clams, mussels, or oysters for market purposes or human consumption. The waters are also suitable for the survival and propagation of a balanced indigenous aquatic community of marine fauna and flora.

Class SB are "tidal saltwaters" suitable for the same uses listed in SA. The difference between the Class SA and SB saltwater concerns the DO limitations. Class SA waters must maintain daily DO averages not less than 5.0 mg/l, with a minimum of 4.0 mg/l, and Class SB waters maintain DO levels not less than 4.0 mg/l.

Class SFH, or "shellfish harvesting" waters, are tidal saltwaters protected for shellfish harvesting, and are suitable also for uses listed in Classes SA and SB.

The Standards are used as instream water quality goals, and shall not be violated due to wastewater discharge. Using mathematical Wasteload Allocation Models, the impact of a wastewater discharge on a receiving stream, where flow is unregulated by dams, is predicted using 7Q10 streamflows. These predictions are then used to set limits for different pollutants on the National Pollutant Discharge Elimination System (NPDES) permits issued by the Department. The NPDES permit limits are set so that, as long as a permittee (wastewater discharger) meets the established permit limits, the discharge will not be the cause of a standards violation in the receiving stream. All discharges to the waters of the State are required to have an NPDES permit and must abide by those limits, under penalty of law.

The classification of a waterbody can be upgraded as uses and conditions change. Such a reclassification must be approved by the State Legislature. The most significant result of such a reclassification is the tightening of permit limits on the NPDES permitted discharges to the waterbody to protect the upgraded uses. In this way, existing conditions can also be protected against future developmental impacts. Classifications cannot be downgraded.

If a waterbody does not meet the Standards for a particular classification, it does not necessarily mean that the waterbody is polluted or of poor water quality. Classifications are based on desired uses, not on natural or existing water quality. Natural conditions may prevent a waterbody from meeting the water quality goals as set forth in the standards. Actual water quality in a waterbody has no bearing on its classification. Classification is strictly a legal means to obtain the best available treatment of discharged wastewater to protect desired uses. The classification or reclassification of a stream does not necessarily mean that water quality in the stream will ever meet the applicable State Standards.

Under USEPA guidance, a waterbody can fail to meet Standards due to natural causes, and still meet its use classification. Certain types of waterbodies (i.e. swamps, black water rivers, lakes, tidal creeks) may violate Standards as a result of natural processes, and have nothing to do with point source or nonpoint source discharges. Several such waterbodies have been given site specific Standards variances (SCDHEC 1992b).

Water Quality Parameters

DISSOLVED OXYGEN

Oxygen is essential for the survival and propagation of aquatic organisms. If the amount of oxygen dissolved in water falls below the minimum requirements for survival, aquatic organisms or their eggs and larvae may die. A fish kill is a more severe example. Dissolved oxygen (DO) varies greatly due to natural phenomena, resulting in daily and seasonal cycles. Different forms of pollution also can cause declines in DO.

The natural diurnal (daily) cycle of DO concentration is well documented. Dissolved Oxygen concentrations are generally lowest in the morning, climbing throughout the day and peaking near dusk, then steadily declining during the hours of darkness. Changes in DO levels can result from temperature changes or the activity of microscopic plants (algae or phytoplankton) present in a waterbody. Photosynthesis by phytoplankton releases oxygen during the day, which results in a rise in DO. In the dark, respiration consumes DO and lowers the concentration.

There is also a seasonal DO cycle in which concentrations are greater in the colder, winter months and lower in the warmer, summer months. Secondary stations are only sampled during summer months when water temperatures are elevated and DO concentrations are depressed, resulting in higher percentages of DO values below Standards, since there are no high winter values. Streamflow (in freshwater) is lower during the summer, which greatly affects flushing, reaeration, and the extent of saltwater intrusion.

When comparing the SCDHEC data to DO standards, it is necessary to consider several extenuating circumstances that contribute to apparent noncompliance. The SCDHEC sampling protocols are biased to approximate worst case conditions resulting from the combination of the tidal,

diurnal, and seasonal cycles. Samples are collected as a single instantaneous grab sample, which is not truly representative of the daily average used as the criterion for most classifications.

Special studies are conducted in summer months to document worst case conditions. This results in many more samples than usual being collected during the crucial summer months, and a higher percentage of DO excursions, especially at the secondary stations. It is essential to examine the data to ascertain such patterns of excursions before summarily concluding that the indicated violations constitute poor water quality. The impact of biased sampling protocols must also be weighed as a factor in instances of nonsupport of classified uses.

BIOCHEMICAL OXYGEN DEMAND

Five-day biochemical oxygen demand (BOD_5) is a measure of the amount of dissolved oxygen consumed by the decomposition of carbonaceous and nitrogenous matter in water over a five-day period. The BOD_5 test indicates the amount of biologically oxidizable carbon and nitrogen that is present in wastewater or in natural water. Matter containing carbon or nitrogen uses dissolved oxygen from the water as it decomposes, which can result in a DO decline.

The quantity of BOD_5 discharged by point sources is limited through the National Pollutant Discharge Elimination System (NPDES) permits issued by the Department. The discharge of BOD_5 from a point source is restricted by the permits so as to maintain the applicable standard.

pH

The hydrogen ion activity in a water sample is defined as the "pH", and is used as a measure of the acidity or alkalinity of the water. The pH scale ranges from 0 to 14 standard units (SU). A pH of 7 is considered neutral, with values less than 7 being acidic, and values greater than 7 being basic (or alkaline). pH may vary from the ranges specified in the standards due to a variety of natural causes. Low pH values are found in natural waters rich in dissolved organic matter, especially in Coastal Plain swamps and black water rivers. The tannic acid released from the decomposition of vegetation causes the tea coloration of the water and low pHs.

High pH values in lakes during warmer months may be due to high phytoplankton (algae) levels. Continuous creek flushing prevents the development of significant phytoplankton populations. Most phytoplankton are dormant during the cold winter months; and populations begin to increase as the water warms in the spring. The relationship between phytoplankton and pH is well established. Daily cycles in pH are common in waters with significant phytoplankton populations. Photosynthesis by phytoplankton consumes carbon dioxide during the day releasing carbonate, which results in a rise in pH. In the dark, respiration releases carbon dioxide and lowers pH. Soft water lakes and ponds may reach a pH of 9-10 SU during periods of intense photosynthesis when large phytoplankton populations are present; hence, excursions of pH beyond Standards may be the result of natural conditions.

FECAL COLIFORM BACTERIA

Coliform bacteria are present in the digestive track and feces of all warm-blooded animals, including humans, poultry, livestock, and wild game species. Fecal coliform bacteria are themselves generally not harmful, but their presence in surface waters may be serious due to their association with sewage or animal waste. At present, it is difficult to distinguish between waters contaminated by animal waste and those contaminated by human waste.

Diseases that can be transmitted to humans through water contaminated by improperly treated human or animal waste are the primary concern. Fecal coliform bacteria are able to survive in water and are usually more numerous than waterborne disease producing organisms (pathogens). Therefore, it is best to test for fecal coliform bacteria as an indicator of possible fecal contamination than to try to isolate the relatively few pathogens which may be present in water.

Public health studies have established a correlation between fecal coliform numbers in recreational and drinking waters, and the risk of adverse health effects. Based on these relationships, the USEPA and SCDHEC have developed enforceable standards for surface waters to protect against adverse health effects from various recreational or drinking water uses. Proper waste disposal or sewage treatment prior to discharge to surface waters minimizes this type of pollution.

NUTRIENTS

'Nutrients', in terms of environmental water quality, usually refers to phosphorus and nitrogen, which are primary requirements for the growth and reproduction of aquatic plants. Oxygen demanding materials and nutrients are the most common constituents discharged to the environment by man's activities, through wastewater facilities and by agricultural, residential, and stormwater runoff. In general, increasing nutrient concentrations are undesirable because of the potential for accelerated growth of aquatic vegetation and algal blooms which may, in turn, deplete dissolved oxygen and result in fish kills.

The forms of nitrogen routinely analyzed at SCDHEC stations are ammonia (NH_3/NH_4), total Kjeldahl nitrogen (TKN), and nitrite-nitrate nitrogen (NO_2/NO_3). TKN assays the amount of organic nitrogen and ammonia in a sample. Nitrate is the product of aerobic decomposition of ammonia, and is a primary aquatic plant nutrient. Total phosphorus (TP) is measured to determine the phosphorus concentration of surface waters. This test includes all of the various forms of phosphorus (organic, inorganic, dissolved, particulate) present in a sample.

There are no official standards or criteria for nutrients in water. However, the USEPA has issued recommendations for total phosphate phosphorus concentrations in order to limit eutrophication. High densities of phytoplankton can cause fluctuations of pH and DO beyond standards. Since these are only recommendations, and not a true criterion for use in evaluating water quality, it is difficult to determine the significance of elevated TP values. Because TP includes all

forms of phosphorus, including that incorporated into algal biomass, it would be necessary to consider biological data to properly assess the implications of observed concentrations.

HEAVY METALS

The USEPA's heavy metals criteria are based on the acid-soluble fraction of metals in water; however, there is no USEPA accepted analytical method for acid-soluble metals analysis. The analysis used by the Department measures total metal concentration, which is a relatively conservative approach, since the total metal concentration is always greater than the acid-soluble fraction. This approach is recommended by the USEPA in the absence of acid-soluble methods, and estimates worst case conditions, resulting in the detection of many more excursions beyond criteria than if only the acid-soluble fraction were measured.

Most heavy metal criteria are calculated for Class FW from formulas using water hardness. The formulas used to calculate criteria values are constructed to apply to the entire United States, including Alaska and Hawaii. As with all the USEPA criteria, there is also a large margin of safety built into the calculations. The applicability of the hardness based criteria derived from the USEPA formulas to South Carolina waters has been a subject of much discussion. Hardness values vary greatly nationwide, with South Carolina representing the lowest end of the hardness range (statewide average value is approximately 18 mg/l).

Representatives of the USEPA Region IV standards group have stated that no toxicity data for hardness values less than 50 mg/l were used in the development of the formulas. They have expressed reservations about the validity of the formulas when applied to hardness values below 50 mg/l. Based on this opinion, South Carolina's State Standards for metals are based on a hardness of 50 mg/l for waters where hardness is 50 mg/l or less, resulting in several criteria values below the Department's current analytical detection limits. Therefore, any detectable concentration of cadmium, copper or lead is an excursion beyond recommended criteria.

The SCDHEC monitoring data has historically indicated that zinc and copper levels in South Carolina waters are elevated relative to USEPA criteria, apparently a statewide phenomenon in both fresh and salt waters, and possibly resulting from natural conditions. These levels do not appear to adversely affect state fisheries, which suggests that the levels are the result of long-term local conditions to which the fauna have adapted, as opposed to point source pollution events.

It is difficult to assess the significance of heavy metals excursions because of the questionable applicability of the formulas at low hardness values, the occurrence of calculated criteria below present detection limits, and the fact that criteria are based on acid-soluble metals, with the Department employing the more conservative analysis for total metals.

Methodology

At the majority of the SCDHEC's monitoring stations, samples for analysis are collected as single grab samples once per month, quarter or year, depending on the parameter. The USEPA does not define the sampling method or frequency other than indicating that it should be "representative". The grab sample method is considered to be representative for the purpose of indicating excursions relative to criteria, within certain considerations. A single grab sample is more representative of a one-hour average than a four-day average, more representative of a one-day average than a one-month average, and so on; thus, when inferences are drawn from grab samples relative to criteria, sampling frequency and the intent of the standards must be weighed. When the sampling method or frequency does not agree with the intent of the particular standard, any conclusion about water quality should be considered as only an indication of conditions, not as a proven circumstance.

Dissolved oxygen, temperature, and pH are measured monthly at each station in situ according to standard procedures (SCDHEC 1987) as dictated by their primary or secondary status. At many stations, these parameters are sampled as a water column profile, with measurements being made at a depth of 0.3 meters below the water surface and at one-meter intervals to the bottom. At other stations, these parameters were measured only at a depth of 0.3 meters which is considered a surface measurement. For the purpose of this assessment, only surface samples were used in the trend analyses and Standards comparisons. All water and sediment samples were collected and analyzed according to standard procedures (SCDHEC 1981, 1987).

Macroinvertebrate community structure is analyzed routinely at selected stations as a means of detecting adverse biological impacts on the aquatic fauna of the state's waters due to water quality conditions which may not be readily detectable in the water column chemistry.

Results from water quality samples can be compared to State Standards and USEPA criteria, with some restrictions due to time of collection and sampling frequency. For certain parameters, the monthly sampling frequency employed in the ambient monitoring network is insufficient for strict interpretation of the Standards. The time period used to assess Standards compliance was the last complete five years of data. This time period was chosen because of subsequent assessments in the basin that will be evaluated from the new data collected within the five years since the last assessment.

For the Standards comparisons (Appendices A, B, C and D), columns headed with "EXC" are the number of values exceeding the criterion. Columns headed "N" are the total number of surface samples considered in the 1987-1991 time period. The "%" columns are the percentage of values exceeding the criterion.

A dissolved oxygen criterion of 4 mg/l is used for Class SB, 6 mg/l for TPGT, and 5 mg/l for all other Classes. An excursion is an occurrence of a DO concentration less than the appropriate criterion. For fecal coliform bacteria, an excursion is an occurrence of a bacteria concentration greater than 400 per 100 ml for all Classes. As per the latest 305(b) guidance, comparisons to the

bacteria geometric mean standard were not considered appropriate based on sampling frequency and the intent of the standard. For pH, there are several acceptable ranges applied depending on the Class of water: 6-8 SU for TPGT; 6-8.5 SU for FW; 5-8.5 SU for FW*; and 6.5-8.5 for SFH, SA, and SB. An excursion is a value outside of the appropriate range.

In general, support of aquatic life uses is determined based on the percentage of DO and pH excursions, increases in water temperature due to heated effluents, and impacts to the macroinvertebrate community. Support for recreational uses is based on the frequency of fecal coliform bacteria excursions and the occurrence of bathing area closures. Class SFH standards for the consumption of shellfish are more strict than the 400 per 100 ml figure used to evaluate recreational use support. The decision to close an area to harvesting is made by SCDHEC's Shellfish Sanitation Section, based on a different system of monitoring stations and sampling frequency than that of the ambient monitoring network (SCDHEC, 1992a). Fish/shellfish consumption use support is determined by the occurrence of advisories or bans on consumption for a waterbody.

Specifically, for DO, pH and fecal coliform bacteria, an excursion percentage less than or equal to 10 represents full support of uses. A percentage between 11 and 25 is considered partial support of uses, unless excursions are due to natural conditions. A percentage greater than 25 is considered to represent nonsupport of uses, unless excursions are due to natural conditions. For aquatic life uses, even if chemical conditions indicate full support, a slightly impacted or moderately impacted macroinvertebrate community reduces use support to partial or nonsupport status, respectively. A fish consumption advisory or conditionally approved shellfish harvesting status indicates partial use support, a consumption ban or shellfish harvesting closure indicates nonsupport of uses. This is in keeping with the intent of the most recent USEPA 305(b) guidance.

Heavy metals and organic compounds in water and sediment were not used in the determination of use support unless available biological data indicated an impact to biological integrity. However, excursions of heavy metals above criteria for the protection of aquatic life and human health are summarized in the appendices. The occurrence of ubiquitous elements or compounds (such as zinc, copper, DDT, etc.) is not discussed unless the concentration is unusually high, or the frequency of detection is high and in combination with other rarely detected pollutants. The detection of any rare or unusual element or compound is indicated in the discussion.

Columns headed "AQ EXC" contain the number of values in excess of the aquatic life criterion, and "HH EXC" are the number of values in excess of the human health criterion. The column headed "N" is the total number of samples for the particular metal analyzed between 1987 and 1991. Not all metals have human health criteria. Blank cells for metals indicate no metals samples collected at those stations during the period of review.

The USEPA criteria for heavy metals to protect aquatic life are specified as a four-day average and a one-hour average (USEPA 1986). These criteria have been adopted as State Standards (SCDHEC 1992b). Because of the quarterly sampling frequency for heavy metals, the USEPA

advises against comparisons to chronic toxicity criteria (4-day average concentration); therefore, only the one-hour average criterion for the protection of aquatic life was used in the water quality assessment (Table 1). State Standards for human health for several heavy metals were also used in the assessment.

Surface data from each station were analyzed for statistically significant long-term trends (Appendices A, B, C and D) using a modification of Kendall's tau (Bauer *et al.* 1984, Hirsch *et al.* 1982, Smith *et al.* 1982, Smith *et al.* 1987). The modified Kendall test is a nonparametric test which also removes seasonal effects. The basic methodology utilized was that of Smith *et al.* (1982). Flows were not available for most stations; and the parametric concentrations were not flow-corrected. Seasonal Kendall's tau analysis was used to test for the presence of a statistically significant trend of a parameter, either increasing or decreasing, from January 1980 through December 1991. It indicates whether the concentration of a given parameter is exhibiting consistent change in one direction over the specified time period.

A rigorous evaluation for trends in time-series data usually includes a test for autocorrelation. The data were not tested for autocorrelation prior to the trend analysis. It was felt that autocorrelation would not seriously compromise a general characterization of water quality trends based on a twelve-year series of deseasonalized monthly samples.

Table 1. Metal Standards in Water ($\mu\text{g/l}$)				
Metal	Present Detection Level	Freshwater* 1-Hour Ave.	Saltwater 1-Hour Ave.	Human Health
Cadmium	10.0	1.79	43.0	10.000
Chromium (VI)	10.0	16.00	1100.0	50.000
Copper	10.0	9.22	2.9	
Lead	50.0	33.78	140.0	50.000
Mercury	0.2	2.40	2.1	0.153
Nickel	20.0	789.00	75.0	4584.000
Zinc	10.0	65.00	95.0	

* Freshwater Standards based on a hardness of 50 mg/l as CaCO_3 where appropriate.

One of the advantages of the seasonal Kendall test is that values reported as being below detection limits (DL) are valid data points in this nonparametric procedure, since they are all considered to be tied at the DL value. When the DL changed during the period of interest, all values were considered to be tied at the highest DL occurring during that period as suggested by Hirsch *et al.* (1982). Since fecal coliform bacteria detection limits vary with sample dilution, there is no set DL; therefore, for values reported as less than some number, the value of the number was used.

Since it is possible to measure concentrations equal to the value of the DL, values reported as <DL were reduced by subtraction of a constant so that they would remain tied with each other, but be less than the values equal to the DL.

Columns headed with "N" represent the number of samples utilized in the trend analyses. In the other trend related columns: "D" indicates a statistically significant declining trend at an experimentalwise rate (two-sided) of $p \leq 0.1$; "I" indicates a statistically significant increasing trend at an experimentalwise rate (two-sided) of $p \leq 0.1$; "*" indicates no statistically significant trend at $p=0.1$; and blanks indicate that there were insufficient data to perform a trend analysis. Trend analyses for each station are discussed in the watershed narrative evaluations.

Water column and sediment data were reviewed for occurrences of toxic organic compounds. Those detected repeatedly, or in the most recent sampling events, are discussed in the watershed narrative evaluations. There are no standards or criteria for sediments.

Lake Water Quality Assessments

The Clean Lakes Program was established under §314(a) of the Clean Water Act of 1972, with the purpose of implementing methods and procedures to control sources of pollution affecting water quality in publicly-owned freshwater lakes and to restore deteriorated lakes. Specifically, Lake Water Quality Assessments, conducted under §314, identify and classify the trophic condition of publicly-owned and accessible freshwater lakes, establish procedures and methods to control lake pollution sources and to restore water quality, list and describe impaired lakes, and assess the status and trends of lake water quality. Through the Clean Lakes Program, the USEPA provides technical and financial assistance to the State to assess, protect and restore lake water quality. The following classification system was used to determine degree of eutrophication within the State's lakes and to direct focus appropriately, whether for preservation, protection or restoration (SCDHEC 1991b).

Water Quality Category I describes lakes with excessive nutrients, high productivity, the susceptibility to nuisance macrophyte growth, algal blooms, and/or high turbidity; further study is recommended.

Water Quality Category II describes lakes with intermediate water quality, possible susceptibility to degradation; protection is recommended.

Water Quality Category III describes lakes with the highest water quality; preservation is recommended.

Water Supply

Surface water intakes for drinking water are permitted by SCDHEC for municipalities. Surface water intakes for industrial purposes are permitted by SCWRC. Intake location and the volume removed from a stream are included for appropriate watersheds for both drinking water and industrial usages.

Wetlands

The wetlands component of the WWQMS for the Savannah-Salkehatchie Basin will be completed during 1993; and, though not included in this document, it will be available prior to the assessment update. The wetlands component will involve three program areas: outstanding resource waters (ORW), Section 401 certification compliance, and NPDES permit appraisal (SCDHEC 1992c). In cooperation with the S.C. Land Resources Conservation Commission (SCLRCC), Landsat Thematic Mapper (TM) satellite image data will provide an inventory of wetlands in the basin and an image-based geographical information system (GIS) for subsequent monitoring and tracking efforts.

The list of outstanding resource waters will be refined to include the wetlands in the basin that qualify for, and should be afforded, the highest level of protection. The compliance rates of the 401 water quality certifications will be examined for noncompliance, since many projects may not comply with their requirements and may directly or indirectly damage wetland ecosystems as a result, thus defeating the certification program's objectives.

The wetlands program would evaluate NPDES dischargers to defined channels, swamps or very small creeks to determine if overall water quality could be enhanced and environmental impacts reduced. Dischargers would have fewer possible negative environmental impacts if their effluents were diverted into the surrounding wetlands for assimilation and processing, a natural function of wetlands.

Point Source Contributions

Wasteload Allocation Process

Need for a wasteload allocation is initiated by a request from a potential facility to discharge or from an existing discharger to increase its load. The ability of a stream to assimilate oxygen demanding substances is directly related to its physical and chemical characteristics above and below the discharge point. Mathematical modelling techniques are developed to best estimate this capacity. Model outputs provide the basis for permit limits for oxygen demanding substances. The Department's modelling staff may request additional monitoring data depending on the level of the model required. Model derived discharge limits are provided for use in writing the discharge permits. Department staff determine whether the receiving waters are water quality or effluent

limited and selects the appropriate definition. Streams modelled for this assessment are illustrated in the graphical section before each watershed management unit discussion.

TMDL Definition

A Total Maximum Daily Load (TMDL) is the calculated maximum permissible pollutant loading to a water body at which water quality standards are maintained. The load allocation is that portion of the receiving water's loading capacity attributed to nonpoint or background sources; and the waste load allocation is the portion of capacity attributed to point sources. The Total Maximum Daily Load is, then, the sum of load allocations and waste load allocations, and a margin of safety.

TMDLs form links between water quality standards and point and nonpoint source controls. In water quality impaired areas, the TMDL process provides a mechanism to integrate management of point and nonpoint source pollution. Section 303(d) of the Clean Water Act requires states to identify waters that are water quality impaired, whether as a result of nonattainment of point or nonpoint source related water quality standards, or if controls more stringent than minimums set in effluent guidelines are deemed necessary. Where applicable, TMDLs are to be developed by the states in order to achieve nonattained water quality uses, and results are submitted to USEPA for approval.

The §303(d) list of waterbodies that may require TMDL development is documented in the current §305(b) Report (SCDHEC 1992d), and is included in the appropriate watershed descriptions. TMDLs will be developed for waterbodies included on the §303(d) high priority list. Section 304(l) of the Act requires all States to identify all point sources discharging any toxic pollutant that is believed to be impairing stream water quality and to indicate the amount of the toxic pollutant discharged by each source. The §304(l) short list of point source concerns for toxic effluent is documented in the previous §305(b) Report (SCDHEC 1990), and is also included in the appropriate watershed descriptions.

A completed draft permit is sent to the permittee, the SCDHEC District office, and if it is a major permit, to the USEPA to be certified. When the permit draft is finalized, it is put on public notice. Comments from the public are considered and, if requested, a public hearing may be arranged. Both oral and written comments are collected at the hearing, and after considering all information, the Department staff makes the decision whether to issue the permit as drafted, issue a modified permit, or to deny the permit. Everyone who participated in the process receives a copy of the final staff decision. Minor permits will be grouped by watershed and publicly reviewed together; major permits will individually stand public review. Staff decisions may be appealed according to procedure in Regulation 61-72.

Permitting Strategy

The Domestic Wastewater Division and the Industrial and Agricultural Wastewater Division are responsible for drafting and issuing NPDES permits. All NPDES permits in the Savannah-

Salkehatchie Basin are to be drafted and issued, or revoked and reissued by September 30, 1993, and will all be reissued together in 1998. Savannah-Salkehatchie Basin permits that remain unissued after September 30, 1993 will be issued during the first quarter of Fiscal Year 94. These permits will also be reissued in 1998 to coincide with the basin permitting year. Major and minor NPDES reissued permits will be individually public noticed in a newspaper of general circulation and the site will be posted. New NPDES permits and modifications of existing NPDES permits will be issued as the need arises. New permits and modifications of existing permits will be public noticed by newspaper advertisement and site posting. The permitting Divisions for the Savannah-Salkehatchie Basin will coordinate drafting of permits for reissue by watershed management units during the 1998 basin permitting year. Watershed-based joint public notices also will be held in 1998.

The permitting Divisions use general permits with statewide coverage for certain categories of minor industrial NPDES permits. Discharges covered under general permits include utility water, potable surface water treatment plants, potable ground water treatment plants with iron removal, petroleum contaminated groundwater, and mine dewatering activities. Additional activities proposed for general permits include bulk oil terminals, aquacultural facilities, and ready-mix concrete/concrete products. No discharge (ND) systems for land disposal and lagoons are also permitted, but only the municipal and community (private) ND systems will be included in this document.

Nonpoint Source Contributions

Nonpoint source pollutants are generally introduced to a waterbody during a storm event and enter the system from diverse areas, unlike point source pollutants which enter from discrete sources, such as a pipe. Nonpoint source contributions originate from a variety of activities that include agriculture, silviculture, construction, urban stormwater runoff, hydrologic modification, mining and residual wastes. Section 319 of the 1987 amendment of the Clean Water Act requires states to assess the nonpoint source water pollution associated with surface and ground water within their borders and implement a management strategy to control and abate the pollution. The Assessment of Nonpoint Source Pollution in South Carolina (SCDHEC 1989) fulfills the §319 requirement. The NPS Management Program targets waterbodies for priority implementation of management projects. Best management practices (BMPs) will be demonstrated for educational purposes within these watersheds.

Physiographic Regions

The State of South Carolina has been divided into six Major Land Resource Areas (MLRAs) by the USDA Soil Conservation Service (USDA 1982). The MLRAs are physiographic regions that have soils, climate, water resources and land uses in common. The physiographic regions that define South Carolina are as follows.

The **Blue Ridge** is an area of dissected (separated by erosion into many closely spaced valleys), rugged mountains with narrow valleys dominated by forests; elevations range from 1,000 to 3,300 feet.

The **Piedmont** is an area of gently rolling to hilly slopes with narrow stream valleys dominated by forests, farms and orchards; elevations range from 375 to 1,000 feet.

The **Sand Hills** are an area of gently sloping to strongly sloping uplands with a predominance of sandy areas and scrub vegetation; elevations range from 250 to 450 feet.

The **Upper Coastal Plain** is an area of gentle slopes with increased dissection and moderate slopes in the northwestern section that contain the state's major farming areas; elevations range from 100 to 450 feet.

The **Lower Coastal Plain** is an area that is mostly nearly level and is dissected by many broad, shallow valleys with meandering stream channels; elevations range from 25 to 125 feet.

The **Coastal Zone** is a mostly tidally-influenced area that is nearly level and dissected by many broad, shallow valleys with meandering stream channels; most of the valleys terminate in tidal estuaries along the coast; elevations range from sea level to about 25 feet.

Land Use/Land Cover

General land use/land cover data for South Carolina (SCLRCC 1990) was produced by SPOT multispectral satellite images using image mapping software to inventory the state's land classifications, which are as follows.

Urban land is characterized by man-made structures and artificial surfaces related to industrial, commercial and residential uses, as well as vegetated portions of urban areas.

Agricultural/Grass land is characterized by cropland, pasture and orchards, and may include some grass cover in Urban, Scrub/Shrub and Forest areas.

Scrub/Shrub land is adapted from the western Rangeland classification to represent the "fallow" condition of the land (currently unused, yet vegetated), and is most commonly found in the dry Sandhills region including areas of farmland, sparse pines, regenerating forest lands and recently harvested timber lands.

Forest land is characterized by deciduous and evergreen trees not including forests in wetland settings.

Forested Wetland (swampland) is the saturated bottomland, mostly hardwood forests that are primarily composed of wooded swamps occupying river floodplains and isolated low-lying wet areas, primarily located in the Coastal Plain.

Nonforested Wetland (marshland) is dependent on soil moisture to distinguish it from Scrub/Shrub since both classes contain grasses and low herbaceous cover; nonforested wetlands are most common along the coast and isolated freshwater areas found in the Coastal Plain.

Barren land is characterized by an unvegetated condition of the land, both natural (rock, beaches and unvegetated flats) and man-induced (rock quarries, mines and areas cleared for construction in urban areas or clearcut forest areas).

Water (non-land) includes both fresh and tidal waters.

Soil Types

The dominant soil associations, or those soil series comprising, together, over 40% of the land area, were recorded for each watershed in percent descending order. The watersheds all contained up to 6-24 additional soil series not listed that made up the remaining land area percentage. The individual soil series for the Savannah-Salkehatchie Watershed management units are described as follows (USDA 1963-1990).

Ailey soils are well drained loamy and sandy soils with clayey or loamy subsoil.

Albany soils are deep, somewhat poorly drained soils with sandy to loamy subsoil on nearly level terrain.

Argent soils are poorly drained soils on low, nearly level areas and low ridges.

Ashe soils are shallow to moderately deep, well drained to excessively drained soils in steep areas.

Bladen soils are poorly drained soils on low, nearly level areas and low ridges.

Blanton soils are excessively drained soils that have loamy subsoil or are sandy throughout.

Bohicket soils are very poorly drained soils, clayey throughout or mucky and underlain with clayey layers, frequently flooded.

Bonneau soils are deep, moderately well drained soils with loamy subsoil on ridges.

Capers soils are very poorly drained soils, clayey throughout or mucky, and underlain with clayey layers, frequently flooded.

Cataula soils are deep, gently sloping to strongly sloping, well drained soils with a loamy surface layer and a clayey subsoil.

Cecil soils are deep, well drained, gently sloping to sloping soils that have red subsoil.

Chastain soils are poorly drained to well drained soils that are clayey or loamy throughout and are subject to flooding.

Chewacla soils are nearly level, somewhat poorly drained and well drained soils.

Chiple soils are moderately to excessively well drained soils, sandy throughout, on high ridges.

Chisolm soils are deep, well to moderately drained soils with sandy to loamy subsoil on nearly level to gently sloping terrain.

Coosaw soils are somewhat to poorly drained soils, with a moderately thick sandy surface layer and loamy subsoil, on ridges and in depressions.

Coxville soils are deep, poorly drained soils in thick beds of clayey sediment, nearly level.

Davidson soils are deep, gently sloping to strongly sloping, well drained to somewhat poorly drained soils with a loamy surface layer and a clayey subsoil.

Dothan soils are well drained, sandy soils with loamy subsoil.

Echaw soils are well drained soils, sandy throughout on broad, nearly level to gently sloping ridges.

Fuquay soils are well drained, loamy and sandy soils with clayey or loamy subsoil.

Georgeville soils are gently sloping to sloping, well drained and moderately well drained soils.

Goldsboro soils are moderately well to poorly drained soils with loamy subsoil on nearly level ridges and in shallow depressions.

Goldston soils are dominantly sloping to steep, well drained to excessively drained soils.

Hayesville soils are moderately shallow to deep, well drained soils in gently sloping to steep areas, with red to yellow-brown subsoil.

Helena soils are gently sloping to sloping, moderately well drained to well drained soils.

Herndon soils are gently sloping to sloping, well drained and moderately well drained soils.

Hiwassee soils are well drained, moderately sloping soils with clayey subsoil, moderately deep.

Lakeland soils are well drained, sandy soils with loamy subsoil and excessively drained soils.

Lynchburg soils are moderately well to poorly drained soils, with loamy subsoil, on nearly level ridges and in shallow depressions.

Lynnhaven soils are poorly drained sandy soils, with sandy subsoil, in low areas, and prone to ponding.

Madison soils are well drained, moderately sloping soils, with clayey subsoil, moderately deep.

Norfolk soils are deep, well drained soils, with loamy subsoil, nearly level and gently sloping elevated uplands.

Ocilla soils are somewhat poorly to moderately well drained soils with a thick sandy surface layer and a loamy subsoil, or sandy throughout.

Ogeechee soils are poorly drained and moderately well drained, loamy soils with clayey or loamy subsoil, on terraces.

Okeetee soils are deep, somewhat poorly drained soils, with clayey subsoil, on broad low ridges.

Pacolet soils are well drained, moderately steep soils with clayey subsoil, moderately deep.

Paxville soils are somewhat to very poorly drained soils, with loamy subsoil, on low ridges and in depressions.

Pelham soils are deep, poorly drained soils with loamy subsoil on broad flats and in depressions.

Pungo soils are very poorly drained soils, mucky throughout or loamy and underlain with clayey layers, rarely or frequently flooded with freshwater.

Rains soils are moderately well to poorly drained soils, with a loamy subsoil, on nearly level ridges and in shallow depressions.

Saluda soils are excessively drained to well drained, strongly sloping to very steep soils.

Santee soils are very poorly drained soils on low nearly level areas.

Tatum soils are dominantly sloping to steep, well drained to excessively drained soils, with a loamy subsoil, moderately deep or shallow to weathered rock.

Tawcaw soils are poorly drained to well drained soils that are clayey or loamy throughout and are subject to flooding.

Torhunta soils are poorly drained soils, prone to flooding and ponding, with a loamy surface layer and subsoil, or are sandy throughout, on level areas.

Troup soils are well drained, sandy soils with loamy subsoil and excessively drained soils.

Varina soils are nearly level to sloping, well drained soils, with a sandy surface layer and a clayey or loamy subsoil.

Vaocluse soils are well drained, loamy and sandy soils with clayey or loamy subsoil.

Wahee soils are poorly drained soils on low, nearly level areas and low ridges.

Wilkes soils are dominantly strongly sloping to steep, well drained soils.

Slope and Erodibility

The definition of soil erodibility differs from that of soil erosion. Soil erosion may be more influenced by slope, rainstorm characteristics, cover, and land management than by soil properties. Soil erodibility refers to the properties of the soil itself, which cause it to erode more or less easily than others when all other factors are constant.

The soil erodibility factor, K, is the rate of soil loss per erosion index unit as measured on a unit plot (USDA 1978), and represents an average value for a given soil reflecting the combined effects of all the soil properties that significantly influence the ease of soil erosion by rainfall and runoff if not protected. The K values in this assessment were derived from the SCLRCC's Nonpoint Source Pollution Assessment (1988), where values closer to 1.0 represent higher soil erodibility and a greater need for best management practices. The range of K-factor values in the Savannah-Salkehatchie Basin is from 0.08 to 0.35, among the 60 hydrologic units, or individual watersheds.

Ground Water Contamination

Ground water is an important resource for drinking water use, together with agricultural, industrial and commercial usages. The overall quality of South Carolina's ground water is excellent based on USEPA Drinking Water Standards. Contaminated ground water is expensive and difficult to restore; therefore, ground water protection for present and future usage is the management emphasis.

Localized sources of ground water contamination can include: septic tanks, landfills (municipal and industrial), surface impoundments, oil and gas brine pits, underground storage tanks, above ground storage tanks, injection wells, hazardous waste sites (abandoned and regulated), salt water intrusion, land application or treatment, agricultural activities, road salting, spills and leaks. For the purposes of this assessment, only ground water contamination affecting surface waters will be identified (SCDHEC 1991c); a more detailed accounting of ground water contamination will be addressed in the Savannah-Salkehatchie Basin update in 1997.

Shellfish Harvesting Waters

The Shellfish Sanitation Program of the SCDHEC was created to ensure that shellfish and the shellfish harvesting areas meet health and environmental quality standards. These standards are defined by State Regulation 61-47 (SCDHEC 1992b), and by operational manuals developed by the Interstate Shellfish Sanitation Conference (ISSC) and adopted by the USFDA. Shellfish harvesting season extends from September 15 to May 15 with up to a 15 day variance at the start or conclusion of the season. Sanitary surveys, conducted by the Department, assess the coastal waters and determine shellfish harvesting classifications as follows:

Approved harvesting status is assigned to waters that are not contaminated with fecal material, pathogenic microorganisms, nor poisonous and deleterious substances in concentrations dangerous to

human health. The fecal coliform MPN median does not exceed 14/100ml in the water, and 10% of the samples do not exceed 43/100ml.

Conditionally Approved harvesting status is assigned to waters that are subject to temporary conditions of actual or potential pollution. Temporary decline in water quality may be caused by activities such as malfunctioning wastewater treatment plants or nonpoint source pollution after rainfall events. Fecal coliform standards in such waters are the same as for the approved classification.

Restricted harvesting status is assigned to waters where a limited degree of pollution renders the shellfish unsafe for direct marketing, but may be marketed after relaying or depuration. The median fecal coliform levels in restricted waters are between 14 and 88/100ml, with not more than 10% of the samples exceeding 260/100ml.

Prohibited harvesting status is assigned to waters with excessive concentrations of pollutants, or where the potential exists for excessive concentrations. This classification is ascribed to waters where the median fecal coliform MPN exceeds 88/100ml, or more than 10% of the samples exceed 260/100ml. Shellfish may not be harvested from prohibited areas for human consumption; however, prohibited status does not necessarily indicate lesser water quality, but may indicate a potential for variable water quality due to pollutant sources.

The State's shellfish beds are currently being digitized (S.C. Wildlife & Marine Resources Department) and will be available in the near future. Computer generated maps of shellfish bed locations will be produced and be included in the 1997 update of the Savannah-Salkehatchie Basin assessment. A digital computer layer will also be produced of shellfish areas for GIS (geographic information system) analyses.

Growth Potential and Planning

Land use and management, can define the impacts to water quality in relation to point and nonpoint sources. Assessing the potential for an area to expand and grow allows for water quality planning to occur and, if appropriate, increased monitoring for potential impairment of water quality. Indicators used to predict growth potential include water and sewer service, road and highway accessibility, and population trends. These indicators and others are used as tools to determine areas within the Savannah-Salkehatchie Basin having the greatest potential for impacts to water quality as a result of development.

The regional Councils of Governments (COGs), located within the four watershed management units (WMU), include: the Appalachian Council of Governments in WMU-0101 and WMU-0102, the Upper Savannah Council of Governments in WMU-0102, the Lower Savannah Council of Governments in WMU-0103 and WMU-0104, and the Lowcountry Council of Governments in WMU-0104. The Councils of Governments were requested to identify areas of high growth potential that could adversely impact future water quality (Appalachian Council of Governments 1992, Lowcountry Council of Governments 1992, Lower Savannah Council of

Governments 1992, Upper Savannah Council of Governments 1992). The COGs also provided locational information on the landfills in their regions.

Many counties in the Savannah-Salkehatchie Basin lack county wide zoning ordinances; therefore, there is little local regulatory power to influence the direction or magnitude of regional growth. The majority of municipalities have zoning ordinances in place; however, much of the growth takes place just outside the municipal boundaries, where infrastructure is inadequate. The §208 Areawide Water Quality Management Plans were completed in great detail during the 1970's and are in current need of updating. Revision and addition to the COG's Areawide §208 Plans would greatly expand the planning tools needed to predict growth areas and appropriately plan for them.

Watershed boundaries extend along topographic ridges and drain surrounding surface waters. Roads are commonly built along ridge tops, with the best drainage conditions. Cities often develop in proximity to ridges as a result of their plateau terrain. It is not uncommon, then, to find cities or road corridors located along watershed boundaries, and thus influencing or impacting several watersheds.

Implementation Strategy

The implementation strategy details both impaired and unimpaired streams with noteworthy long-term trends. Streams were considered impaired if they were unable to meet classified uses for aquatic life, recreation or fish consumption based on the corresponding standards. The actions indicated will occur prior to the updating assessment in 1997. (DO=Dissolved Oxygen, BOD5=Five day Biological Oxygen Demand; TP=Total Phosphorus; TN=Total Nitrogen)

IMPAIRED STREAMS

PS=Partially Supported; NS=Not Supported

WATERSHED WATERBODY	IMPAIRED USE	STATUS	POSSIBLE CAUSE	PLANNED ACTION
03060102-060 Chattooga River	Recreation	PS - Elevated Fecal Coliform	Nonpoint Source (NPS) Land Use Practices (Poultry Farms)	NPS Target Study Underway for Waste Reduction
03060102-120 Chauga River	Aquatic Life	PS - Impacted Macroinvertebrate Community	Nonpoint Source (NPS) Land Use Practices (Sediments)	NPS Target Study Underway for Sediment Reduction
Norris Creek	Recreation	NS - Elevated Fecal Coliform	Unknown	Further Evaluation Planned -Continue Monitoring
03060101-030 Eastatoe Creek	Recreation	PS - Elevated Fecal Coliform	Unknown	Further Evaluation Planned - Continue Monitoring
03060101-040 Six and Twenty Creek	Recreation	PS - Elevated Fecal Coliform	Point and Nonpoint Sources	Revise Permit Limits - Continue Monitoring
Seneca River Arm of Lake Hartwell	Fish Consumption	NS - Lake Hartwell Advisory	Previous Industrial Discharge	Superfund Process Ongoing
03060101-060 North Fork Twelve Mile Creek	Recreation	PS - Elevated Fecal Coliform	Unknown	Further Evaluation Planned - Continue Monitoring
	Fish Consumption	NS - Lake Hartwell Advisory	Previous Industrial Discharge	Superfund Process Ongoing
Town Creek	Fish Consumption	NS - Lake Hartwell Advisory	Previous Industrial Discharge	Superfund Process Ongoing
Twelve Mile Creek	Recreation	NS - Elevated Fecal Coliform	Point Source	Revise Permit Limits
	Fish Consumption	NS - Lake Hartwell Advisory	Previous Industrial Discharge	Superfund Process Ongoing
	--	Groundwater Contaminated with Volatile Organics	Point Source	Site on EPA National Pollution List
Golden Creek	Recreation	NS - Elevated Fecal Coliform	Point Source	Revise Permit Limits

PS=Partially Supported; NS=Not Supported

WATERSHED WATERBODY	IMPAIRED USE	STATUS	POSSIBLE CAUSE	PLANNED ACTION
03060101-070 Twelve Mile Creek	Recreation	NS, PS (2 sites)- Elevated Fecal Coliform	Point Source	Revise Permit Limits
	Fish Consumption	NS - Lake Hartwell Advisory	Previous Industrial Discharge	Superfund Process Ongoing
	--	Groundwater Contaminated with Volatile Organics	Point Source	Site on EPA National Pollution List
03060101-080 Coneross Creek	Recreation	NS, PS (2 sites)- Elevated Fecal Coliform	Point Source	Consent Order Sent to OCSC to Address Upgrade
03060101-090 Woodside Branch	Aquatic Life	PS - Low DO	Point Source	Revise Permit Limits - Continue Monitoring
	Recreation	NS - Elevated Fecal Coliform		
Eighteen Mile Creek	Recreation	NS - Elevated Fecal Coliform	Point Source	Revise Permit Limits
03060101-100 Three and Twenty Creek	Recreation	PS - Elevated Fecal Coliform	Point Source	Revise Permit Limits
03060103-020 Lake Hartwell	Fish Consumption	PS - Lake Hartwell Advisory	Previous Industrial Discharge	Superfund Process Ongoing
03060103-030 Big Generostee Creek	Aquatic Life	NS - Low DO; Impacted Macroinvertebrate Community	Point Source	Order Issued to WTP - Improvements Underway; Upgrade to Primary Monitoring Station; Revise Permit Limits
	Recreation	NS - Elevated Fecal Coliform		
	--	Groundwater Contaminated with Volatile Organics	Point Source	Point Source in Recovery Phase
03060103-070 Rocky River	Aquatic Life	NS - Low DO Impacted Macroinvertebrate Community	Unknown	Further Evaluation Planned
	--	Receives Contaminated Groundwater from Betsy Creek & Beaver Creek	Point Source	One Under Enforcement & One Being Upgraded
	Recreation	PS - Elevated Fecal Coliform (2 sites)	Point Source	WTP Expanded and Upgraded

PS=Partially Supported; NS=Not Supported

WATERSHED WATERBODY	IMPAIRED USE	STATUS	POSSIBLE CAUSE	PLANNED ACTION
Cupboard Creek	Aquatic Life	PS, NS - Low DO (2 sites)	Point Source	Point Source Being Eliminated
	Recreation	NS - Elevated Fecal Coliform		
Broadway Creek	Recreation	PS - Elevated Fecal Coliform	Point Source	Point Source Being Eliminated
Betsy Creek	Recreation	NS - Elevated Fecal Coliform	Unknown	Further Evaluation Planned
	--	Groundwater contaminated with volatile organics	Point Source	Facility Under Enforcement
Cherokee Creek	Recreation	PS - Elevated Fecal Coliform	Point Source	Point Source Eliminated
Sawney Creek	Recreation	PS - Elevated Fecal Coliform	Point Source	Enforcement Action Underway
03060103-150 Long Cane Creek	Recreation	PS - Elevated Fecal Coliform	Point Source	Revise Permit Limits
Blue Hill Creek	Recreation	NS - Elevated Fecal Coliform	Unknown	Further Evaluation Planned - Continue Monitoring
03060107-010 Hard Labor Creek	Aquatic Life	PS - Low DO (Trends are Improving)	Point Source	Continue Monitoring
	Recreation	NS - Elevated Fecal Coliform		
03060107-030 Beaverdam Creek	Recreation	PS - Elevated Fecal Coliform	Point Source	Point Source Being Eliminated
03060107-040 Stevens Creek	Aquatic Life	PS - Impacted Macroinvertebrate Community	Nonpoint Source	High priority for NPS study
03060106-030 Savannah River	Recreation	PS - Elevated Fecal Coliform	Point & Nonpoint Sources	Continue Monitoring
03060106-050 Horse Creek	--	Groundwater contaminated with volatile organics	Point Source	Continue Special Monitoring
Sand River	Recreation	PS - Elevated Fecal Coliform	Nonpoint Source (NPS) Land Use Practices	Further Evaluation Planned - Continue Monitoring
Langley Pond	Fish Consumption	NS - Fishing Advisory	Previous Industrial Discharge	Further Action Pending Departmental Decision

PS=Partially Supported; NS=Not Supported

WATERSHED WATERBODY	IMPAIRED USE	STATUS	POSSIBLE CAUSE	PLANNED ACTION
03060106-060 Savannah River	Recreation	PS - Elevated Fecal Coliform (upstream site)	Point Source	Revise Permit Limits
	--	Hollow Creek Groundwater contaminated	Point Source	Remediation Phase; Surface Water Verification Planned
03060106-100 Tims Branch	Recreation	PS - Elevated Fecal Coliform	Point Source	Revise Permit Limits
03060106-110 Fourmile Branch	--	Groundwater Contamination	Point Source	Enforcement & Monitoring
03060106-140 Savannah River	--	Groundwater Contamination	Point Source	Surface Water Verification Planned
03060109-060 Savannah River	Aquatic Life	PS - Low DO	Unknown	Study Underway
	Recreation	PS - Elevated Fecal Coliform	Point Source	WTP Under Enforcement to Upgrade
03050207-020 Turkey Creek	Aquatic Life	PS - Low DO	Unknown	Increase Monitoring
	Recreation	PS - Elevated Fecal Coliform	Point Source	Revise Permit Limits
	--	Groundwater contaminated with volatile organics	Point Source	Assessment of Groundwater Contamination Extent Ongoing
03050207-030 Salkehatchie River	Recreation	NS - Elevated Fecal Coliform	Unknown	Further Evaluation Planned - Continue Monitoring
03050207-040 Salkehatchie River	Aquatic Life	PS - Low DO	Unknown	Further Evaluation Planned - Continue Monitoring
	Recreation	PS - Elevated Fecal Coliform		
03050208-010 Combahee Swamp	Aquatic Life	NS - Low DO	Unknown	Further Evaluation Planned - Continue Monitoring
	Recreation	PS - Elevated Fecal Coliform		
03050208-020 Ireland Creek	Aquatic Life	NS - Low DO	Unknown	Increase Monitoring
	Recreation	NS - Elevated Fecal Coliform	Point Source	Revise Permit Limits
03050208-040 Ashepoo River	--	Groundwater Contamination	Point Source	Surface Water Verification Planned
03050208-060 Lake George Warren	Aquatic Life	NS - Low DO	Unknown	Increase Monitoring

PS=Partially Supported; NS=Not Supported

WATERSHED WATERBODY	IMPAIRED USE	STATUS	POSSIBLE CAUSE	PLANNED ACTION
03050208-070 Coosawhatchie River	Aquatic Life	NS - Low DO	Point Source	Special Study Planned
	--	Groundwater contaminated with phenols	Point Source	Remediation phase
Sanders Branch	Aquatic Life	PS - Low DO	Point Source	Special Study Planned
	Recreation	NS - Elevated Fecal Coliform		Consent Order to Upgrade WTP
03050208-090 Coosawhatchie River	Recreation	PS - Elevated Fecal Coliform	Point Source	Special Study Planned
Bees Creek	Recreation	NS - Elevated Fecal Coliform	Unknown	Further Evaluation Planned - Continue Monitoring
Pocotaligo River	Aquatic Life	NS - Low DO	Nonpoint Source (NPS) - Land Use Practices	Further Evaluation Planned - Continue Monitoring
	Recreation	NS - Elevated Fecal Coliform		
Chechessee River	Aquatic Life	NS - Low DO (Elevated BOD5)	Unknown	Further Evaluation Planned - Continue Monitoring
03050208-100 Beaufort River	Aquatic Life	NS - Low DO (Elevated BOD5)	Point & Nonpoint Sources - Poor Flushing	TMDL Development Planned
Whale Branch	Aquatic Life	NS - Low DO (Elevated BOD5)		
	Shellfish consumption	NS - Elevated Fecal Coliform)		
03050208-110 Skull Creek	Aquatic Life	PS - Low DO	Point Source	Increase Monitoring
Calibogue Sound	Shellfish consumption	NS - Elevated Fecal Coliform	Point & Nonpoint Sources	Further Evaluation Planned
03050208-130 New River	Aquatic Life	NS - Low DO	May be natural	Continue Monitoring
	Recreation	NS - Elevated Fecal Coliform	Unknown	Further Evaluation Planned

UNIMPAIRED WATERS WITH NOTABLE TRENDS

The waters listed in this table are not impaired, but rather display long-term trends that bear following, primarily with continued monitoring.

WATERSHED WATERBODY	CONCERN	POTENTIAL CAUSE	PLANNED ACTION
03060102-030 East Fork Chattooga River	Increasing trend in Fecal Coliform	Nonpoint Source (NPS) Land Use Practices (Poultry farms)	NPS Target study-BMPs for Waste Reduction
North Fork Chattooga River	Increasing trend in Fecal Coliform	Nonpoint Source (NPS) Land Use Practices (Poultry farms)	NPS Target study-BMPs for Waste Reduction
	Increasing trend in turbidity	Nonpoint Source (NPS) Land Use Practices (Timber harvesting)	Continue Evaluation
03060102-130 Norris Creek	Declining trend in DO		Continue Evaluation
03060101-040 Seneca River	Declining trend in DO		Continue Evaluation
Lake Hartwell	Declining trend in DO		Continue Evaluation
03060101-050 Lake Keowee	Declining trend in DO		Continue Evaluation
03060101-060 Twelve Mile Creek	Declining trend in DO		Continue Evaluation
	Increasing trend in Turbidity	Point & Nonpoint Sources	Continue Evaluation
03060101-070 Golden Creek	Declining trend in DO		Continue Evaluation
Unnamed Trib to 12Mile Ck	Declining trend in DO		Continue Evaluation
03060101-080 Coneross Creek	Declining trend in DO		Continue Evaluation
	Increasing trend in TN - may cause algal problems	Nonpoint Source	Continue Evaluation
03060103-030 Lake Richard B. Russell	Declining trend in DO	Nonpoint Source	Continue Evaluation
03060103-070 Cupboard Creek	Increasing trend in Turbidity	Nonpoint Source	Continue Evaluation
Betsy Creek	Increasing trend in TP		Continue Evaluation
Cherokee Creek	Declining trend in DO		Continue Evaluation
Lake Secession	Declining trend in DO		Continue Evaluation
	phytoplankton blooms		Recommend Phase I Diagnostic Fesability Study to Identify Extent and Cause of Problems.

WATERSHED WATERBODY	CONCERN	POTENTIAL CAUSE	PLANNED ACTION
Broadway Lake	Floating plants	Nonpoint Source	Phase III Post-Implementation Monitoring (funds pending)
03060103-100 Lake Thurmond	Increasing trend in Fecal Coliform (Increasing trend in Turb. & TSS)	Nonpoint Source	Continue Evaluation
03060103-150 Long Cane Creek	Increasing trend in Turbidity	Nonpoint Source	BMP study for sediment reduction underway
03060107-010 Stevens Creek	Substantial Backflow problem. Declining trend in DO	Lake power generation	Special study recommended
03060106-050 Horse Creek	Declining trend in DO; Increasing trend in Turbidity	Nonpoint Source	Continue Evaluation
Little Horse Creek	Declining trend in DO		Continue Evaluation
03060106-060 Savannah R.	Increasing trend in Turbidity	Nonpoint Source	Continue Evaluation
03060106-100 Upper Three Runs Creek	Increasing trend in Turbidity	Nonpoint Source	Continue Evaluation
Tims Branch	Increasing trend in Turbidity; Increasing trend in TP	Nonpoint Source	Continue Evaluation
03060106-130 Lower Three Runs Creek	Increasing trend in Turbidity and TP	Point & Nonpoint Source	Continue Evaluation
03060106-140 Savannah River	Declining trend in DO		Continue Evaluation
	Increasing trend in Turbidity	Nonpoint Source	Continue Evaluation
03060109-060 Savannah River	Increasing trend in Turbidity	Nonpoint Source	High priority list for BMP study
03050207-010 Salkehatchie River	Increasing trend in Turbidity and Declining trend in DO	Nonpoint Source	Continue Evaluation
03050207-020 Turkey Creek	Increasing trend in Turbidity; Increasing trend in TP	Nonpoint Source	Continue Evaluation
Lake Edgar A. Brown	Algal blooms and numerous aquatic plants	Poor flushing within lake- Nutrients bound in sediment	Restoration and funding mechanisms being identified
03050207-030 Salkehatchie River	Increasing trend in Turbidity	Nonpoint Source	Continue Evaluation
03050207-040 Salkehatchie River	Increasing trend in Turbidity	Nonpoint Source	High priority list for BMP Study

WATERSHED WATERBODY	CONCERN	POTENTIAL CAUSE	PLANNED ACTION
03050208-010 Combahee Swamp	Increasing trend in TP		Continue Evaluation
03050208-020 Ireland Creek	Increasing trend in Turbidity	Nonpoint Source	Continue Evaluation
03050208-060 Lake George Warren	Increasing trend in Turbidity	Nonpoint Source	Continue Evaluation
03050208-070 Coosawhatchie River	Increasing trend in Turbidity	Nonpoint Source	High priority list for BMP study
03050208-090 Coosawhatchie River	Increasing trend in Turbidity	Nonpoint Source	Continue Evaluation
Bees Creek	Increasing trend in Turbidity	Nonpoint Source	Continue Evaluation
Pocotaligo River	Increasing trend in Turbidity	Nonpoint Source	Continue Evaluation
Broad River	Increasing trend in BOD5		Continue Evaluation
Chechessee River	Increasing trend in Fecal Coliform		Continue Evaluation
03050208-100 Whale Branch	Increasing trend in Fecal Coliform		Continue Evaluation
03050208-110 Calibogue Sound	Declining trend in DO		Continue Evaluation
03050208-130 New River	Increasing trend in Turbidity	Nonpoint Source	Continue Evaluation

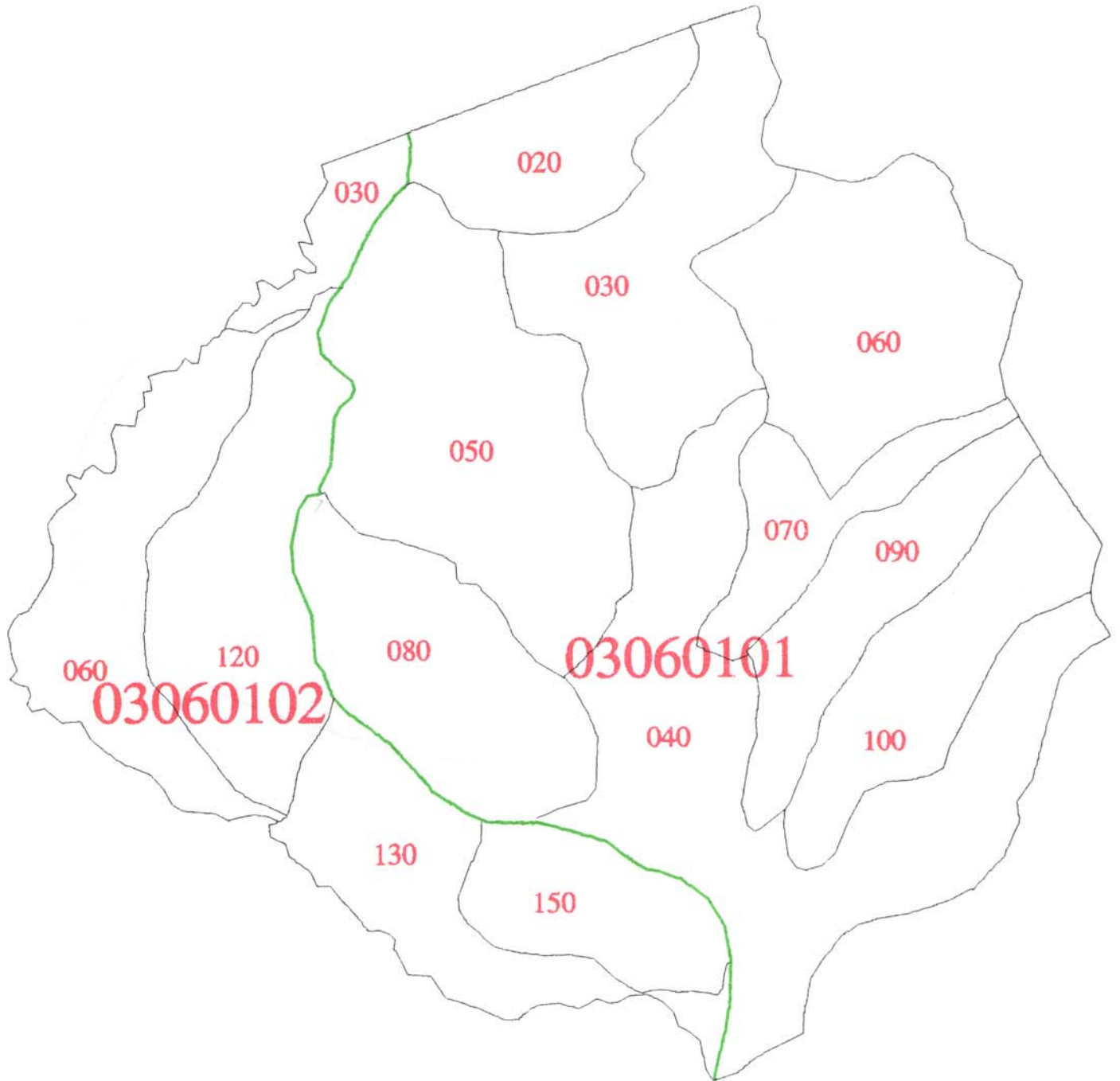
WATERSHED MANAGEMENT UNIT 0101

Climate

Normal yearly rainfall in the WMU-0101 area was 60.97 inches, according to the S.C. historic climatological record (SCWRC 1990). Data compiled from National Weather Service stations in Longcreek, Salem, Walhalla, Clemson University and Pickens were used to determine the general climate information for the northwestern corner of the state. Within the four Savannah-Salkehatchie watershed management units, the highest level of rainfall occurred in WMU-0101, which is characteristic of the mountains and upper piedmont region. The highest seasonal rainfall occurred in the spring with 17.29 inches; 14.88, 12.72 and 16.08 inches of rain fell in the summer, fall and spring, respectively. The average annual daily temperature was 59.7°F, the coolest in the state. Winter temperatures averaged 42.9°F, spring temperatures averaged 59.4°F and summer and fall mean temperatures were 75.6 and 60.8°F, respectively.

Watershed Unit Index Map

Savannah-Salkehatchie Watershed Management Unit 0101



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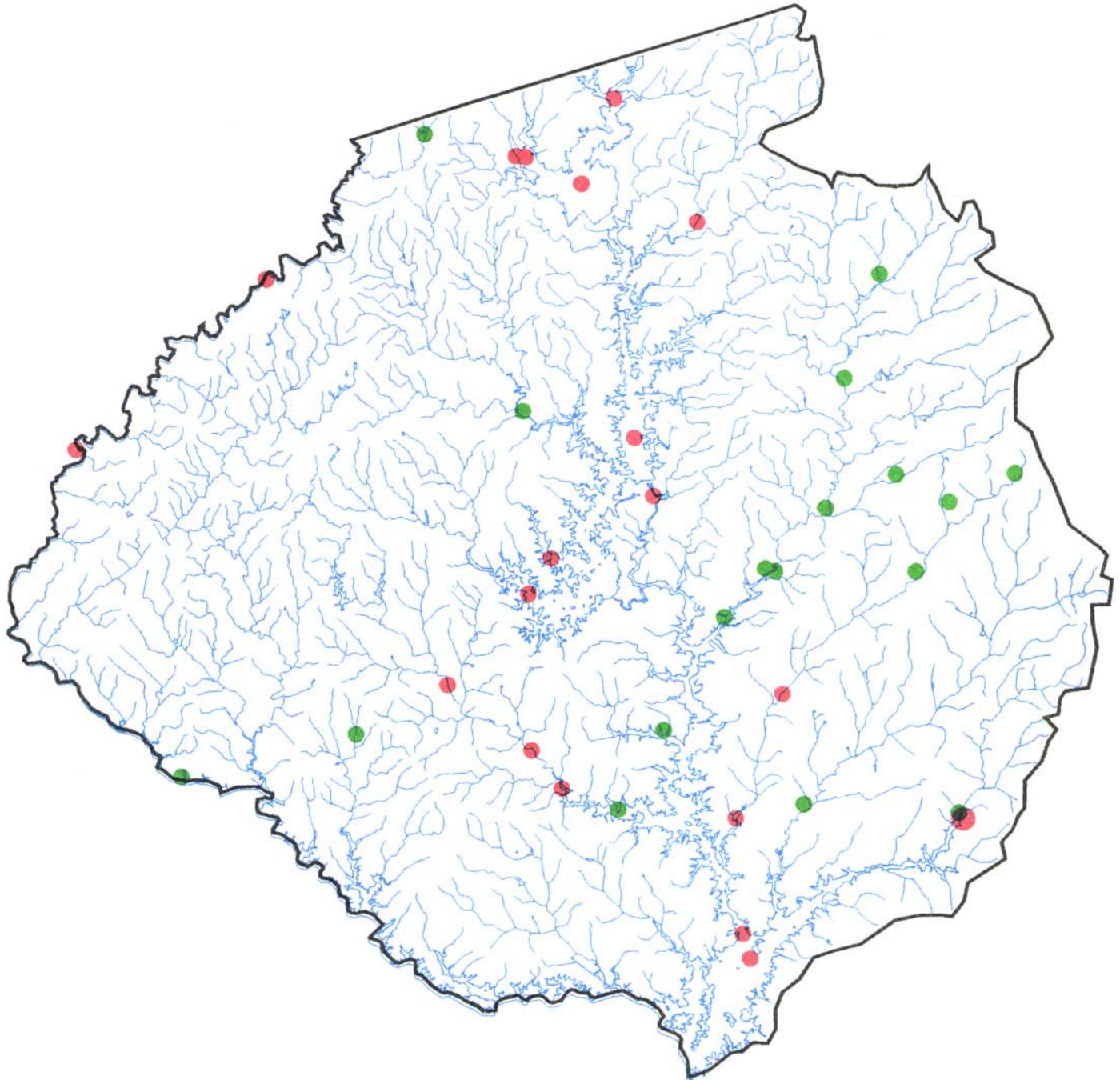
Environmental Quality Control, Sept. 1992

Monitoring Station Descriptions MU-0101

STATION NUMBER	STATION DESCRIPTION	TYPE
03060101-020		
SV-335	LK JOCASSEE AT TOXAWAY, HORSE PASTURE, & LAUREL FORK CONFLUENCE	P
SV-337	LK JOCASSEE OUTSIDE COFFER DAM AT BAD CK PROJECT	P
SV-336	LK JOCASSEE AT CONFLUENCE OF THOMPSON AND WHITEWATER RVRs	P
SV-334	LK JOCASSEE, MAIN BODY	P
03060101-030		
SV-230	BIG EASTATOE CREEK AT S-39-143	P
SV-338	LK KEOWEE ABOVE SC ROUTE 130 AND DAM	P
03060101-050		
SV-203	LITTLE RVR AT S-37-24 7.1 MI NE OF WALHALLA	S
SV-312	LK KEOWEE AT SC 188 - CROOKED CK ARM 4.5 MI N SENECA	P
SV-311	LK KEOWEE AT SC 188 - CANE CK ARM 3.5 MI NW SENECA	P
03060101-080		
SV-333	CONERROSS CK AT S-37-13	P
SV-004	CONERROSS CK AT SC 59	P
SV-322	HARTWELL RES AT S-37-54 (CONERROSS CK ARM)	P
03060101-060		
SV-206	N FORK 12 MI CK AT US 178 2.9 MI N OF PICKENS	S
SV-282	12 MI CK AT S-39-273 2.8 MI SSW OF PICKENS	S
03060101-070		
SV-239	GOLDEN CK AT S-37-222 1.2 MI NW OF LIBERTY	S
SV-015	TWELVE MI CK AT S-39-51 N OF NORRIS	S
SV-137	12 MI CK AT S-39-337	S
SV-136	FIRST CK AFTER LEAVING CENTRAL AT CLVT ON MAW BRDG RD	S
SV-107	TWELVE MI CK AT SC 133	S
03060101-090		
SV-017	18 MI CK AT UNNUMBERED CO RD 2.25 MI SSW OF EASLEY	S
SV-241	WOODSIDE BR AT US 123 1.5 MI E OF LIBERTY	S
SV-245	18 MI CK AT S-39-27 3.3 MI S OF LIBERTY	S
SV-135	18 MI CK AT S-39-93 SW OF CENTRAL	P
SV-268	EIGHTEEN MILE CK AT 2-04-1098	P
03060101-100		
SV-111	THREE & TWENTY CREEK AT CO RD 280	S
03060101-040		
SV-288	HARTWELL RESERVOIR AT SC 24 9.7 MI WNW OF ANDERSON	P
SV-181	6 & 20 CK AT S-04-29 8.2 MI SE OF PENDLETON	S
SV-339	LK HARTWELL, SENECA RVR ARM NEAR MARKERS S-19 AND S-21	P
SV-249	SENECA RVR AT SC 183 3.8 MI WSW SIX MILE	P
SV-106	MARTIN CK ARM OF LAKE HARTWELL AT S-37-65 N OF CLEMSON	S
SV-236	LAKE HARTWELL AT S-37-184 6.5 MI SSE OF SENECA	S
03060102-030		
SV-308	E FK OF CHATTOOGA RVR AT SC 107 2 MI S OF ST LINE	S
SV-227	N FORK CHATTOOGA RVR AT SC 28 3.5 MI NW MT REST	P
03060102-060		
SV-199	CHATTOOGA RVR AT US ROUTE 76	P
SV-200	TUGALOO RVR ARM OF LAKE HARTWELL AT US 123	S
03060102-130		
SV-301	NORRIS CK AT S-37-435 1 MI S OF WESTMINSTER	S

Primary and Secondary Monitoring Stations

Savannah-Salkehatchie Watershed Management Unit 0101

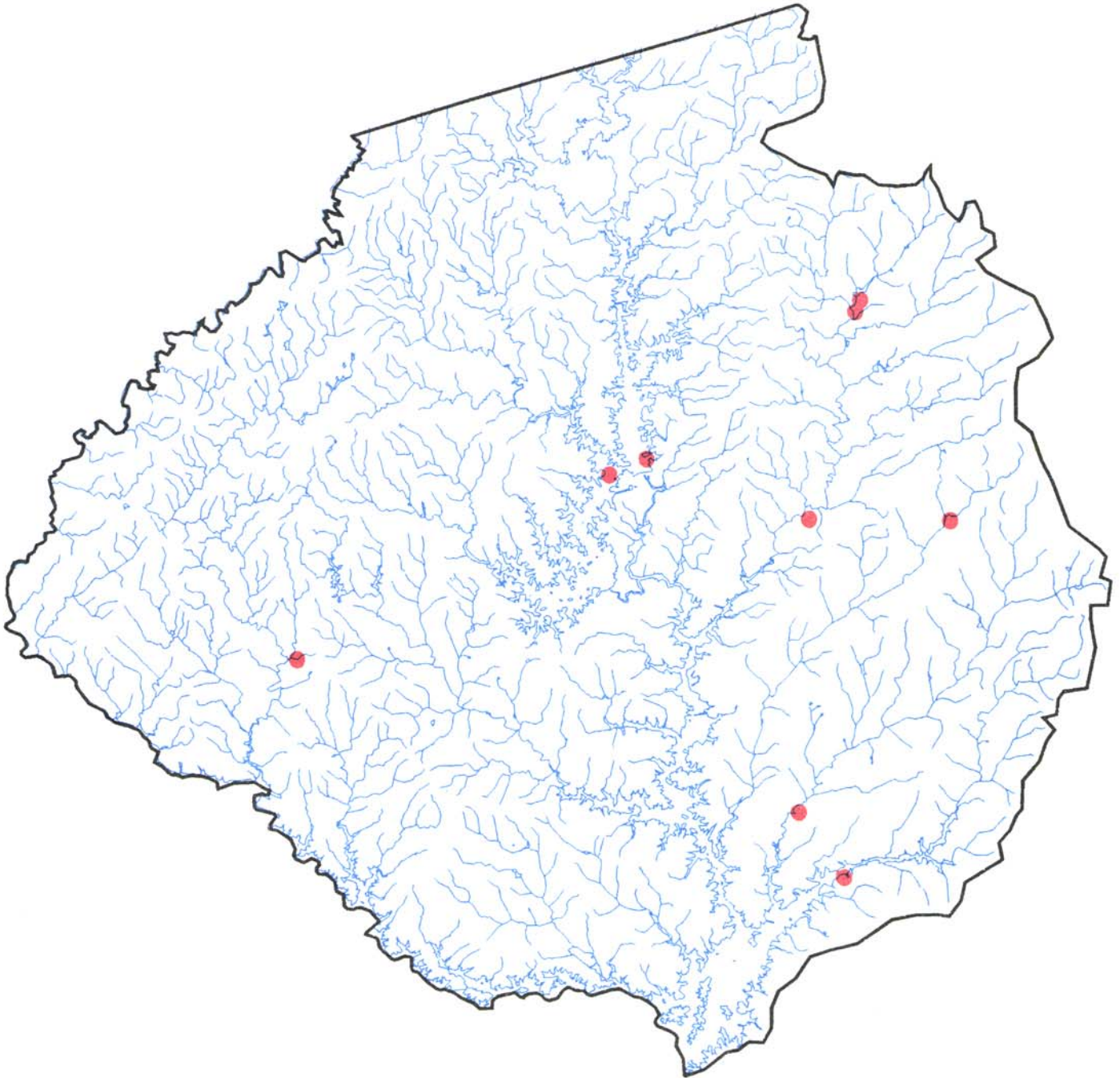


- Primary Monitoring Station
- Secondary Monitoring Station
- Hydrography



Surface Water Intakes

Savannah-Salkehatchie Watershed Management Unit 0101



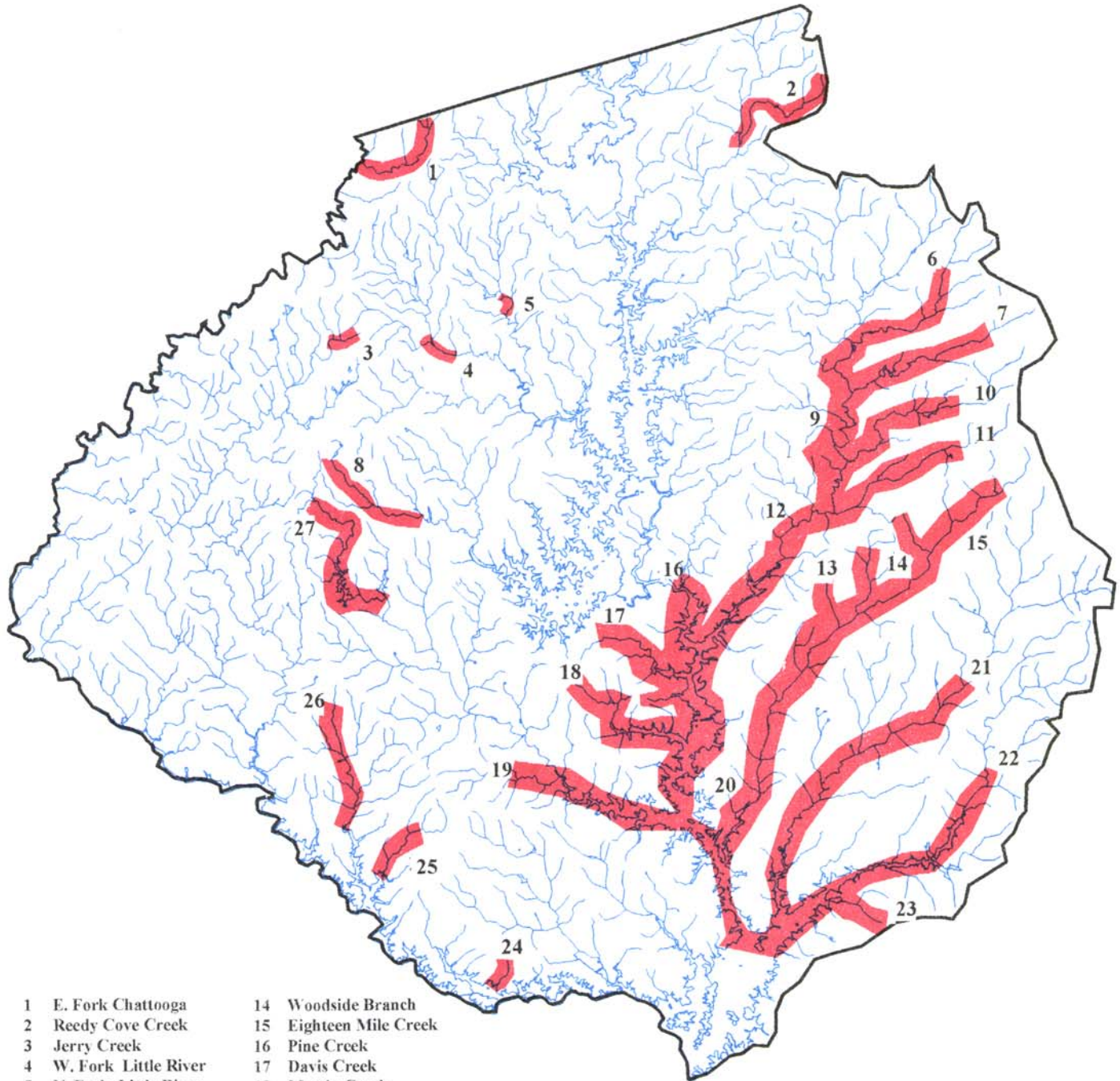
● Surface Water Intake

■ Hydrography



Modelled Streams Map

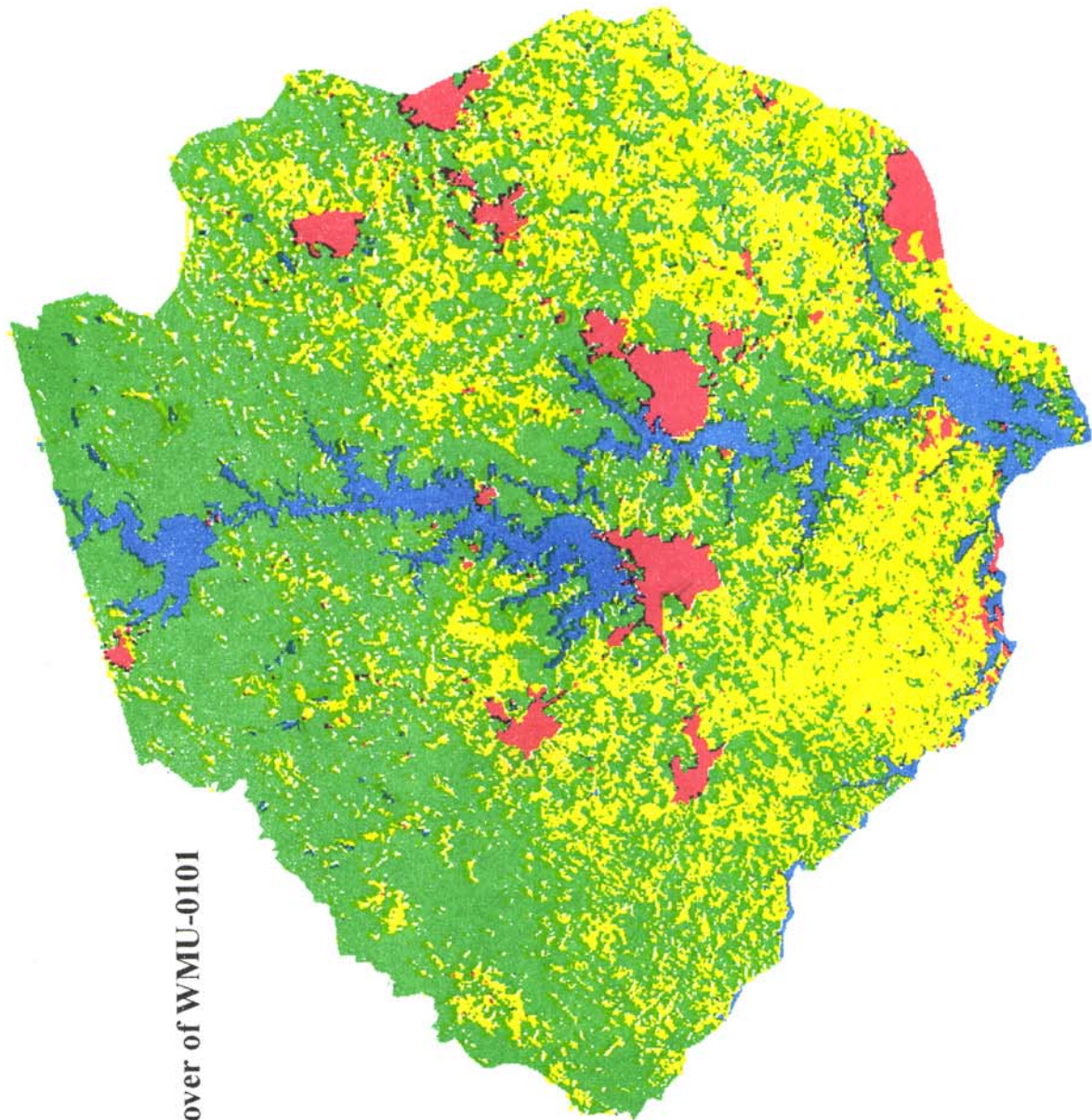
Savannah-Salkehatchie Watershed Management Unit 0101



- | | |
|------------------------|---------------------------------------|
| 1 E. Fork Chattooga | 14 Woodside Branch |
| 2 Reedy Cove Creek | 15 Eighteen Mile Creek |
| 3 Jerry Creek | 16 Pine Creek |
| 4 W. Fork Little River | 17 Davis Creek |
| 5 N. Fork Little River | 18 Martin Creek |
| 6 Town Creek | 19 Coneross Creek |
| 7 Wolf Creek | 20 Seneca River |
| 8 Cane Creek | 21 Three and Twenty Creek |
| 9 Haters Creek | 22 Six and Twenty Creek |
| 10 Rices Creek | 23 Salem Creek |
| 11 Golden Creek | 24 Tugaloo River Arm of Lake Hartwell |
| 12 Twelve Mile Creek | 25 Little Choestoea Creek |
| 13 Mohahasce Branch | 26 Choestoea Creek |
| | 27 Little Coneross Creek |



+



Land Use/Land Cover of WMU-0101

- Forest
- Agriculture
- Urban
- Water

Groundwater Contaminated Sites

Savannah-Salkehatchie Watershed Management Unit 0101



● Sangamo

■ Hydrography

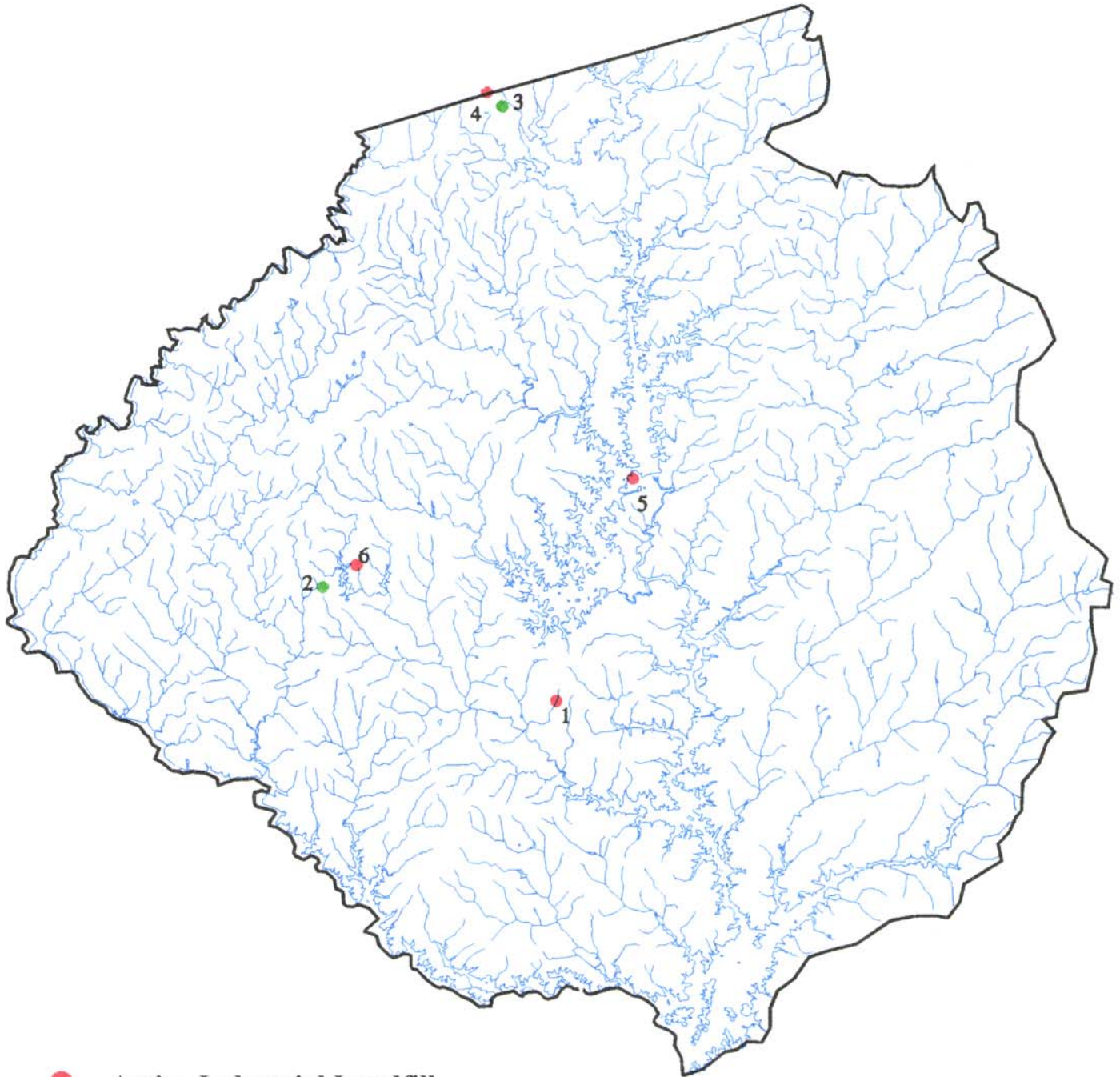


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Environmental Quality Control, Oct. 1992

Industrial and Municipal Landfills

Savannah-Salkehatchie Watershed Management Unit 0101



- Active Industrial Landfill
- Active Municipal Landfill
- Hydrography

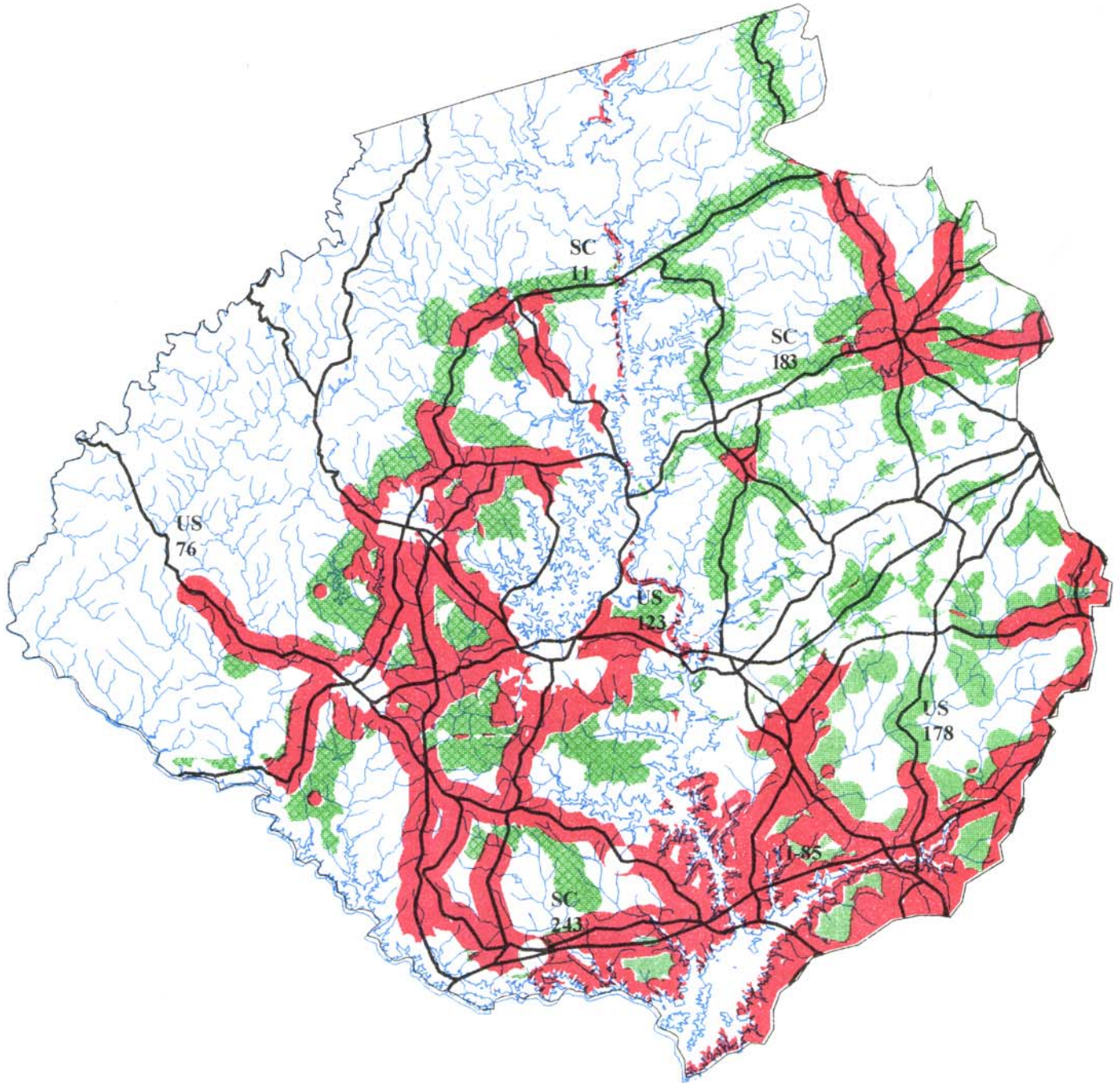
- 1 J.P. Stevens & Co.
- 2 Oconee County
- 3 Oconee County
- 4 Duke Power Co. - Bad Creek
- 5 Duke Power Co. - Bad Creek
- 6 Duke Power Co. - Oconee Nuclear



0 5 10 15 MILES

Potential Growth Areas

Savannah-Salkehatchie Watershed Management Unit 0101



- High Potential
- Medium Potential
- Hydrography
- Highway



Watershed Descriptions Within WMU-0101

03060102-030

General Description

Watershed 03060102-030 is located in Oconee County and consists primarily of the **Chattooga River** and its tributaries. The watershed occupies 15,258 acres of the Blue Ridge region of South Carolina. The predominant soil types consist of an association of the Saluda-Ashe-Hayesville series. The erodibility of the soil (K) averages 0.21; the slope of the terrain averages 43.0%, with a range of 10-80%. Land use/land cover in the watershed includes: 0.12% urban land, 6.43% agricultural land, 1.06% scrub/shrub land, 91.95% forested land and 0.44% water.

There are a total of 11.62 stream miles contained in this watershed. A segment of the Chattooga River, which is a National Wild and Scenic River, crosses the North Carolina border and flows through this watershed; the segment is classified ORW. The East Fork Chattooga River also crosses the North Carolina State line and joins the Chattooga. The East Fork Chattooga River is classified as ORW from the North Carolina boundary to the confluence with Indian Camp Branch (ORW); the distance between Indian Camp Branch and the Chattooga River is classified as TN (U.S. Fish Hatchery on this stream).

Streams draining into the East Fork Chattooga River include Slatten Branch (ORW), Bad Creek (ORW), Dark Creek (ORW) and Jack Creek (ORW). Ira Branch (ORW) enters the Chattooga River, as does King Creek (ORW). Pig Pen Branch (ORW) flows into Lick Log Creek, which is ORW from Thrift Lake to the Chattooga. Another natural resource in the watershed is the Sumter National Forest, which extends across the entire watershed.

Water Quality

East Fork Chattooga River - Aquatic life and recreational uses are fully supported for this stream; however, recreational uses may be threatened by a significantly increasing trend in fecal coliform bacteria concentrations.

North Fork Chattooga River - Recreational uses are fully supported for this stream, but may be threatened by a significantly increasing trend in fecal coliform bacteria concentrations. Aquatic life uses are fully supported based on water chemistry and macroinvertebrate community data. One mercury sample exceeded human health standards in 1991. Turbidity shows a significantly increasing trend, which could be related to timber harvesting activities on the U.S. Forest Service land.

Point Source Contributions

RECEIVING STREAM	NPDES #
FACILITY NAME	TYPE
PERMITTED FLOW @ PIPE (MGD)	COMMENT

EAST FORK CHATTOOGA RIVER
US WILDLIFE SERV/WALHALLA FISH
PIPE #: 001 FLOW: NO FLOW

SC0000451
MINOR INDUSTRIAL

EAST FORK CHATTOOGA RIVER
US WILDLIFE SERV/WALHALLA FISH
PIPE #: 002 FLOW: 3.0

SC0000451
MINOR INDUSTRIAL
HATCHERY RACEWAY WATER

Growth Potential

The northwest region of Oconee County may incur limited impacts to water quality from timber and recreational activities. The watershed is owned by the U.S. Forest Service (Sumter National Forest) and has a relatively low potential for serious growth due to the steep slopes, which limit the establishment of infrastructure; however, impacts to water quality from development upstream in North Carolina are possible.

03060102-060

General Description

Watershed 03060102-060 is located in Oconee County and consists primarily of the **Chattooga River** and its tributaries. The watershed occupies 60,892 acres of the Blue Ridge region of South Carolina. The predominant soil types consist of an association of the Hayesville-Saluda-Pacolet series. The erodibility of the soil (K) averages 0.22; the slope of the terrain averages 27.7%, with a range of 10-80%. Land use/land cover in the watershed includes: 0.40% urban land, 8.28% agricultural land, 11.24% scrub/shrub land, 0.17% barren land, 78.24% forested land and 1.67% water.

This section of the Chattooga River flows through Tugaloo Lake and dam, and then through Lake Yonah to the Tugaloo River (FW) and headwaters of Lake Hartwell. The watershed contains a total of 48 stream miles. The Chattooga River is classified as ORW to Opossum Creek, where it becomes FW. Moss Mill Creek (ORW) enters the Chattooga River upstream of Brasstown Creek. Brasstown Creek (FW) flows into the Tugaloo River just below the Lake Yonah dam. Another natural resource in the watershed is the Sumter National Forest, which extends across all but the lowest end of the watershed.

Water Quality

Chattooga River - Recreational uses are only partially supported due to fecal coliform bacteria excursions; the source of the bacteria is unknown. Aquatic life uses are fully supported and macroinvertebrate data at this location showed no noticeable impact.

Brasstown Creek - No water chemistry data are available for this creek. Aquatic life use is fully supported based on macroinvertebrate community data.

Lake Water Quality Assessment

The Tugaloo River drains into **Lake Yonah** which was categorized as a minor lake and has a watershed covering 150 km² in South Carolina (watershed extends into both Georgia and North Carolina). Lake Yonah has a surface area of 80.9 hectares and a maximum and mean depth of 20.4m and 9.8m, respectively. There are no impaired recreational usages of the lake. Lake Yonah drains into the lower Tugaloo River.

A single Algal Growth Potential Test, conducted in the summer of 1989, indicated that the limiting nutrient in the lake system was phosphorus. Eutrophication studies classified the lake as a Category III for highest water quality and recommended it for preservation. Lake Yonah had the lowest eutrophication level of the minor lakes in the state.

Point Source Contributions

There are no point source dischargers in the watershed.

Nonpoint Source Contributions

Battle Creek, Opossum Creek and Brasstown Creek are included in the most recent listing of waters impacted by nonpoint sources. Data collected from other agencies and citizen groups indicate that the creeks were impacted from silviculture activities and land-development construction, leading to elevated suspended solids and turbidity.

The Chattooga River was also evaluated from outside agency data and determined to be impacted by agricultural (nonirrigated and specialty crop production) and silvicultural activities, again elevating suspended solids and turbidity. Computer modelling by the SCLRCC indicated a high potential for NPS problems from agricultural and urban activities for this stream.

The Chattooga River is listed in the NPS Management Program as a high priority for implementation action. A nonpoint source watershed implementation project is underway in this watershed. It is a joint effort among several agencies utilizing EPA Section 319 and USDA funding. The targeted group is poultry producers, many of which operate in this watershed. The high concentration of livestock has intensified water quality concerns due to the large amounts of animal wastes generated. The objectives of the project include the demonstration and provision of technical assistance to land owners of best management practices (BMPs). Implementation of these controls should reduce the sediment and nutrient loading to the streams in this watershed, thus improving water quality. Results from the study will be included in the 1997 update of the Savannah-Salkehatchie Watershed.

Growth Potential

The northwest region of Oconee County may incur limited impacts to water quality from timber and recreational activities. A substantial portion of the watershed is owned by the U.S. Forest Service (Sumter National Forest) and has a relatively low potential for serious growth due to the steep slopes, which limit establishment of infrastructure; however, impacts to water quality from development upstream in North Carolina are possible.

03060102-120

General Description

Watershed 03060102-120 is located in Oconee County and consists primarily of the Chauga River and its tributaries. The watershed occupies 70,539 acres of the Blue Ridge region of South Carolina. The predominant soil types consist of an association of the Pacolet-Hayesville-Madison series. The erodibility of the soil (K) averages 0.23; the slope of the terrain averages 22.3%, with a range of 6-80%. Land use/land cover in the watershed includes: 0.58% urban land, 7.05% agricultural land, 14.33% scrub/shrub land, 0.18% barren land, 77.37% forested land and 0.48% water.

The predominate stream in the watershed is the **Chauga River**, which is classified as ORW from the stream origin to Highway 76, where it is classified FW to the Tugaloo River. There are a total of 53.92 stream miles in the watershed. The Chauga River flows into the Tugaloo River at the headwaters of Lake Hartwell. Jerry Creek (FW) flows into the Chauga River, as does Toxaway Creek (FW) just prior to the confluence of the Chauga and Tugaloo Rivers. Additional natural resources in the watershed includes the Sumter National Forest, extending across all but the lowest end of the watershed, and the Oconee State Park which lies within the Sumter National Forest in the upper region of the watershed.

Water Quality

No water quality data is available for this watershed. Water quality sampling is planned prior to the assessment update.

Toxaway Creek - Aquatic life use is fully supported based on macroinvertebrate community data, which showed no discernable impact.

Chauga River - Macroinvertebrate data was collected at two locations on this river. The upstream site exhibited partial support of aquatic life uses based on a slightly impacted community. This impact is probably due to the increased sedimentation noted at this location, as a result of adjacent land use practices (see Nonpoint Source Contributions below). The downstream site showed full support of aquatic life uses, and was used as the reference site for comparisons within the piedmont region.

Water Supply

WATER USER (TYPE)	STREAM	AMOUNT WITHDRAWN (MGD)
Town of Westminster (M)	Chauga River	1.916
Town of Westminster (M)	Ramsey Creek	0.000

Point Source Contributions

RECEIVING STREAM
FACILITY NAME
PERMITTED FLOW @ PIPE (MGD)

NPDES #
TYPE
COMMENT

JERRY CREEK
SC DEPT PRT/OCONEE STATE PARK
PIPE #: 001 FLOW: 0.06

SC0024872
MINOR COMMUNITY

Nonpoint Source Contributions

The Chauga River is currently included in the listing of waters impacted by nonpoint sources. Data collected from other agencies and citizen groups indicate that the river is impacted by silvicultural and construction (land development) activities elevating the level of suspended solids in the stream. The Chauga River is listed in the NPS Management Program as a high priority for implementation action. A nonpoint source watershed implementation project is underway in this watershed. It is a joint effort among several agencies utilizing EPA Section 319 and USDA funding. The targeted group is poultry producers, many of which operate in this watershed. The high concentration of livestock has intensified water quality concerns due to the large amounts of animal wastes generated. The objectives of the project include the demonstration and provision of technical assistance to land owners of best management practices (BMPs). Implementation of these controls should reduce the sediment and nutrient loading to the streams in this watershed, thus improving water quality. Results from the study will be included in the 1997 update of the Savannah-Salkehatchie Watershed.

Growth Potential

The northwest region of Oconee County may incur limited impacts to water quality from timber and recreational activities. A substantial portion of the watershed is owned by the U.S. Forest Service (Sumter National Forest) and has a relatively low potential for serious growth due to the steep slopes, which limit establishment of infrastructure.

03060102-130

General Description

Watershed 03060102-130 is located in Oconee and Anderson Counties and consists primarily of the **Tugaloo River** and its tributaries. The watershed occupies 53,600 acres of the Piedmont region of South Carolina. The predominant soil types consist of an association of the Cecil-Madison-Hiwassee series. The erodibility of the soil (K) averages 0.25; the slope of the terrain averages 13.2%, with a range of 2-25%. Land use/land cover in the watershed includes: 5.52% urban land, 20.64% agricultural land, 21.25% scrub/shrub land, 6.89% barren land, 29.04% forested land and 16.67% water.

The Tugaloo River (FW) flows through the watershed and combines with the Seneca River (03060101-040) to form the headwaters of the Savannah River (FW), which creates the headwaters of Lake Hartwell. Norris Creek (FW) flows into Choestoea Creek near the Town of Westminster; Choestoea Creek and Little Choestoea Creek flow into the Tugaloo River and the headwaters of Lake Hartwell. There are a total of 13.87 stream miles in this watershed, all classified as freshwater. This watershed also accepts the drainage from watersheds 03060102-060, -120 and -150.

Water Quality

Norris Creek - Aquatic life uses are fully supported, but may be threatened by a significant declining trend in dissolved oxygen. Recreational uses are not supported due to fecal coliform bacteria excursions under Class FW standards.

Point Source Contributions

RECEIVING STREAM FACILITY NAME PERMITTED FLOW @ PIPE (MGD)	NPDES # TYPE COMMENT
CHOESTOEA CREEK WESTMINSTER/WATER PLANT PIPE #: 001 FLOW: MR	SC0037877 MINOR INDUSTRIAL
HARBIN CREEK WEST-OAK HS/OCONEE CO SCH DIST PIPE #: 001 FLOW: 0.032	SC0038644 MINOR COMMUNITY
LITTLE CHOESTOEA CREEK TR OAKWAY ELEM & MDL SCHOOLS PIPE #: 001 FLOW: 0.015	SC0033944 MINOR COMMUNITY
LAKE HARTWELL FOXWOOD HILLS/MT BAY EST. UTIL PIPE #: 001 FLOW: 0.1	SC0022357 MINOR COMMUNITY

LAKE HARTWELL
NACO CAROLINA LANDING
PIPE #: 001 FLOW: 0.02

SC0022063
MINOR COMMUNITY

LAKE HARTWELL
SC HWY/WELCOME CTR-FAIRPLAY
PIPE #: 001 FLOW: 0.018

SC0026638
MINOR COMMUNITY

**NO DISCHARGE SYSTEM
FACILITY NAME**

**ND#
TYPE**

LAND DISPOSAL
ECONO LODGE

ND0067237
MINOR COMMUNITY

LAND DISPOSAL
HARTWELL UTIL/CHICKASAW PT.

ND0065927
MINOR COMMUNITY

LAND DISPOSAL
PARKVIEW DEV

ND0069086
MINOR COMMUNITY

Nonpoint Source Contributions

The Tugaloo River is listed in the NPS Management Program as a high priority for implementation action. A nonpoint source watershed implementation project is underway in this watershed. It is a joint effort among several agencies utilizing EPA Section 319 and USDA funding. The targeted group is poultry producers, many of which operate in this watershed. The high concentration of livestock has intensified water quality concerns due to the large amounts of animal wastes generated. The objectives of the project include the demonstration and provision of technical assistance to land owners of best management practices (BMPs). Implementation of these controls should reduce the sediment and nutrient loading to the streams in this watershed, thus improving water quality. Results from the study will be included in the 1997 update of the Savannah-Salkehatchie Watershed.

Lake Hartwell is currently included on the list of waterbodies impacted by nonpoint source pollutants. The lake was evaluated from data collected by other agencies and citizen groups, and found to have elevated levels of suspended solids resulting from agricultural practices, construction (land development) and urban surface runoff. Computer modelling by the SCLRCC indicated a high potential for NPS problems from agricultural and urban activities for this stream.

Growth Potential

The Town of Westminster influences both this watershed and the Coneross Creek watershed (03060101-080), being located along the watershed boundary, and is predicted to have some of the greatest developmental pressure in the county. Particular emphasis will be placed on residential, commercial and industrial growth and development along the U.S. Highway 123 corridor, beginning with Westminster and extending towards Seneca.

03060102-150

General Description

Watershed 03060102-150 is located in Oconee and Anderson Counties and consists primarily of **Beaverdam Creek** and its tributaries. The watershed occupies 36,687 acres of the Piedmont region of South Carolina. The predominant soil types consist of an association of the Cecil-Hiwassee series. Soil erodibility (K) averages 0.26; the slope of the terrain averages 9.8%, with a range of 2-25%. Land use/land cover in the watershed includes: 3.41% urban land, 46.29% agricultural land, 20.29% scrub/shrub land, 3.84% barren land, 19.64% forested land and 6.53% water.

The Beaverdam Creek watershed consists of Beaverdam Creek and Little Beaverdam Creek, which form arms of Lake Hartwell. There are a total of 19.39 stream miles in this watershed, all classified as FW.

Water Quality

No water quality data is available for this watershed. Water quality sampling is planned prior to the assessment update.

Point Source Contributions

There are no point source dischargers in this watershed.

Nonpoint Source Contributions

Beaverdam Creek is currently listed among waters impacted by nonpoint sources. The creek has elevated suspended solids and nutrient levels as a result of agricultural activities, namely nonirrigated crop production and pastureland management. Beaverdam Creek is listed in the NPS Management Program as a high priority for implementation action. A nonpoint source watershed implementation project targeting poultry producers is currently underway. It is a joint effort among several agencies utilizing EPA §319 and USDA funding. The high concentration of livestock has intensified water quality concerns due to the large amounts of animal wastes generated. The objectives of the project include the demonstration and provision of technical assistance to land owners of best management practices (BMPs). Implementation of these controls should reduce the sediment and nutrient loading to the streams in this watershed, thus improving water quality. Results from the study will be included in the 1997 update of the Savannah-Salkehatchie Watershed.

Growth Potential

There is no serious growth or development predicted for this area.

03060101-020

General Description

Watershed 03060101-020 is located in Oconee and Pickens Counties and consists of **Lake Jocassee** and its tributaries forming the lake. The watershed occupies 39,724 acres of the Blue Ridge region of South Carolina. The predominant soil types consist of an association of the Ashe-Saluda series. The erodibility of the soil (K) averages 0.23; the slope of the terrain averages 45.2%, with a range of 10-65%. Land use/land cover in the watershed includes: 2.19% urban land, 0.77% agricultural land, 1.60% scrub/shrub land, 0.05% barren land, 73.48% forested land and 21.91% water.

The Lake Jocassee watershed includes the Toxaway River, Whitewater River and Thompson River, all which flow across the North Carolina border to merge and form Lake Jocassee; the entire lake to the Jocassee dam is included in the watershed. All streams are classified as freshwater (FW). The Sumter National Forest, another natural resource, encompasses the entire watershed.

Water Quality

Lake Jocassee - Aquatic life and recreational uses are fully supported for this lake.

Lake Water Quality Assessment

The Whitewater, Thompson and Toxaway Rivers, together with Lake Keowee (via a pumped storage hydroelectric facility), drain to form **Lake Jocassee**. Lake Jocassee's watershed covers 93 km² in South Carolina, and the watershed extends into North Carolina as well. Lake Jocassee drains into Lake Keowee. A deep-water lake, Jocassee's maximum depth is 98.8m and mean depth is 47.8m; the surface area encompasses 3,061.5 hectares. There are no recreational impairments on this lake, which enjoys the highest water quality in the state.

A single Algal Growth Potential Test, conducted in the summer of 1989, indicated that the limiting nutrient in the lake system was phosphorus. Eutrophication studies classified Lake Jocassee as a Category III for highest water quality, and recommended it for preservation. The headwaters region has improved over time; and the dam site maintained the lowest eutrophication level of all the state's lakes.

Point Source Contributions

RECEIVING STREAM	NPDES #
FACILITY NAME	TYPE
PERMITTED FLOW @ PIPE (MGD)	COMMENT

LAKE JOCASSEE
DUKE POWER/BAD CREEK STORAGE
PIPE #: 001 FLOW: 0.18

SC0037800
MINOR INDUSTRIAL

LAKE JOCASSEE
DUKE POWER/BAD CREEK STORAGE
PIPE #: 01B FLOW: 4.3

SC0037800
MINOR INDUSTRIAL

LAKE JOCASSEE
DUKE POWER/BAD CREEK STORAGE
PIPE #: 002 FLOW: 0.013

SC0037800
MINOR INDUSTRIAL

LAKE JOCASSEE
DUKE POWER/BAD CREEK STORAGE
PIPE #: 003 FLOW: 2.9

SC0037800
MINOR INDUSTRIAL

LAKE JOCASSEE
DUKE POWER/BAD CREEK STORAGE
PIPE #: 004 FLOW: NO LIMIT

SC0037800
MINOR INDUSTRIAL

Nonpoint Source Contributions

The Thompson and Whitewater Rivers are both currently included on the list of waterbodies impacted by nonpoint source pollutants, as evaluated by outside agencies and citizen groups. The Thompson River was reported to be impacted by agricultural activities (nonirrigated crop production), land development construction and urban surface runoff, activities elevating suspended solid levels and turbidity.

The Whitewater River was reported to be impacted by pastureland activities and urban surface runoff that elevated suspended solids and turbidity levels. Computer modelling by the SCLRCC indicated a high potential for nonpoint source problems on this stream brought about by agricultural and urban activities.

Growth Potential

Residential growth in and adjacent to the mountain region is predicted at relatively high levels, despite the low population base. Special concern should be given to this environmentally pristine and aesthetically valuable region.

03060101-030

General Description

Watershed 03060101-030 is located in Oconee and Pickens Counties and consists of the upper region of **Lake Keowee** and its tributaries. The watershed occupies 75,177 acres of the Blue Ridge region of South Carolina. The predominant soil types consist of an association of the Pacolet-Ashe-Hayesville series. The erodibility of the soil (K) averages 0.23; the slope of the terrain averages 27.8%, with a range of 2-80%. Land use/land cover in the watershed includes: 0.30% urban land, 6.38% agricultural land, 3.29% scrub/shrub land, 0.10% barren land, 78.98% forested land and 10.96% water.

This watershed contains a total of 34.18 stream miles. Eastatoe Creek (FW) joins with the Keowee River just below the Jocassee dam to form the upper region of Lake Keowee. The watershed includes the headwaters of Lake Keowee extending down to the Keowee dam, the first of two dams on this reservoir. Another natural resource is the Keowee Toxaway State Park, located in the upper reaches of the watershed.

Water Quality

Eastatoe Creek - Recreational uses are only partially supported for this stream due to fecal coliform bacteria excursions. Although one excursion for chromium was measured, macroinvertebrate data from this location indicated the least impacted community of the mountain region sites and was used as the regional reference site. On this basis, aquatic life uses are fully supported.

Rocky Bottom Creek - There are no water chemistry data available for this creek. Aquatic life use is fully supported based on macroinvertebrate community data.

Lake Keowee - Aquatic life and recreational uses are fully supported in this portion of the lake.

Lake Water Quality Assessment

General water quality for **Lake Keowee** is described in management unit 03060101-050, where the majority of the lake and the sampling sites are located. The Lake Keowee dam site was classified as category III for its high quality, and recommended for preservation.

Water Supply

WATER USER (TYPE)	STREAM	AMOUNT WITHDRAWN (MGD)
Greenville Water System (M)	Lake Keowee	4.380

Point Source Contributions

RECEIVING STREAM FACILITY NAME PERMITTED FLOW @ PIPE (MGD)	NPDES # TYPE COMMENT
REEDY CREEK-EASTATOE CREEK MCCALL ROYAL AMBASSADOR CAMP PIPE #: 001 FLOW: 0.012	SC0026557 MINOR COMMUNITY
KEOWEE RIVER DUKE POWER/OCONEE NUCLEAR STA PIPE #: 001 FLOW: 2324.7	SC0000515 MAJOR INDUSTRIAL
KEOWEE RIVER DUKE POWER/OCONEE NUCLEAR STA PIPE #: 002 FLOW: 3.7	SC0000515 MAJOR INDUSTRIAL
KEOWEE RIVER DUKE POWER/OCONEE NUCLEAR STA PIPE #: 003 FLOW: 0.035	SC0000515 MAJOR INDUSTRIAL
KEOWEE RIVER DUKE POWER/OCONEE NUCLEAR STA PIPE #: 004 FLOW: 0.007	SC0000515 MAJOR INDUSTRIAL
KEOWEE RIVER DUKE POWER/OCONEE NUCLEAR STA PIPE #: 005 FLOW: 0.18	SC0000515 MAJOR INDUSTRIAL

Nonpoint Source Contributions

Lake Keowee is currently included on the §304(l) long list of impacted waterbodies due to nonpoint source concerns for nontoxics and ambient toxicity.

Growth Potential

Residential growth in and adjacent to the mountain region is predicted to occur at a relatively high level, despite its low population base. Special concern should be given to the environmentally pristine and aesthetically valuable region.

03060101-040

General Description

Watershed 03060101-040 is located in Pickens, Oconee and Anderson Counties and consists of the **Seneca River**, which together with its tributaries form the upper region of **Lake Hartwell**. The watershed occupies 137,014 acres of the Piedmont region of South Carolina. The predominant soil types consist of an association of the Cecil-Hiwassee series. The erodibility of the soil (K-factor) averages 0.26; the slope of the terrain averages 10.7%, with a range of 2-25%. Land use/land cover in the watershed includes: 7.76% urban land, 18.99% agricultural land, 13.26% scrub/shrub land, 0.75% barren land, 43.74% forested land and 15.50% water.

The Seneca River (FW) flows out of the Keowee dam to form the headwaters of the Seneca River region of Lake Hartwell, which extends down to its confluence with the Tugaloo River region of the lake. This watershed accepts the drainage of Sixmile Creek (FW), which flows into the Seneca River just below the Little River dam, and from Six and Twenty Creek (FW), which enters the watershed just above the confluence with the Tugaloo River. Town Creek (FW) flows into Six and Twenty Creek. There are a total of 29.93 stream miles in this watershed. Watershed 03060101-040 also accepts the drainage from Twelve Mile Creek (03060101-060,-070), Eighteen Mile Creek (03060101-090), Coneross Creek (03060101-080) and Lake Keowee (03060101-050) watersheds.

Water Quality

Six and Twenty Creek - Aquatic life uses are fully supported for this stream. Recreational uses are only partially supported due to fecal coliform bacteria excursions under Class FW standards. This creek was Class B until April, 1992 and bacterial conditions are expected to improve as new NPDES permit limits are instituted in the watershed.

Seneca River Arm of Lake Hartwell - There are three sampling locations in this portion of the lake. Aquatic life and recreational uses are fully supported; however, aquatic life uses may be threatened by significantly declining trends in dissolved oxygen at three of the four stations sampled. Copper exceeded the standard three times in 1989, once at the detection limit and twice above the detection limit, but this does not seem to be a chronic condition. Mercury exceeded the human health standard once in 1990 at one station. PCBs were detected in sediments at the sampling location furthest uplake. Fish consumption uses for the Seneca River arm of the lake (upstream of Highway 24) are not supported due to the fish consumption advisory (see Special Study below) for Lake Hartwell. This region of the lake system allows no consumption of fish. Downstream of Highway 24, fish consumption uses are partially supported and consumption of fish under 3 pounds is allowed.

An application to prohibit the discharge of any sewage from all vessels into Lake Hartwell was submitted to the USEPA in accordance with §312(f)(3) of the Federal Clean Water Act and EPA Regulation 40 CFR 140.4. The pursuance of this designation was initiated by a citizens group as a prevention and protection mechanism.

Special Study of Lake Hartwell and PCB Contamination

In 1976, the SCDHEC and the USEPA discovered fish contaminated with polychlorinated biphenyl (PCB) in certain areas of Lake Hartwell; the levels were found to be above allowable limits set by the USFDA. As a result of these findings, a fish consumption advisory was issued for portions of Lake Hartwell to reduce human exposure. Since 1976, the SCDHEC has conducted annual surveys of Lake Hartwell to evaluate PCB levels in the fish population. Portions of Lake Hartwell became eligible for Superfund support in 1990.

The results of the most current Lake Hartwell study (SCDHEC 1992e) assessed fish having PCB concentrations greater than 2.0ppm, USFDA's acceptable level. The Twelve Mile Creek Arm of Lake Hartwell, the original source of the contaminant, continues to have the highest level of PCBs. A gradient of decreasing PCB-contaminated fish (non-migratory) originates in the Twelve Mile Creek region and extends down to the dam. The forage fish in the Twelve Mile Creek arm were highly contaminated with PCBs and played a major role in the game fish contamination via the food chain.

Current data indicates that the original fish consumption advisory, which extended to all fish in the Seneca River arm upstream of Highway 24, should remain in effect, and any fish greater than three pounds outside of the advisory area and within the reaches of Lake Hartwell should not be consumed. PCBs in the environment are persistent and could linger at unacceptable levels for many years; however, if remedial actions under the Superfund program occur, the time span may be narrowed.

Lake Water Quality Assessment

The Tugaloo River and Seneca River together drain into **Lake Hartwell**, which has a watershed covering 2,386.4 km² in South Carolina (the watershed also extends into Georgia). Lake Hartwell has a surface area of 24,828 hectares and undergoes thermal stratification during the summer. The lake has a maximum depth of 53.4m and a mean depth of 13.9m. A fish consumption advisory is in effect lakewide due to PCB contamination. Fish tissue samples are collected periodically by the SCDHEC and the USEPA to monitor trends. The Clean Lake study locations have been analyzed by watershed: Twelve Mile Creek arm (03060101-070), Coneross Creek arm (03060101-080), Eighteen Mile Creek arm (03060101-090) and the dam site (03060103-020). Other watersheds draining into the lake include Three and Twenty Creek (03060103-100) and Beaverdam Creek (03060102-150).

Water Supply

WATER USER (TYPE)	STREAM	AMOUNT WITHDRAWN (MGD)
Duke Power	Lake Hartwell	14.400
J.P.Stevens-Clemson Plt (I)	Lake Hartwell	3.600
Milliken&Co.-Defore Mill (I)	Lake Hartwell	0.121

Point Source Contributions

Lake Hartwell is currently included on the §304(l) long list for point source concerns for toxic pollutants. The Seneca River arm of Lake Hartwell is currently listed on the §303(d) priority list of waters that require TMDL development in relation to elevated nutrient levels.

RECEIVING STREAM FACILITY NAME PERMITTED FLOW @ PIPE (MGD)	NPDES # TYPE COMMENT
SENECA RIVER EMRO MKTG/STARVIN MARVIN PIPE #: 001 FLOW: MR	SC0040690 MINOR INDUSTRIAL
SIX AND TWENTY CREEK ANDERSON CO SWR AUTH PIPE #: 001 FLOW: 0.5	SC0040193 MINOR MUNICIPAL
SIX AND TWENTY CREEK SC HWY DEPT/REST AREA I-85 S PIPE #: 001 FLOW: 0.02	SC0025992 MINOR COMMUNITY
SALEM CREEK SPRINGS IND/WAMSUTTA MILLS PIPE #: 001 FLOW: MR	SC0000469 MINOR INDUSTRIAL
STEEL CREEK SC HWY DEPT/REST AREA I-85 N PIPE #: 001 FLOW: 0.02	SC0025984 MINOR COMMUNITY
BEAR SWAMP CREEK AVONDALE MILLS/WALHALLA PLT PIPE #: 001 FLOW: 0.0158	SC0039608 MINOR INDUSTRIAL
SHORE CREEK KEOWAY VILLAGE APTS PIPE #: 001 FLOW: 0.03	SC0029360 MINOR COMMUNITY
UNNAMED STREAM JP STEVENS/CLEMSON PLT PIPE #: 001 FLOW: 2.16	SC0000591 MAJOR INDUSTRIAL
MARTIN CREEK WEST PT PEPPERELL/SENECA PL PIPE #: 001 FLOW: MR	SC0022551 MINOR INDUSTRIAL

MARTIN CREEK WEST PT PEPPERELL/SENECA PL PIPE #: 002 FLOW: MR	SC0022551 MINOR INDUSTRIAL
MARTIN CREEK WEST PT PEPPERELL/SENECA PL PIPE #: 003 FLOW: MR	SC0022551 MINOR INDUSTRIAL
LITTLE RIVER COURTENAY UTIL INC/WAYNE ENV PIPE #: 001 FLOW: 0.0495	SC0000272 MINOR COMMUNITY
LAKE HARTWELL TR DAYS INN/I-85 & SC HWY 187 PIPE #: 001 FLOW: 0.025	SC0023311 MINOR COMMUNITY
LAKE HARTWELL TR ISAEQUEENA MOBILE HOME PARK PIPE #: 001 FLOW: 0.024	SC0023141 MINOR COMMUNITY
LAKE HARTWELL TR RC EDWARDS JR HS/PICKENS CO PIPE #: 001 FLOW: 0.015	SC0028762 MINOR COMMUNITY
LAKE HARTWELL TR DANIEL HIGH SCH/PICKENS CO PIPE #: 001 FLOW: 0.02	SC0038652 MINOR COMMUNITY
LAKE HARTWELL TR CLEMSON UNIV/COOPER SER LAB PIPE #: 001 FLOW: 0.003	SC0036200 MINOR INDUSTRIAL
LAKE HARTWELL CLEMSON UNIVER/PHYSICAL PLT PIPE #: 001 FLOW: 1.8	SC0034843 MAJOR COMMUNITY
LAKE HARTWELL CLEMSON/MAIN PLANT PIPE #: 001 FLOW: 1.0	SC0020010 MAJOR MUNICIPAL
LAKE HARTWELL CLEMSON UNIV/CENTRAL ENERGY PIPE #: 001 FLOW: 14.11	SC0022004 MINOR INDUSTRIAL
LAKE HARTWELL HARBOR GATE CONDOMINIUMS PIPE #: 001 FLOW: 0.0375	SC0021849 MINOR COMMUNITY
LAKE HARTWELL MILLIKEN & CO/DEFORE MILL PIPE #: 001 FLOW: MR	SC0023353 MINOR INDUSTRIAL
LAKE HARTWELL MILLIKEN & CO/DEFORE MILL PIPE #: 002 FLOW: MR	SC0023353 MINOR INDUSTRIAL

LAKE HARTWELL
SHOALS SEWER COMPANY
PIPE #: 001 FLOW: 0.019

SC0021873
MINOR COMMUNITY

**NO DISCHARGE SYSTEM
FACILITY NAME**

**ND#
TYPE**

LAND DISPOSAL
SIX MILE RETIRE&CONVL CNTR

ND0067679
MINOR COMMUNITY

LAND DISPOSAL
CLEMSON UNIVERSITY-CAMP HOPE

ND0067512
MINOR COMMUNITY

LAND DISPOSAL
HARVEYS LOVE&CARE HOME

ND0067539
MINOR COMMUNITY

LAND DISPOSAL
LEBANON MHP

ND0069680
MINOR COMMUNITY

Nonpoint Source Contributions

Six and Twenty Creek is included in the most recent listing of waters impacted by nonpoint sources. Nonpoint source inputs to the creek in the form of agricultural activities (nonirrigated crop production and animal holding management) and land development construction were evaluated by the Department, other agencies and citizen groups. These inputs elevated fecal coliform bacteria and nutrient levels on numerous occasions and increased turbidity periodically. Computer modelling by the SCLRCC indicated a high potential for NPS problems from agricultural and urban activities for this stream. Six and Twenty Creek is included on the §304(l) long list for impacted waterbodies due to nonpoint source concerns for nontoxics.

Growth Potential

The Towns of Clemson and Six Mile are included in this watershed. Clemson is near the boundary of the Twelve Mile Creek watershed (03060101-070) and potentially impacts both watersheds. Residential growth in this watershed would occur along S.C. Highway 133 from Clemson to Six Mile.

Clemson is one of the three greatest potential development areas in the county and is currently one of the largest manufacturing areas in the upstate region. Future growth of the manufacturing industry is dependent on infrastructure expansion, which is dependent on the capacity of existing facilities to treat the effluent, and on the assimilative capacity of surrounding streams to absorb the effluent. Many wastewater treatment facilities are at or near their capacity to treat industrial discharges.

Another future growth area surrounds the intersection of I-85 and S.C. Road 81, near Six and Twenty Creek at the base of the watershed.

03060101-050

General Description

Watershed 03060101-050 is located in Oconee County and consists primarily of the **Little River** and its tributaries, which form an arm of **Lake Keowee**. The watershed occupies 104,698 acres of the Blue Ridge (upper third) and Piedmont (lower two-thirds) regions of South Carolina. The predominant soil types consist of an association of the Pacolet-Cecil-Hiwassee series. The erodibility of the soil (K-factor) averages 0.24; the slope of the terrain averages 19.3%, with a range of 2-80%. Land use/land cover in the watershed includes: 4.48% urban land, 12.41% agricultural land, 3.19% scrub/shrub land, 0.19% barren land, 68.17% forested land and 11.57% water.

In this watershed, Oconee Creek and North Fork Creek join to form the Little River, which forms an arm of Lake Keowee. A large portion of Lake Keowee, from the Keowee dam to the Little River dam, is contained in this watershed. Cane Creek and Little Cane Creek, together with Crooked Creek, form arms of Lake Keowee. The tributaries of Lake Keowee extend for a total of 59.59 stream miles, all are classified as FW.

Water Quality

Little River - Aquatic life and recreational uses are fully supported for this stream.

Lake Keowee - Recreational and aquatic life uses are fully supported in this portion of the lake; however, aquatic life uses may be threatened by significantly declining trends in DO. Lead levels exceeded aquatic life and human health standards once in 1989, but this does not appear to be a chronic condition. Copper was measured above the detection limit at both locations in 1989.

Lake Water Quality Assessment

Lake Jocassee and the Little River drain into **Lake Keowee**, which has a watershed covering 796.2 km². The surface area of the lake is 7,435 hectares with a maximum depth of 47.2m and a mean depth of 16.6m. Lake Keowee drains into the Keowee and Little Rivers. There are no recreational impairments on the lake; and overall water quality is second only to Lake Jocassee. Lake Keowee has experienced nonpoint source impacts from both agriculture and land development.

A single Algal Growth Potential Test, conducted in the summer of 1989, indicated that the limiting nutrient in the lake system was phosphorus. Eutrophication studies classified the Cane Creek arm of Lake Keowee as a Category III for highest water quality, and recommended for preservation. The Cane Creek arm achieved the second lowest eutrophication status in the state.

Water Supply

WATER USER (TYPE)	STREAM	AMOUNT WITHDRAWN (MGD)
City of Seneca (M)	Lake Keowee	4.100
Oconee Nuclear Station (M)	Lake Keowee	0.120

Point Source Contributions

RECEIVING STREAM FACILITY NAME PERMITTED FLOW @ PIPE (MGD)	NPDES # TYPE COMMENT
NORTH FORK CREEK TR SALEM HI&ELEM SCH/OCONEE CO PIPE #: 001 FLOW: 0.011	SC0026603 MINOR COMMUNITY
DAVEY BRANCH-WEST FORK CREEK TAMASSEE DAR SCHOOL PIPE #: 001 FLOW: 0.031	SC0026727 MINOR COMMUNITY
CANE CREEK TORRINGTON COMPANY PIPE #: 001 FLOW: MR	SC0037711 MINOR INDUSTRIAL
LAKE KEOWEE SHADOW WALK INC PIPE #: 001 FLOW: 0.04	SC0041416 MINOR COMMUNITY
KELLY CREEK GREENVILLE/LAKE KEOWEE WTR PLT PIPE #: 001 FLOW: MR	SC0041165 MINOR INDUSTRIAL
LAKE KEOWEE LAKE KEOWEE DEVELOPMENT CORP PIPE #: 001 FLOW: 0.90	SC0022322 MINOR COMMUNITY
LAKE KEOWEE SENECA/WATER PLANT PIPE #: 001 FLOW: MR	SC0037478 MINOR INDUSTRIAL
UNNAMED STREAM KENDALL CO/SENECA PLANT PIPE #: 001 FLOW: MR	SC0042111 MINOR INDUSTRIAL

Nonpoint Source Contributions

Lake Keowee is included in the most recent listing of waters impacted by nonpoint sources. Elevated ammonia levels were reported by SCDHEC personnel as a result of pastureland activities; land development was also listed as a nonpoint source for the lake. Computer modelling by the SCLRCC indicated a high potential for NPS problems from agricultural and urban activities for this

stream. Lake Keowee is included on the §304(l) long list of impacted waterbodies due to nonpoint source concerns for nontoxics and ambient toxicity.

The Little River was also listed as an impacted waterbody from Department monitoring reports. Nonpoint source inputs occurred in the form of agricultural and silvicultural activities, together with land development, causing numerous elevated nutrient and suspended solid levels and DO excursions. Computer modelling by the SCLRCC indicated a high potential for NPS problems from agricultural and urban activities for this stream.

Growth Potential

The Town of Salem and the shoreline of Lake Keowee are predicted for growth in the form of retirement communities. S.C. Road 130, running from Salem to Seneca, will be particularly prone to development.

03060101-060

General Description

Watershed 03060101-060 is located in Pickens County and consists of the upper reach of **Twelve Mile Creek** and its tributaries. The watershed occupies 74,972 acres of the Piedmont region of South Carolina. The predominant soil types consist of an association of the Cecil-Hiwassee-Pacolet series. The erodibility of the soil (K-factor) averages 0.25; the slope of the terrain averages 13.7%, with a range of 2-80%. Land use/land cover in the watershed includes: 5.92% urban land, 24.08% agricultural land, 4.51% scrub/shrub land, 0.58% barren land, 64.33% forested land and 0.58% water.

The predominant stream in this watershed is the upper reach of Twelve Mile Creek, which flows near the Town of Pickens. Middle Fork Twelve Mile Creek and North Fork Twelve Mile Creek join to form Twelve Mile Creek, which flows through the watershed and is joined, along the way, by Town Creek, Wolf Creek and Rices Creek; the drainage from all these streams flows into the lower reaches of Twelve Mile Creek (03060101-070), and into Lake Hartwell. There are a total of 51.64 stream miles in this watershed, all classified FW.

Water Quality

North Fork Twelve Mile Creek - Aquatic life uses are fully supported for this stream. Recreational uses are only partially supported due to fecal coliform bacteria excursions under Class FW standards, compounded by a significantly increasing trend in bacterial concentrations. The source of the bacteria is unknown.

Town Creek - There is no water quality data available for this watershed. Water quality sampling is planned prior to the assessment update. Fish consumption uses for this region of the lake are not supported due to the fish consumption advisory (see watershed 03060101-040) for Lake Hartwell. This region of the lake system allows no consumption of fish. Cornell-Dubilier Marketing, located on Town Creek, experienced a few PCB permit limit violations in 1992. Prior PCB enforcement based on actions of previous owner Sangamo.

Twelve Mile Creek - Aquatic life uses are fully supported for the upper reach of Twelve Mile Creek, but may be threatened by a significantly declining trend in dissolved oxygen. Recreational uses are not supported due to fecal coliform bacteria excursions under Class FW standards. This creek was Class B until April, 1992 and bacterial conditions are expected to improve as new NPDES permit limits are instituted in the watershed. Fish consumption uses for this region of the lake are not supported due to the fish consumption advisory (see watershed 03060101-040) for Lake Hartwell.

This region of the lake system allows no consumption of fish. Polychlorinated biphenyls (PCBs) are present in sediment. Turbidity shows a significant increasing trend, which could be from a combination of point and nonpoint sources (see Point and Nonpoint Source Contributions below).

Lake Water Quality Assessment

General water quality for **Lake Hartwell** is described in watershed 03060101-040, where the majority of the lake is located and where the sampled streams drain into. Analysis specific to Twelve Mile Creek is described under watershed 03060101-070.

Water Supply

WATER USER (TYPE)	STREAM	AMOUNT WITHDRAWN (MGD)
Town of Pickens (M)	Twelve Mile Creek	2.040
Town of Pickens (M)	Twelve Mile Creek	0.000
Alice Manufacturing Co.- Elljean Plt. (I)	Golden Creek	0.000(Inactive)

Point Source Contributions

Town Creek is included on the §304(l) short list for waters not expected to meet applicable water quality standards after full implementation of NPDES permit conditions due, in part or entirely, to point source discharges of §307(a) toxics; Cornell-Dubilier Marketing Inc. is the facility discharging a toxic effluent (PCBs) into Town Creek. Town Creek and Twelve Mile Creek are both included on the §304(l) long list for impacted waterbodies due to point source concerns for toxic pollutants (PCBs).

RECEIVING STREAM FACILITY NAME PERMITTED FLOW @ PIPE (MGD)	NPDES # TYPE COMMENT
PICKENS MILL BRANCH-TOWN CREEK MAYFAIR MILLS/PICKENS DIV PIPE #: 001 FLOW: MR	SC0002674 MINOR INDUSTRIAL
TOWN CREEK TR KENT MANUFACTURING COMPANY PIPE #: 001 FLOW: MR	SC0035432 MINOR INDUSTRIAL
TOWN CREEK RYOBI MOTOR PRODUCTS/PICKENS PIPE #: 001 FLOW: MR	SC0026492 MINOR INDUSTRIAL
TOWN CREEK CORNELL-DUBILIER MARKETING INC PIPE #: 001 FLOW: 0.3	SC0000141 MAJOR INDUSTRIAL

TOWN CREEK CORNELL-DUBILIER MARKETING INC PIPE #: 002 FLOW: MR	SC000G141 MAJOR INDUSTRIAL
TOWN CREEK PICKENS/TOWN CREEK PLANT PIPE #: 001 FLOW: 0.6	SC0021661 MINOR MUNICIPAL
WOLF CREEK PICKENS/WOLF CREEK PLANT PIPE #: 001 FLOW: 0.5	SC0021679 MINOR MUNICIPAL
RICES CREEK ALICE MFG/ELLJEAN & FOSTER PLT PIPE #: 001 FLOW: 0.04	SC0000370 MINOR INDUSTRIAL
RICES CREEK ALICE MFG/ELLJEAN & FOSTER PLT PIPE #: 002 FLOW: 0.006	SC0000370 MINOR INDUSTRIAL
RICES CREEK ALICE MFG/ELLJEAN & FOSTER PLT PIPE #: 003 FLOW: 0.008	SC0000370 MINOR INDUSTRIAL
PRATERS CREEK SPANGLERS GROCERY PIPE #: 001 FLOW: 0.009	SC0000434 MINOR INDUSTRIAL
NO DISCHARGE SYSTEM FACILITY NAME	ND# TYPE
LAND DISPOSAL PICKENS COUNTY STOCKADE	ND0067521 MINOR COMMUNITY

There is a planned expansion for the Town of Pickens (Town Creek and Wolf Creek) facilities. The town is currently in the process of developing a facilities plan for an SRF project. The upgrade should significantly improve the effluent quality from these facilities. There may be some consolidation of treatment and work to correct excessive inflow and infiltration will also be completed. There is an enforcement action (Consent Order) being taken to insure these steps are completed.

Nonpoint Source Contributions

Twelve Mile Creek is listed as an impacted waterbody from nonpoint sources that include the agricultural practices of nonirrigated crop production and pastureland management. Numerous fecal coliform excursions and elevated nutrient levels have been recorded by the Department on this stream segment, along with scattered elevated turbidity readings. Computer modelling by the SCLRCC indicated a high potential for NPS problems from agricultural activities for this stream.

Ground Water Contamination

The ground water in the vicinity of the landfill owned by Cornell-Dubilier Inc. (formally Sangamo) is contaminated with volatile organics as a result of industrial landfill seepage; the contaminated area is listed as a USEPA National Priority List (NPL) site. The probable recipients of the contaminated discharge are Twelve Mile Creek and Lake Hartwell.

Growth Potential

The Town of Pickens is the prominent focus of potential development in this watershed. Commercial growth is predicted between Pickens and Easley (03060101-070) along S.C. Highway 8. Residential growth has the potential to increase, as does industrial growth. Industrial growth in this watershed is due to the established infrastructure and transportation system, and the proximity of I-85 to the industrial community.

03060101-070

General Description

Watershed 03060101-070 is located in Pickens County and consists of the lower reach of **Twelve Mile Creek** and its tributaries. The watershed occupies 30,279 acres of the Piedmont region of South Carolina. The predominant soil types consist of an association of the Cecil-Hiwassee series. The erodibility of the soil (K-factor) averages 0.26; the slope of the terrain averages 9.6%, with a range of 2-25%. Land use/land cover in the watershed includes: 20.50% urban land, 12.45% agricultural land, 7.76% scrub/shrub land, 0.35% barren land, 57.25% forested land and 1.70% water.

The lower reach of Twelve Mile Creek flows into and forms an arm of Lake Hartwell. Golden Creek (FW) flows into this segment of Twelve Mile Creek near the Towns of Liberty and Easley. This watershed contains a total of 18.97 stream miles, all classified FW, and accepts the drainage of the upper Twelve Mile Creek watershed (03060101-060).

Water Quality

Golden Creek - Aquatic life uses are fully supported, but may be threatened by a significantly declining trend in dissolved oxygen. Recreational uses are not supported due to fecal coliform bacteria excursions under Class FW standards. This creek was Class B until April, 1992 and bacterial conditions are expected to improve as new NPDES permit limits are instituted in the watershed. The Town of Easley/Golden Creek Lagoon, Imperial Die Casting, and Town of Liberty/Roper Lagoon are all located upstream of this sampling location and each had several permit limit violations in 1992. The combination of TSS, BOD, and fecal coliform bacteria excursions from these three facilities may be a contributing factor to the observed water quality impacts. Fecal coliform limitations will be more stringent when the permits are reissued.

Unnamed tributary to Twelve Mile Creek - Aquatic life and recreational uses are fully supported; however, aquatic life uses may be threatened by a significantly declining trend in dissolved oxygen.

Twelve Mile Creek - There are three sampling locations along the lower reach of Twelve Mile Creek, all locations fully supporting aquatic life uses. Using Class FW standards for fecal coliform bacteria excursions, recreational uses were not supported at the farthest upstream location, only partially supported at the midstream location, and fully supported at the downstream location. The Cateechee Village wastewater treatment plant, located between the two uppermost stations in this watershed, experienced two fecal coliform bacteria permit limit violations in 1992. This creek was

Class B until April, 1992 and bacterial conditions are expected to improve as new NPDES permit limits are instituted in the watershed.

Fish consumption uses for this region of the lake are not supported due to the fish consumption advisory (see watershed 03060101-040) for Lake Hartwell. This region of the lake system allows no consumption of fish. Polychlorinated biphenyls (PCBs) are present in sediment at all three locations. Two chromium samples in 1987 were in excess of the aquatic life standard. One of these was also greater than the human health standard. Metals are not routinely monitored at these locations and these results represent one sampling event. Additional metals sampling may be warranted. The upstream sampling location exhibited a significantly increasing trend in turbidity, possibly due to a combination of both point and nonpoint source contributions.

Lake Water Quality Assessment

General water quality for **Lake Hartwell** is described in watershed 03060101-040, where the majority of the lake is located and where the streams sampled drain into. A single Algal Growth Potential Test, conducted in the summer of 1989, indicated that the limiting nutrient in the Twelve Mile Creek arm of the lake was phosphorus. Eutrophication studies classified this region of Lake Hartwell as a Category II for intermediate water quality, which may be susceptible to further degradation, with protection recommended; the overall status of this embayment indicates improvement over time. Agricultural nonpoint source inputs were recorded in the Twelve Mile Creek area.

Water Supply

WATER USER (TYPE)	STREAM	AMOUNT WITHDRAWN (MGD)
Easley-Central (M)	Twelve Mile Creek	1.180
BASF Corp.-Fibers Div. (I)	Twelve Mile Creek	1.500
Vulcan Materials-Liberty (I)	Golden Creek	0.792

Point Source Contributions

Golden Creek is included on the §304(l) long list of impacted waterbodies due to point source concerns for nontoxic pollutants. Twelve Mile Creek is included on the §304(l) long list due to point source concerns for toxic pollutants (PCBs).

RECEIVING STREAM FACILITY NAME PERMITTED FLOW @ PIPE (MGD)	NPDES # TYPE COMMENT
GOLDEN CREEK IMPERIAL DIE CASTING CORP	SC0039586 MINOR INDUSTRIAL

PIPE #: 001	FLOW: 0.0022	
GOLDEN CREEK		SC0026191
LIBERTY/ROPER LAGOON		MINOR MUNICIPAL
PIPE #: 001	FLOW: 0.279	
GOLDEN CREEK		SC0000361
ALICE MFG/ALICE PLANT		MINOR INDUSTRIAL
PIPE #: 001	FLOW: MR	
GOLDEN CREEK		SC0000418
VULCAN MATERIALS CO/LIBERTY		MINOR INDUSTRIAL
PIPE #: 001	FLOW: MR	
GOLDEN CREEK		SC0023035
EASLEY/GOLDEN CREEK LAGOON		MINOR MUNICIPAL
PIPE #: 001	FLOW: 0.58	
MURPHEE BRANCH		SC0026166
LIBERTY/CRAMER LAGOON		MINOR MUNICIPAL
PIPE #: 001	FLOW: 0.157	
TWELVE MILE CREEK		SC0000302
BASF CORP/FIBERS DIV		MAJOR INDUSTRIAL
PIPE #: 001	FLOW: 0.1415	
HUGGINS CREEK		SC0000302
BASF CORP/FIBERS DIV		MAJOR INDUSTRIAL
PIPE #: 002	FLOW: 0.427	
PIKE CREEK		SC0000132
AMERICAN HOUSE SPINNING		MINOR INDUSTRIAL
PIPE #: 001	FLOW: 0.033	
TWELVE MILE CREEK		SC0024996
CENTRAL/NORTH PLANT		MINOR MUNICIPAL
PIPE #: 001	FLOW: 0.15	
TWELVE MILE CREEK		SC0022012
CATECHEE VILLAGE INC		MINOR COMMUNITY
PIPE #: 001	FLOW: 0.02	
TWELVE MILE CREEK TR		SC0027049
MASSINGILL TRAILER COURT		MINOR COMMUNITY
PIPE #: 001	FLOW: 0.0024	
NO DISCHARGE SYSTEM		ND#
FACILITY NAME		TYPE
LAND DISPOSAL		ND0067407
MONTE VISTA SD		MINOR COMMUNITY

Nonpoint Source Contributions

Twelve Mile Creek is listed as an impacted waterbody from nonpoint sources that include the agricultural practices of nonirrigated crop production and pastureland management. Numerous elevated nutrient levels have been recorded by the Department on this stream segment, along with scattered elevated turbidity readings. Computer modelling by the SCLRCC indicated a high potential for NPS problems from agricultural activities for this stream.

Growth Potential

The greatest potential for residential and commercial growth and development in the county lies in this watershed and the Eighteen Mile Creek watershed (03060101-090); both watersheds are influenced by the Towns of Easley, Liberty, Central and, to some extent, Clemson along the S.C. Highway 123 corridor. This growth will occur, provided there is sufficient infrastructure to accommodate it. The residential growth trend is eastward from Clemson to Central, Liberty and Easley along S.C. Road 93 and U.S. Highway 123. Commercial growth is predicted to occur between Easley and Pickens (03060101-060) along S.C. Highway 8. The Town of Easley has the greatest potential for commercial growth in the county due to its proximity to S.C. Roads 93, 153, and 8, and U.S. Highway 123.

Industrial growth in this watershed is due, in part, to the established infrastructure and transportation system, and the proximity of I-85. The topography of Easley is most conducive to industrial development and gives it the highest potential for growth in this area. The Town of Liberty also has a high potential for industrial growth due to the large tracts in the Liberty vicinity that are projected to develop, pending the construction of new or expanded sewage disposal plants in the area. Construction of these will encourage growth along the U.S. Highway 123 corridor.

03060101-080

General Description

Watershed 03060101-080 is located in Oconee County and consists of **Coneross Creek** and its tributaries, which form an arm of Lake Hartwell. The watershed occupies 61,871 acres of the Blue Ridge (upper third) and Piedmont (lower two-thirds) regions of South Carolina. The predominant soil types consist of an association of the Cecil-Hiwassee series. The erodibility of the soil (K-factor) averages 0.26; the slope of the terrain averages 11.1%, with a range of 2-25%. Land use/land cover in the watershed includes: 12.54% urban land, 25.70% agricultural land, 14.14% scrub/shrub land, 0.42% barren land, 46.25% forested land and 0.95% water.

There are a total of 38.72 stream miles in this watershed, all classified as FW (Lake Hartwell is not included in this watershed.) Richmond Creek, East Fork Creek, Colonels Fork Creek and Millers Branch drain into Coneross Creek, which flows past the Town of Walhalla and into Lake Hartwell.

Water Quality

Coneross Creek - There are two sampling locations in the upper reaches of this creek and aquatic life uses are fully supported on both. A significant increasing trend in turbidity was detected at the downstream station, possibly due to adjacent land use practices (see Nonpoint Source Contributions). Recreational uses are not supported at the upstream station and only partially supported at the downstream station due to fecal coliform bacteria excursions. The Oconee County wastewater treatment plant, located in this watershed, experienced several fecal coliform bacteria permit limit violations in 1992. The Oconee County Sewer Commission is in the process of completing a Facilities Plan for the expansion and upgrade of the Coneross Creek Wastewater Treatment Facility. This upgrade should significantly improve the effluent quality from the facility which is presently receiving excessive inflow and infiltration from the collection systems. A SCDHEC Consent Order has been issued to OCSC to address the excessive flows.

There is another station downstream in the impounded region of Coneross Creek. Aquatic life and recreational uses are fully supported, but aquatic life uses may be threatened due to a significantly declining trend in dissolved oxygen. Total nitrogen shows a significantly increasing trend, which could contribute to algal or aquatic weed problems.

Lake Water Quality Assessment

General water quality for **Lake Hartwell** is described in watershed 03060101-040, where the majority of the lake is located, and where the sampled streams drain into. A single Algal Growth Potential Test, conducted in the summer of 1989, indicated that the limiting nutrient in the Coneross

Creek arm of the lake was phosphorus. Eutrophication studies classified this region of Lake Hartwell as a Category II for intermediate water quality which may be susceptible to further degradation; protection is recommended.

Point Source Contributions

RECEIVING STREAM FACILITY NAME PERMITTED FLOW @ PIPE (MGD)	NPDES # TYPE COMMENT
CONEROSS CREEK OCONEE COUNTY SEWER COMMISSION PIPE #: 001 FLOW: 5.0	SC0033553 MAJOR MUNICIPAL
CONEROSS CREEK WALHALLA/CONEROSS CK WATER PLT PIPE #: 001 FLOW: 0.20	SC0040908 MINOR INDUSTRIAL
CONEROSS CREEK OCONEE MEMORIAL HOSPITAL PIPE #: 001 FLOW: 0.015	SC0039012 MINOR COMMUNITY

Nonpoint Source Contributions

Coneross Creek is currently included on the list of waterbodies impacted by nonpoint source pollutants. The stream was evaluated from data collected by outside agencies and citizen groups and found to have elevated levels of suspended solids and turbidity resulting from agricultural practices (nonirrigated crop production and pastureland management) and construction (land development). Computer modelling by the SCLRCC indicated a high potential for NPS problems from agricultural and urban activities for this stream.

Growth Potential

The Towns of Seneca, Westminster, Walhalla and West Union are located in this watershed; and all are predicted to experience growth and development. Seneca, in particular, is considered one of the largest manufacturing areas in the upstate region. In the short term, growth of the manufacturing industry is dependent on infrastructural expansion, which is dependent on the capacity of existing facilities. Long term growth is dependent on planned construction of additional treatment capacity by Oconee County Sewer Commission. Many wastewater treatment facilities are at or near their capacity to treat industrial discharges.

Residential, commercial and industrial growth is expected along the U.S. Highway 123 corridor from Westminster through Seneca to Clemson (03060101-040,060), as well as along S.C. Road 28 from Seneca through West Union to Walhalla.

03060101-090

General Description

Watershed 03060101-090 is located in Pickens and Anderson Counties and consists of **Eighteen Mile Creek** and its tributaries, which form an arm of Lake Hartwell. The watershed occupies 42,802 acres of the Piedmont region of South Carolina. The predominant soil types consist of an association of the Cecil-Hiwassee series. The erodibility of the soil (K-factor) averages 0.26; the slope of the terrain averages 9.2%, with a range of 2-25%. Land use/land cover in the watershed includes: 9.0 % urban land, 21.22% agricultural land, 18.81% scrub/shrub land, 0.56% barren land, 50.09% forested land and 0.34% water.

There are a total of 26.59 stream miles in the watershed, classified as FW, that flow into Lake Hartwell (lake not in this watershed). Fifteen Mile Creek (FW), Brushy Creek (FW) and Woodside Branch (FW) flow into Eighteen Mile Creek near the Towns of Central and Norris; and Eighteen Mile Creek flows past the Town of Pendleton en route to Lake Hartwell.

Water Quality

Woodside Branch - Aquatic life uses is only partially supported due to dissolved oxygen excursions. Since this is a secondary monitoring station, sampling is purposely biased towards periods with the potential for low dissolved oxygen concentrations. A significantly increasing trend in dissolved oxygen and a significantly declining trend in five-day biochemical oxygen demand (BOD₅) suggest improving dissolved oxygen conditions. Recreational uses are not supported due to fecal coliform bacteria excursions under Class FW standards; however, a significantly declining trend in bacterial concentrations suggests improving conditions. This creek was Class B until April, 1992 and bacterial conditions are expected to continue to improve as new NPDES permit limits are instituted in the watershed.

Eighteen Mile Creek - There are four routine monitoring stations on Eighteen Mile Creek, all fully supporting aquatic life uses. The upstream location shows a significantly increasing trend in dissolved oxygen and a significantly declining trend in five-day biochemical oxygen demand (BOD₅), both of which suggest improving dissolved oxygen conditions. Recreational uses were not supported at any of the four locations, due to fecal coliform bacteria excursions under Class FW standards. The two farthest upstream locations exhibited significantly declining trends in fecal coliform bacteria concentrations, indicative of improving conditions. This creek was Class B until April, 1992 and bacterial conditions are expected to improve as new NPDES permit limits are instituted in the watershed. Significantly increasing trends in turbidity were detected at the two midstream stations, possibly due to increasing nonpoint source contributions from adjacent land use activities.

Lake Water Quality Assessment

General water quality for **Lake Hartwell** is described in watershed 03060101-040, where the majority of the lake is located, and where the sampled streams drain into. A single Algal Growth Potential Test, conducted in the summer of 1989, indicated that the limiting nutrient in the Eighteen Mile Creek arm of the lake was phosphorus. Eutrophication studies classified this region of Lake Hartwell as a Category II for intermediate water quality which may be susceptible to further degradation, with protection recommended. The overall status of this embayment indicates improvement over time.

Water Supply

WATER USER (TYPE)	STREAM	AMOUNT WITHDRAWN (MGD)
Town of Liberty (M)	Eighteen Mile Creek	1.200
Pendleton Finishing Plt.- Div. Milliken & Co. (I)	Eighteen Mile Creek	2.592

Point Source Contributions

Woodside Branch is currently included on the §304(l) long list of waterbodies impacted due to point source concerns for toxic pollutants. Eighteen Mile Creek is included on the §303(d) priority list of waters that require TMDL development. A TMDL has been developed (see below) and is in the process of implementation. Eighteen Mile Creek is also included on the §304(l) long list of waterbodies impacted by point source, nontoxic pollutants. Implementation of the TMDL should alleviate these concerns.

RECEIVING STREAM FACILITY NAME PERMITTED FLOW @ PIPE (MGD)	NPDES # TYPE COMMENT
MOHASCO BRANCH LIBERTY/OWENS LAGOON PIPE #: 001 FLOW: 0.072	SC0026182 MINOR MUNICIPAL
WOODSIDE BRANCH LIBERTY/LUSK PROPERTY LAGOON PIPE #: 001 FLOW: 0.281	SC0026174 MINOR MUNICIPAL
BRUSHY CREEK MOHAWK COMM CARPET/LIBCO MILL PIPE #: 001 FLOW: 0.012	SC0000213 MINOR INDUSTRIAL
UNNAMED STREAM MILLIKEN & CO/PENDLETON PIPE #: 001 FLOW: 3.0	SC0000477 MAJOR INDUSTRIAL

EIGHTEEN MILE CREEK TR MILLIKEN & CO/GERRISH MILLIKEN PIPE #: 001 FLOW: NO LIMIT	SC0023434 MINOR INDUSTRIAL
EIGHTEEN MILE CREEK TR MILLIKEN & CO/GERRISH MILLIKEN PIPE #: 002 FLOW: NO LIMIT	SC0023434 MINOR INDUSTRIAL
EIGHTEEN MILE CREEK TR WHISPERING PINES SD/MADERA UT PIPE #: 001 FLOW: 0.12	SC0028703 MINOR COMMUNITY
EIGHTEEN MILE CREEK TR CENTRAL WESLEYAN COLLEGE PIPE #: 001 FLOW: 0.03	SC0026387 MINOR COMMUNITY
EIGHTEEN MILE CREEK TR GREENWOOD MILLS/LIBERTY PLT 2 PIPE #: 001 FLOW: 0.017	SC0000230 MINOR INDUSTRIAL
EIGHTEEN MILE CREEK TR HEATHERWOOD SD/MADERA UTIL PIPE #: 001 FLOW: 0.072	SC0029548 MINOR COMMUNITY
EIGHTEEN MILE CREEK LIBERTY/WATER TRMT PLANT PIPE #: 001 FLOW: MR	SC0041114 MINOR INDUSTRIAL
EIGHTEEN MILE CREEK GREENWOOD MILLS/LIBERTY PLT 1 PIPE #: 001 FLOW: 0.387	SC0000264 MAJOR INDUSTRIAL
EIGHTEEN MILE CREEK CENTRAL/SOUTH PLANT PIPE #: 001 FLOW: 0.35	SC0025003 MINOR MUNICIPAL
EIGHTEEN MILE CREEK PENDLETON-CLEMSON REGIONAL SWR PIPE #: 001 FLOW: 1.725	SC0035700 MAJOR MUNICIPAL
NO DISCHARGE SYSTEM FACILITY NAME	ND# TYPE
LAND DISPOSAL QUAIL HAVEN S/D	ND0067377 MINOR COMMUNITY

Summary of Eighteen Mile Creek TMDL

A final draft report proposing a total maximum daily load (TMDL) for Eighteen Mile Creek was submitted by the SCDHEC and approved by the USEPA, with recommendations for the final report. Past water quality data for the Eighteen Mile Creek embayment indicated that portions of the system did not meet applicable water quality standards for dissolved oxygen. Eighteen Mile Creek

enters Lake Hartwell in an embayment and reaeration is greatly reduced upon entry. There are fourteen dischargers to the creek and its tributaries (eleven of which are modelled); there are no direct dischargers to the lake.

Prior to this study, only the stream segment was modelled; effluent limits did not consider the embayment. The result of omitting the embayment in the past was over-allocating the system's assimilative capacity. Separate models for the stream and embayment were constructed for the new Eighteen Mile Creek analysis. The output from the stream model (QUAL2E model) served as the input for the embayment model (Comprehensive Water Quality Model or CWQM). Due to the excellent reaeration of the stream segments, the embayment proved to be the limiting factor; therefore, more emphasis was placed on the embayment model for the watershed TMDL determination.

The point source portion of the TMDL was the combination of the maximum allowable CBOD_u (Ultimate Carbonaceous Biochemical Oxygen Demand) and NBOD_u (Ultimate Nitrogenous Biochemical Oxygen Demand), which approximates 856 lbs/d and is considered the system's target TMDL for UOD (Ultimate Oxygen Demand). The nonpoint source contribution was evaluated under 7Q10 conditions and determined to have negligible impact during low flow regimes. To meet the target TMDL for the system, the effluent limits of the dischargers would need to exceed currently accepted limits of technology. It was decided that TMDLs of 1,766 lbs/d for UOD and 56 lbs/d for total phosphorus would serve as interim limits for this system, with a requirement for a comprehensive study of the stream and embayment. It is understood that the comprehensive study may show the need for effluent limits that are more stringent than the interim TMDLs.

Growth Potential

The greatest potential for residential and commercial growth and development in Pickens County lies in this watershed and in the Twelve Mile Creek watershed (03060101-070); both watersheds are influenced by the Towns of Easley, Liberty, Central, and to some extent, Clemson along the S.C. Highway 123 corridor. This growth will occur provided there is sufficient infrastructure to accommodate it. A residential growth trend extends eastward from Clemson to Central, Liberty and Easley, along S.C. Road 93 and U.S. Highway 123. Commercial growth is predicted between Easley and Pickens (03060101-060), along S.C. Highway 8. The Town of Easley has the greatest potential for commercial growth in the county due to its proximity to S.C. Roads 93, 153, and 8, and U.S. Highway 123.

Industrial growth in this watershed is due, in part, to the established infrastructure and transportation system, and the proximity of I-85. The topography of Easley is most conducive to industrial development and gives it the highest potential for future growth in the area. The Town of Liberty also has a high potential for industrial growth due to the large projected tracts in the Liberty

vicinity that will develop pending the construction of new or expanded sewage disposal plants in the area. Construction of these will encourage growth along the U.S. Highway 123 corridor.

The Town of Pendleton also lies in this watershed and is projected for industrial growth along the U.S. Highway 76 corridor from Pendleton to Anderson (03060103-030). In addition, a rail line runs through Pendleton to Seneca, a criterion for siting a new industry.

03060101-100

General Description

Watershed 03060101-100 is located in Pickens and Anderson Counties and consists primarily of **Three and Twenty Creek** and its tributaries, which form an arm of Lake Hartwell. The watershed occupies 49,913 acres of the Piedmont region of South Carolina. The predominant soil types consist of an association of the Cecil-Hiwassee series. The erodibility of the soil (K-factor) averages 0.26; the slope of the terrain averages 9.5%, with a range of 2-25%. Land use/land cover in the watershed includes: 1.39% urban land, 35.69% agricultural land, 22.38% scrub/shrub land, 1.20% barren land, 38.91% forested land and 0.42% water.

There are a total of 44.89 stream miles in the watershed, classified as FW, that flow into Lake Hartwell. Pickens Creek, Double Branch, Cuffle Creek, Little Garvins Creek, Big Garvins Creek, Shanklin Creek and Milwee Creek all drain into Three and Twenty Creek, which flows through the Town of LaFrance before entering the lake.

Water Quality

Three and Twenty Creek - Aquatic life uses are fully supported for this stream. Recreational uses are only partially supported due to fecal coliform bacteria excursions under Class FW standards. This creek was Class B until April, 1992 and bacterial conditions are expected to improve as new NPDES permit limits are instituted in the watershed. The La France/ Mount Vernon Mills, and Michelin Tire/Sandy Springs facilities are both located upstream of the sampling station in this watershed. Both experienced fecal coliform bacteria permit limit violations in 1992. Michelin Tire/Sandy Springs facility experienced toxicity problems several times in 1992.

Water Supply

WATER USER (TYPE)	STREAM	AMOUNT WITHDRAWN (MGD)
LaFrance Industry (M)	Three & Twenty Creek	0.300
Mt.Vernon Mills	Three & Twenty Creek	1.080
-LaFrance Div. (I)		

Point Source Contributions

Three and Twenty Creek is included on the §304(I) long list of impacted waterbodies due to point source concerns for toxic pollutants.

RECEIVING STREAM FACILITY NAME PERMITTED FLOW @ PIPE (MGD)	NPDES # TYPE COMMENT
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SHANKLIN CREEK
YODERS BROTHERS INC
PIPE #: 001 FLOW: MR

SC0039543
MINOR INDUSTRIAL

THREE AND TWENTY CREEK
MICHELIN TIRE/SANDY SPRINGS
PIPE #: 001 FLOW: 0.48

SC0026701
MINOR INDUSTRIAL

THREE AND TWENTY CREEK
PANTRY #587/SANDY SPRINGS
PIPE #: 001 FLOW: MR

SC0044211
MINOR INDUSTRIAL
GROUNDWATER REMEDIATION

THREE AND TWENTY CREEK
LA FRANCE IND/MT VERNON MILLS
PIPE #: 001 FLOW: 0.49

SC0000485
MAJOR INDUSTRIAL

Growth Potential

The area between Anderson and Pendleton, including the Town of LaFrance, along U.S. Highway 76, is predicted to grow significantly. In addition, a rail line, an encouragement for growth, runs through LaFrance and Pendleton to Seneca. Planned sewer expansion by Anderson County in the area may also increase growth.

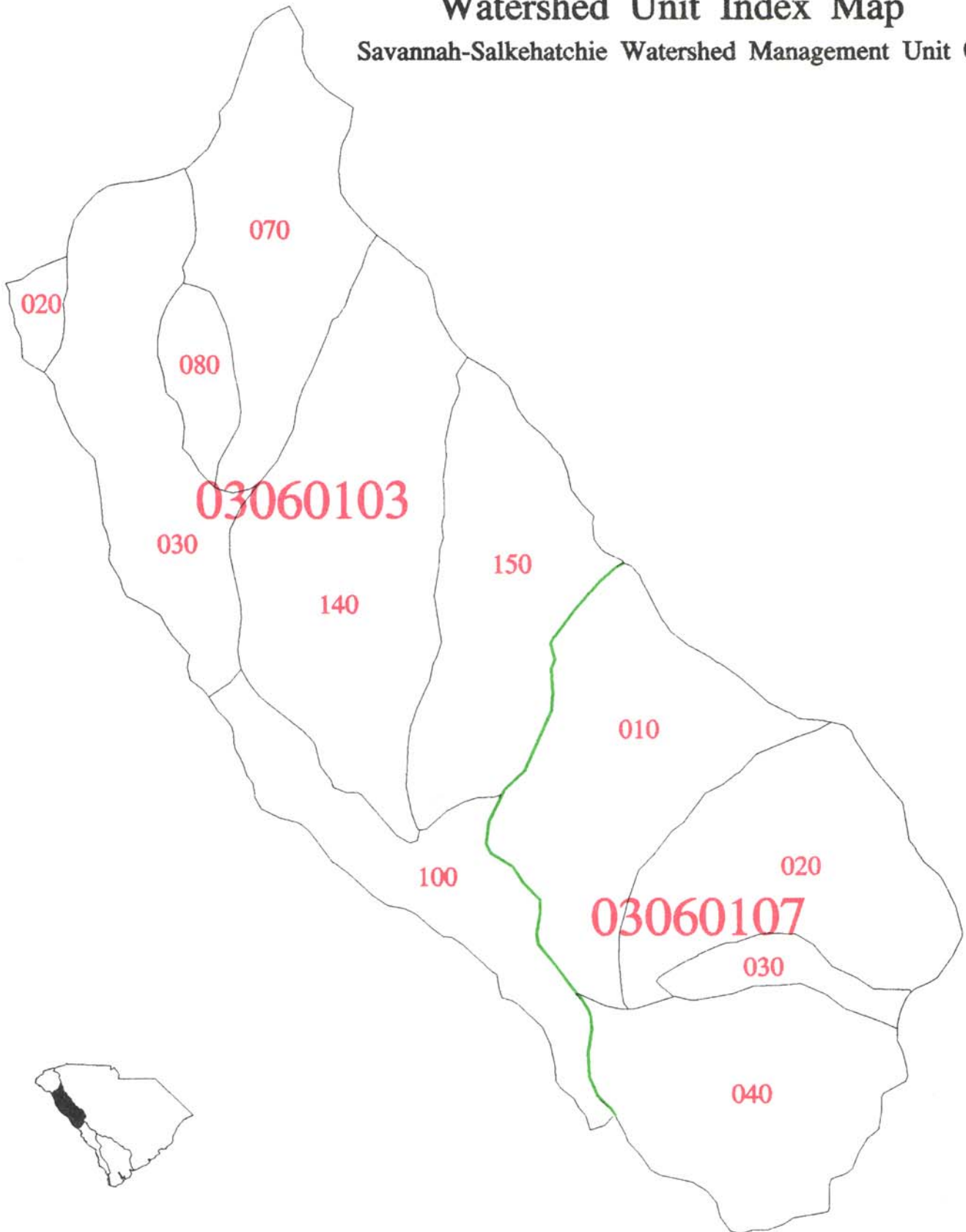
WATERSHED MANAGEMENT UNIT 0102

Climate

Data from National Weather Service stations in Anderson, Anderson FAA Airport, West Pelzer, Calhoun Falls, Greenwood, Lake Thurmond dam, Edgefield and McCormick were compiled to determine seasonal climatic information for the WMU-0102 area. Historical climatological records were compiled (SCWRC 1990) to provide the normal values. The normal annual rainfall in the WMU-0102 region was 48.18 inches. The highest seasonal rainfall occurred in the spring with 13.68 inches; the average summer, fall and winter rainfalls were 11.95, 9.80 and 12.75 inches, respectively. The mean annual daily temperature was 61.1°F. On a seasonal basis, spring temperatures averaged 60.8°F and summer, fall and winter temperatures averaged 77.9, 62.2 and 43.6°F, respectively.

Watershed Unit Index Map

Savannah-Salkehatchie Watershed Management Unit 0102



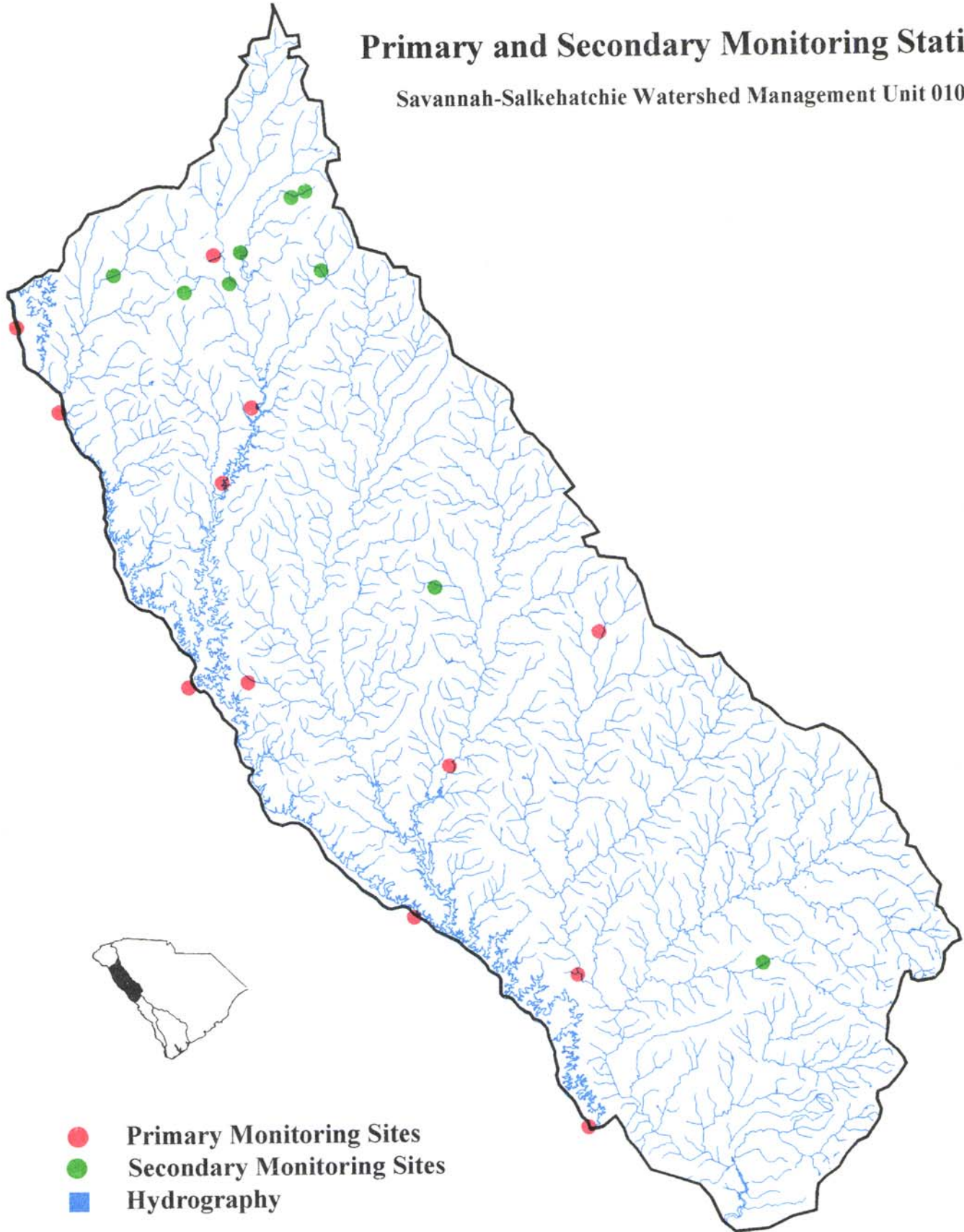
0 5 10 15 MILES

Monitoring Station Descriptions MU-0102

STATION NUMBER	STATION DESCRIPTION	TYPE
03060103-020		
SV-340	LK HARTWELL, MAIN BODY IN AREA OF MARKERS 12 & 14	P
03060103-030		
SV-316	BIG GENEROSTEE CK AT CO RD 104	S
SV-100	LAKE RUSSELL AT SC 181 6.5 MI SW STARR	P
SV-098	LAKE RUSSELL AT SC 72 3.1 MI SW CALHOUN FALLS	P
03060103-070		
SV-031	ROCKY RVR AT S-04-263 2.7 MI SE ANDERSON AT STP	P
SV-041	ROCKY RVR AT S-04-152 BL ROCKY RVR STP	S
SV-139	CUPBOARD CK AT S-04-733 AB BREAZEALE ST PLANT & BL BLAIR HILL	S
SV-140	CUPBOARD CK AT S-04-209 BL EFF FROM BELTON 2 PLANT	S
SV-141	BROADWAY CK AT US 76 BTWN ANDERSON & BELTON	S
SV-037	BETSY CK AT S-04-259 BL FIBERGLAS OUTFALL	S
SV-043	CHEROKEE CK AT S-04-318 4 MI S OF BELTON	S
SV-331	LK SECESSION, 1 1/4 MI BELOW SC ROUTE 28	P
SV-332	LK SECESSION APPROX 400 YDS ABOVE DAM	P
03060103-140		
SV-052	SAWNEY CK AT CO RD 1.5 MI SE OF CALHOUN FALLS	P
03060103-150		
SV-053B	BLUE HILL CK ON S MAIN ST ABBEVILLE	S
SV-318	LONG CANE CK AT S-33-117 7.0 MI NW MCCORMICK	P
03060103-100		
SV-291	CLARKS HILL RESERVOIR AT US 378 7 MI SW MCCORMICK	P
SV-294	CLARKS HILL RESERVOIR AT DAM AT US 221 SW CLARKS HILL	P
03060107-010		
SV-151	HARD LABOR CREEK AT S-24-164 BRIDGE	P
SV-330	STEVENS CREEK AT S-33-21	P
03060107-030		
SV-068	BEAVERDAM CK AT S-19-35 3.8 MI NW OF EDGEFIELD	S

Primary and Secondary Monitoring Stations

Savannah-Salkehatchie Watershed Management Unit 0102



- Primary Monitoring Sites
- Secondary Monitoring Sites
- Hydrography

0 5 10 15 MILES

Surface Water Intakes

Savannah-Salkehatchie Watershed Management Unit 0102

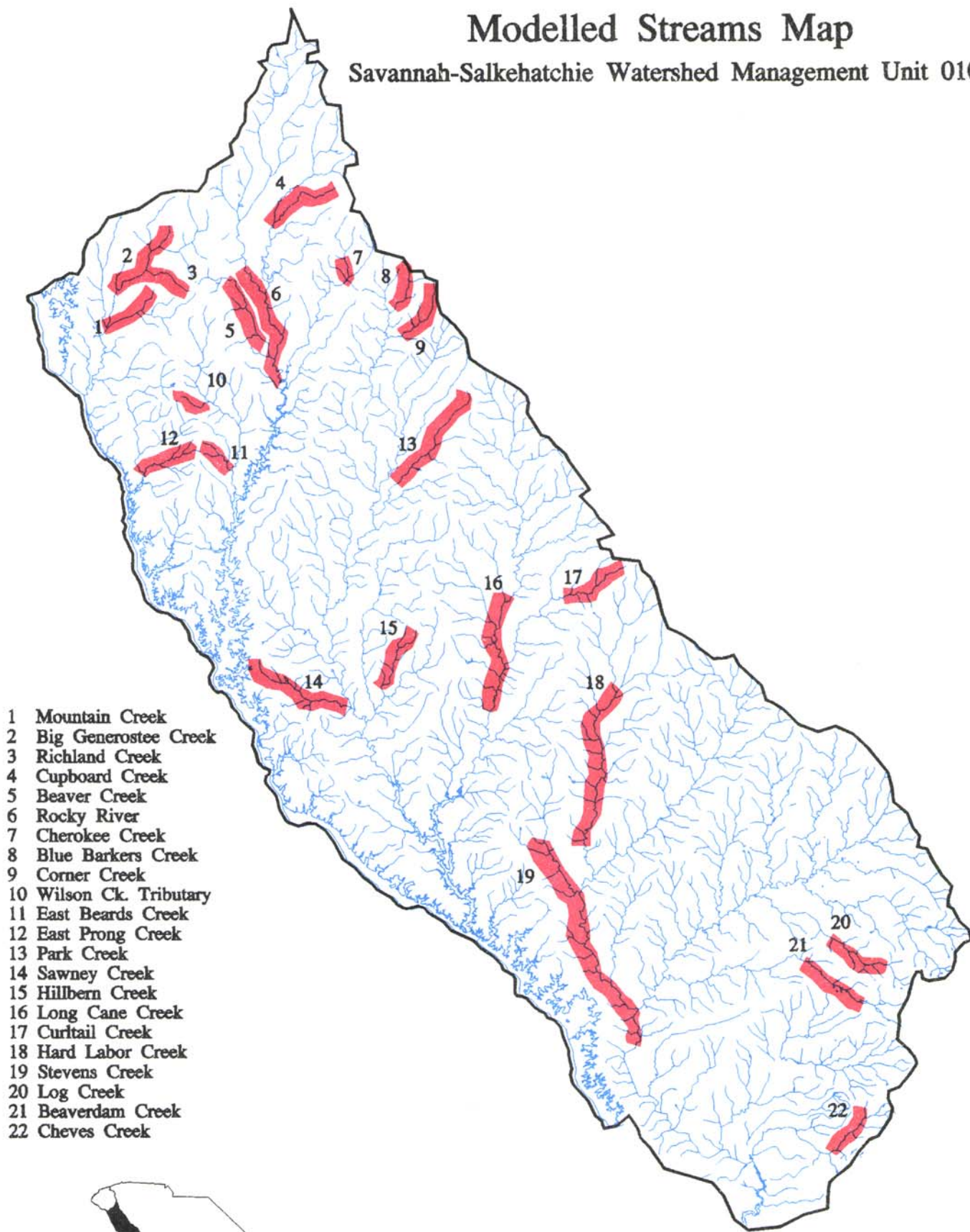


- Surface Waater Intakes
- Hydrology

0 5 10 15
MILES

Modelled Streams Map

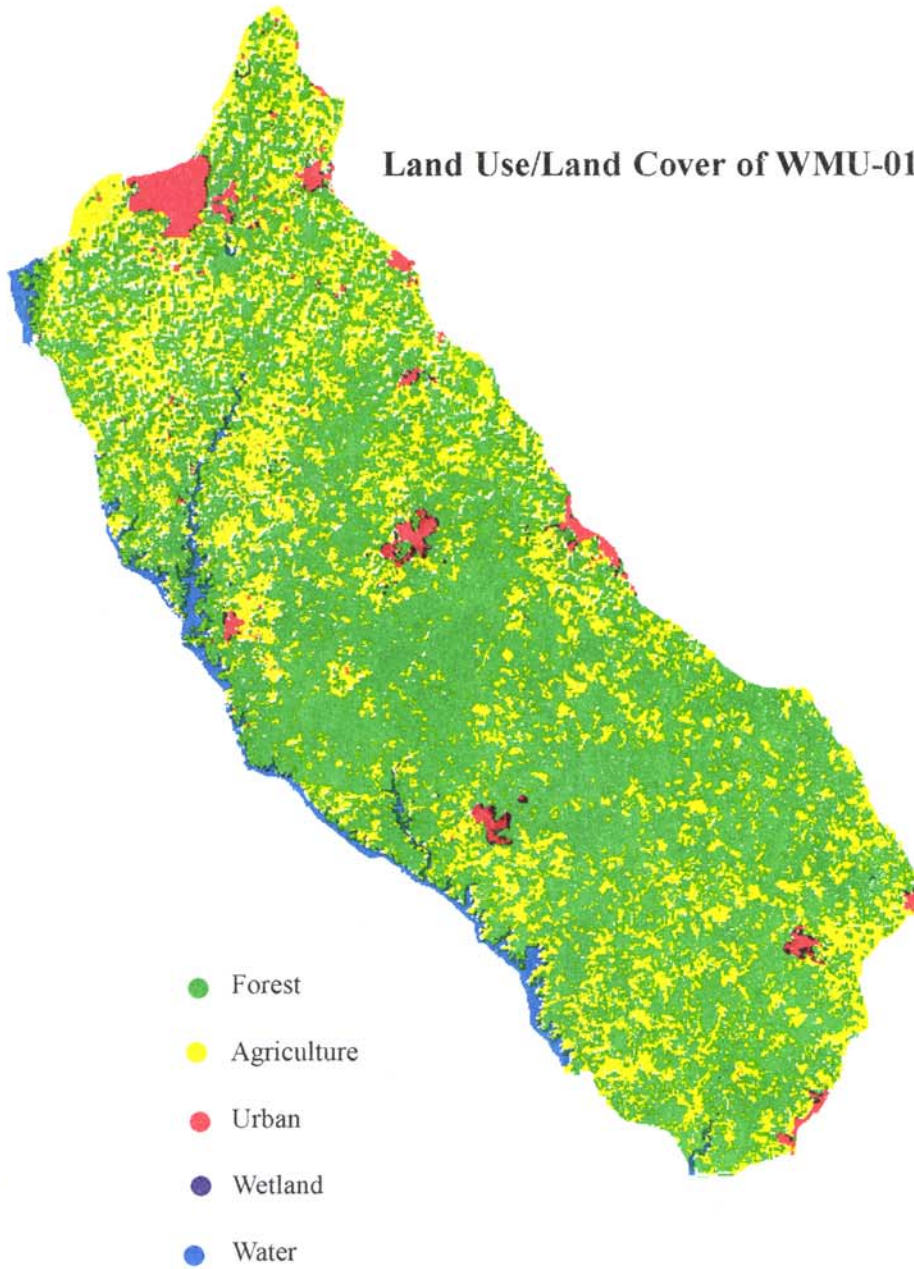
Savannah-Salkehatchie Watershed Management Unit 0102



0 5 10 15 MILES

+

Land Use/Land Cover of WMU-0102



Groundwater Contaminated Sites

Savannah-Salkehatchie Watershed Management Unit 0102



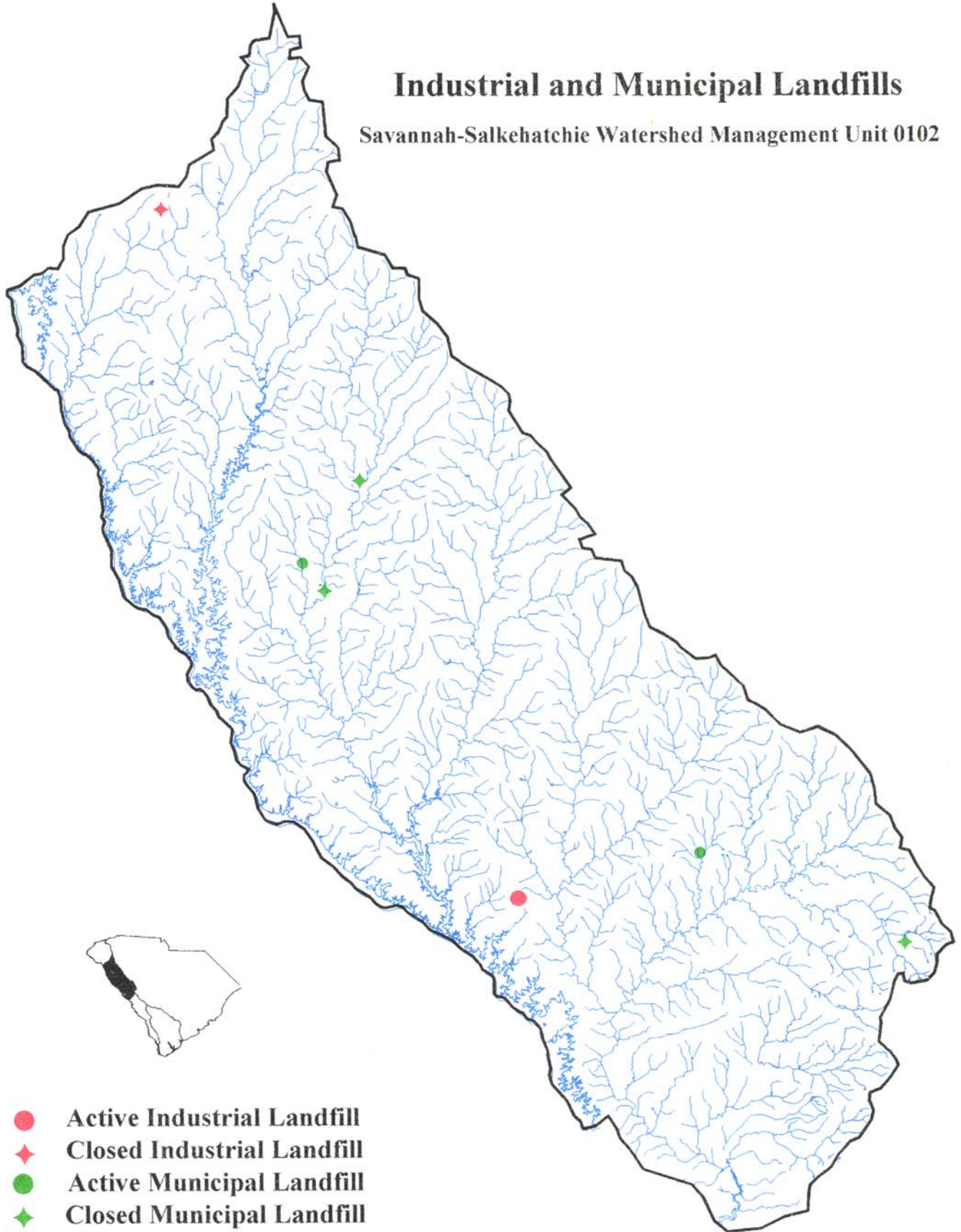
- 1 Owens-Corning Fiberglass
 - 2 Eliskim
 - 3 Singer (Ryobi)
- Hydrography



0 5 10 15 MILES

Industrial and Municipal Landfills

Savannah-Salkehatchie Watershed Management Unit 0102

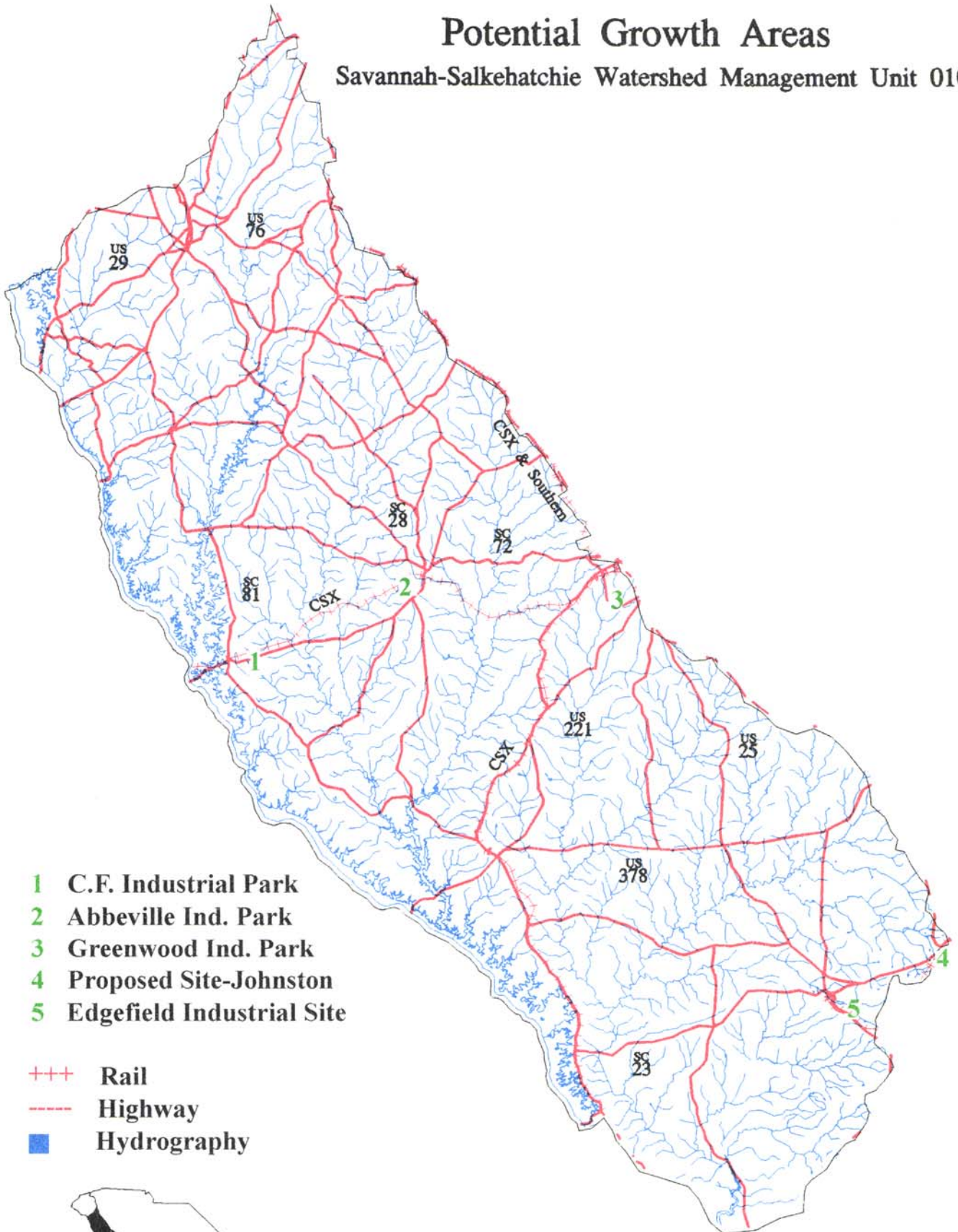


- Active Industrial Landfill
- ◆ Closed Industrial Landfill
- Active Municipal Landfill
- ◆ Closed Municipal Landfill
- Hydrology



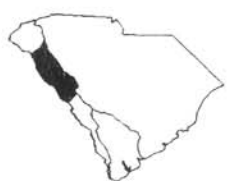
Potential Growth Areas

Savannah-Salkehatchie Watershed Management Unit 0102



- 1 C.F. Industrial Park
- 2 Abbeville Ind. Park
- 3 Greenwood Ind. Park
- 4 Proposed Site-Johnston
- 5 Edgefield Industrial Site

- +++ Rail
- Highway
- Hydrography



0 5 10 15 MILES

Watershed Descriptions Within WMU-0102

03060103-020

General Description

Watershed 03060103-020 is located in Anderson County and consists primarily of the lower end of **Lake Hartwell**. The watershed occupies 12,528 acres of the Piedmont region of South Carolina. The predominant soil types consist of an association of the Cecil-Madison-Pacolet series. The erodibility of the soil (K-factor) averages 0.26; the slope of the terrain averages 11.5%, with a range of 2-40%. Land use/land cover in the watershed includes: 1.60% urban land, 26.84% agricultural land, 14.31% scrub/shrub land, 0.70% barren land, 25.96% forested land and 30.59% water.

This watershed contains the lower end of **Lake Hartwell** on the South Carolina side of the state boundary, which includes the Hartwell dam; no major streams flow through the watershed. Sadlers Creek State Park on **Lake Hartwell** near the dam is another natural resource in the watershed.

Water Quality

Lake Hartwell - Aquatic life and recreational uses are fully supported in this portion of the lake. Fish consumption uses are only partially supported for this stream due to the fish consumption advisory (see watershed 03060101-040) for **Lake Hartwell**. This region of the lake system allows consumption of fish under three pounds.

Lake Water Quality Assessment

General water quality for **Lake Hartwell** is described in watershed 03060101-040, where the majority of the lake is located and where the sampled streams drain into. Unlike the upper reaches, and the body of the lake, the water quality at the dam was a category III, with preservation recommended to maintain the highest water quality.

Point Source Contributions

There are no point source dischargers in this watershed.

Growth Potential

There is no serious growth potential in this watershed.

03060103-030

General Description

Watershed 03060103-030 is located in Anderson and Abbeville Counties and consists primarily of **Lake Richard B. Russell** and its tributaries. The watershed occupies 138,716 acres of the Piedmont region of South Carolina. The predominant soil types consist of an association of the Cecil-Hiwassee-Davidson series. The erodibility of the soil (K-factor) averages 0.26; the slope of the terrain averages 9.9%, with a range of 2-15%. Land use/land cover in the watershed includes: 8.37% urban land, 19.58% agricultural land, 22.71% scrub/shrub land, 0.47% barren land, 41.17% forested land and 7.70% water.

The Savannah River flows out of Lake Hartwell dam and through Lake Richard B. Russell. The reach of the Savannah River just below Hartwell dam and prior to Lake Russell's headwaters is classified as TPGT; the remainder of the river is classified as FW. Flowing into the Savannah River below Hartwell dam, and prior to Lake Russell, is the Big Generostee Creek drainage (Devil's Fork Creek, Richland Creek and Mountain Creek), and farther downstream at the headwaters of Lake Russell, the Little Generostee Creek drainage (Canoe Creek, East Prong Creek, and Crooked Creek) enters. All drainages to the Savannah River are classified as FW. The watershed includes all of Lake Russell on the South Carolina side to the Richard B. Russell dam, including the Rocky River arm of the lake which extends up to, but does not include, Lake Secession. There are a total of 157.1 stream miles in the watershed.

Water Quality

Big Generostee Creek - Aquatic life uses for this stream are not supported due to dissolved oxygen excursions. Since this is a secondary monitoring station, sampling is purposely biased towards periods with potentially low dissolved oxygen concentrations. This station exhibited a moderately impacted macroinvertebrate community, possibly due to low dissolved oxygen. Recreational uses are not supported due to fecal coliform bacteria excursions under Class FW standards, compounded by a significant increasing trend in bacterial concentrations. This creek was Class B until April, 1992 and bacterial conditions are expected to improve as new NPDES permit limits are instituted in the watershed. The Anderson/Generostee Creek Plant experienced multiple fecal coliform bacteria and BOD permit limit violations in 1992, which may have contributed to the observed water quality impacts. The City of Anderson is substantially expanding the size of the municipal wastewater treatment facility on this creek, and it is recommended that the monitoring station located on the creek be converted from a secondary to a primary station.

Lake Richard B. Russell - Recreational and aquatic life uses are fully supported in this portion of the lake; however, aquatic life uses may be threatened at both sampling locations by significantly declining trends in dissolved oxygen. In 1990, one chromium sample was measured in excess of the aquatic life and human health standard, but this does not appear to be a chronic condition. Copper has been measured in excess of the aquatic life standard several times at both stations between 1989 and 1990. Diazinon was detected in one water sample in 1991. Diazinon is a common household pesticide used for the control of fire ants, and was probably introduced through nonpoint source runoff from the adjacent land area.

Lake Water Quality Assessment

The Savannah River and Rocky River together flow into **Lake Richard B. Russell**, which has a watershed 645.2 km² in South Carolina; a portion of the watershed extends into Georgia. The surface area of the lake extends 10,533.1 hectares, with a maximum depth of 44.7m and a mean depth of 12m; the lake undergoes stratification in the summer. There were no impaired recreational usages of the lake. The lake drains into Lake Thurmond.

A single Algal Growth Potential Test, conducted in the summer of 1989, indicated that both nitrogen and phosphorus were limiting in the Rocky River arm of the lake. Eutrophication studies classified the Rocky River arm of the lake as a category II for intermediate water quality and identified a need for protection, and the Lake Russell dam as a category III for highest water quality, with preservation recommended.

Water Supply

WATER USER (TYPE)	STREAM	AMOUNT WITHDRAWN (MGD)
Town of Calhoun Falls (M)	Lake Richard B. Russell	0.660
Bigelow-Sanford (M)	Lake Richard B. Russell	0.750
City of Abbeville (M)	Rocky River	1.810
Bigelow-Sanford, Inc.	Rocky River	3.600
Rocky River Plt. (I)		

Point Source Contributions

RECEIVING STREAM FACILITY NAME PERMITTED FLOW @ PIPE (MGD)	NPDES # TYPE COMMENT
MOUNTAIN CREEK TR CHAMBERT FOREST SD/UNITED UTIL PIPE #: 001 FLOW: 0.03	SC0024716 MINOR COMMUNITY

MOUNTAIN CREEK TR CHAMBERT FOREST SD/UNITED UTIL PIPE #: 002 FLOW: 0.04	SC0024716 MINOR COMMUNITY
BIG GENEROSTEE CREEK ANDERSON/GENEROSTEE CREEK PLT PIPE #: 001 FLOW: 6.2	SC0023752 MAJOR MUNICIPAL
BIG GENEROSTEE CREEK BASF CORP/ANDERSON PIPE #: 001 FLOW: MR	SC0000281 MAJOR INDUSTRIAL STORMWATER
BIG GENEROSTEE CREEK BASF CORP/ANDERSON PIPE #: 002 FLOW: 0.66	SC0000281 MAJOR INDUSTRIAL
BIG GENEROSTEE CREEK BASF CORP/ANDERSON PIPE #: 003 FLOW: MR	SC0000281 MAJOR INDUSTRIAL
BRYSON CREEK SINGER COMPANY/ANDERSON PIPE #: 001 FLOW: 0.043	SC0003000 MINOR INDUSTRIAL
EAST PRONG CREEK IVA/FACILITY B WESTSIDE PIPE #: 001 FLOW: 0.378	SC0025828 MINOR MUNICIPAL
UNNAMED STREAM AMERADA HESS #40233 PIPE #: 001 FLOW: 0.0072	SC0044881 MINOR INDUSTRIAL
UNNAMED STREAM CALHOUN FALLS/WATER PLANT PIPE #: 001 FLOW: NO LIMIT	SC0040851 MINOR INDUSTRIAL
ROCKY RIVER FIELDCREST CANNON/ROCKY RIVER PIPE #: 001 FLOW: NO LIMIT	SC0000299 MAJOR INDUSTRIAL
ROCKY RIVER FIELDCREST CANNON/ROCKY RIVER PIPE #: 002 FLOW: NO LIMIT	SC0000299 MAJOR INDUSTRIAL
NO DISCHARGE SYSTEM FACILITY NAME	ND# TYPE
LAND DISPOSAL HARTWELL VILLA DEV.	ND0067041 MINOR COMMUNITY
LAND DISPOSAL STONE CREEK COVE HOME ASSO.	ND0067032 MINOR COMMUNITY

Nonpoint Source Contributions

Lake Richard B. Russell is currently included on the list of waterbodies impacted by nonpoint source pollutants. The lake was evaluated by other agencies and citizen groups and found to have elevated levels of suspended solids resulting from agricultural practices (nonirrigated crop production and pastureland management) and land development. Computer modelling by the SCLRCC indicated a high potential for NPS problems from agricultural activities for this stream.

Ground Water Contamination

The ground water in the vicinity of the landfill owned by the Singer Company (formally Ryobi) is contaminated with volatile organics as a result of industrial landfill seepage. There is a possible adverse impact to Bryson Creek which flows into Big Generostee Creek and finally into the Savannah River. The facility is currently in the recovery phase, which entails pumping and cleaning up the ground water after determining the extent and degree of contamination.

Growth Potential

The Towns of Iva and Starr influence both this watershed and the Wilson Creek watershed (03060103-080). The City of Anderson is currently one of the largest manufacturing areas in the upstate region. In the short term, growth of the manufacturing industry is dependent on infrastructural expansion, which is dependent on the capacity of existing facilities. Long term growth is dependent on construction of additional treatment capacity, which is dependent on the assimilative capacity of surrounding streams. Many wastewater treatment facilities are at or near their capacity to treat industrial discharges.

Projected industrial development in this watershed runs along the U.S. Highway 76 corridor from Anderson to Pendleton (03060101-100), along the S.C. Road 81 corridor from Anderson to Starr, and along the western side of Anderson on S.C. Road 28. Also, a rail line runs between Iva and Starr to Anderson, a criterion for siting new industry. Overall development trends are predicted to occur outside the city limits of Anderson and Powdersville, between Anderson and Belton along U.S. Highway 76, and between Anderson and Iva (including Starr) along S.C. Road 81.

A relatively high growth area lies between the Towns of Lowndesville and Antreville (03060103-140), and will be impacted along S.C. Highway 81 by proposed development in Calhoun Falls, located on Lake Richard B. Russell near the dam. A multiple-use development on the west side of Calhoun Falls is planned that will create several hundred jobs and increase the population substantially. The Town of Calhoun Falls currently operates a lagoon treatment system to treat the domestic waste of roughly a thousand households and one large industry. A long term goal of Calhoun Falls is to upgrade the treatment system in expectation of new development; but planning must be done to replace the system with a new, non-lagoon treatment plant.

03060103-070

General Description

Watershed 03060103-070 is located in Anderson and Abbeville Counties and consists primarily of the **Rocky River** and its tributaries. The watershed occupies 128,810 acres of the Piedmont region of South Carolina. The predominant soil types consist of an association of the Cecil-Hiwassee series. The erodibility of the soil (K-factor) averages 0.26; the slope of the terrain averages 8.8%, with a range of 2-15%. Land use/land cover in the watershed includes: 6.15% urban land, 27.88% agricultural land, 21.57% scrub/shrub land, 1.38% barren land, 41.41% forested land and 1.62% water.

The Rocky River watershed includes Broadway Lake, and farther downstream, Lake Secession. The river flows past the Town of Anderson and eventually forms an arm of Lake Richard B. Russell. The watershed contains a total of 97.7 stream miles that are classified as FW. At the top of the watershed, Beaverdam Creek flows through the Anderson Reservoir and joins the Rocky River, as does Little Beaverdam Creek in a separate drainage.

The Broadway Creek drainage includes Cupboard Creek, Pea Creek and Neals Creek and forms Broadway Lake, which flows into and joins with the Rocky River to form Lake Secession. Also draining into the Rocky River prior to the headwaters of Lake Secession is the Hen Coop Creek drainage (Cherokee Creek) and the Bear Creek and Beaver Creek (Betsy Creek) drainages. Governors Creek and First Creek enter into Lake Secession; all of Lake Secession is included in the watershed.

Water Quality

Rocky River - There are two monitoring locations on the Rocky River; aquatic life uses are fully supported at the upstream location, but not supported at the downstream location due to dissolved oxygen excursions. Since the downstream station is a secondary monitoring station, sampling is purposely biased towards periods with potentially low dissolved oxygen concentrations. Recreational uses at both locations are only partially supported due to fecal coliform bacteria excursions. At the downstream station, this is compounded by a significantly increasing trend in bacterial concentrations. Copper was measured above the aquatic life criterion twice in 1989 and twice in 1990 at the upstream site. Macroinvertebrate data collected further downstream indicated a slight impact. Sedimentation was evident at the macroinvertebrate sampling site, and some of the apparent impact may be attributed to natural differences in available habitat between the regional reference site and the Rocky River site. The Anderson/Rocky River Plant experienced fecal coliform bacteria and BOD permit limit violations in 1992, which may have contributed to the observed water quality impacts.

The City of Anderson has recently substantially expanded the size of the municipal wastewater treatment facility on this creek, and it is recommended that the monitoring station located on the creek be converted from a secondary to a primary station.

Cupboard Creek - There are two monitoring locations on Cupboard Creek; aquatic life uses are only partially supported at the upstream location, and not supported at the downstream location due to dissolved oxygen excursions. Aquatic life uses at the upstream site may be further compromised by a significantly increasing trend in five-day biochemical oxygen demand. Since both stations are secondary monitoring stations, sampling is purposely biased towards periods with potentially low dissolved oxygen concentrations. Recreational uses are not supported at either site due to fecal coliform bacteria excursions under Class FW standards. This creek was Class B until April, 1992 and bacterial conditions are expected to improve as new NPDES permit limits are instituted in the watershed. A significantly increasing trend in turbidity was also detected, possibly due to adjacent land use practices. The Blair Mills facility experienced toxicity and BOD permit limit violations in 1992. This facility's discharge is to be eliminated.

Broadway Creek - Aquatic life uses are fully supported for this stream. Recreational uses are only partially supported due to fecal coliform bacteria excursions under Class FW standards. The point source discharge will be eliminated.

Betsy Creek - Aquatic life uses are fully supported for this stream. Recreational uses are not supported due to fecal coliform bacteria excursions under Class FW standards, this is compounded by a significantly increasing trend in bacteria. A significantly increasing trend in total phosphorus concentration was measured, which could contribute to algal or aquatic weed problems in downstream impoundments. A wide variety of volatile organic compounds have been detected in water samples at this location, as well as several species of PCBs in sediment. This site is downstream of the Owens-Corning fiberglass facility, which is being investigated by the Bureau of Solid and Hazardous Waste.

Cherokee Creek - Aquatic life uses are fully supported for this stream, but may be threatened by a significantly declining trend in dissolved oxygen. Since this is a secondary monitoring station, sampling is purposely biased towards periods with potentially low dissolved oxygen concentrations. Recreational uses are only partially supported due to fecal coliform bacteria excursions under Class FW standards. The point source discharge will be eliminated.

Lake Secession - There are two lake sampling locations. Several high pH values were measured (greater than 8.5 SU) at the uplake station, suggesting phytoplankton blooms as a probable cause. The significantly declining pH trend may indicate improving conditions. Aquatic life uses are fully

supported, but may be threatened by significantly declining trends in dissolved oxygen at both sites. Recreational uses are fully supported. A wide variety of base-neutral and acid extractable organic compounds have been detected in the water column, which may be related to upstream point sources or groundwater discharge.

Lake Water Quality Assessment

Broadway Creek and Neals Creek drain into **Broadway Lake**, which is a minor lake with a watershed covering 75.8 km². The lake, with a surface area of 121.4 hectares, undergoes thermal stratification during the summer. The maximum and mean lake depths are 6.7m and 1.8m, respectively. Broadway Lake drains into lower Broadway Creek. Swimming usage is impaired in the Broadway Creek arm of the lake due to the abundant floating plants. Various forms of agricultural activities occur in the watershed and may contribute to the increased algal production.

A single Algal Growth Potential Test, conducted in the summer of 1989, indicated that the limiting nutrient in the Neals Creek arm of the lake was phosphorus. Eutrophication studies classified the lake as a Category I due to high nutrient levels. Over the last decade, Broadway Lake has undergone extensive restoration, and is currently under evaluation to measure restorative effectiveness and to recommend management strategies for further restoration. Funds are currently pending to initiate Phase III Post-Implementation monitoring.

The Rocky River drains into **Lake Secession**, which has a watershed that encompasses 360.1 km² in area. The lake has a surface area of 356.1 hectares and a maximum and mean depth of 28m and 6.7m, respectively; thermal stratification occurs during the summer months. The lake drains into the lower Rocky River. Swimming usage of the lake may be impaired in the headwaters of the lake where chlorophyll-a concentrations are greater than 40µg/l. Both agriculture and land development related nonpoint source inputs have been recorded entering the lake.

A single Algal Growth Potential Test, conducted in the summer of 1989, indicated that the limiting nutrient in the headwaters region of the lake was nitrogen. The dam site has degraded over time and has crossed into a new water quality category. Both ends of the lake were classified as category I, described as having excessive nutrients and extremely high productivity. A Phase I Diagnostic Feasibility Study to identify the extent and cause of the problems is recommended.

Point Source Contributions

Cupboard Creek is included on the §304(l) short list for waters not expected to meet applicable water quality standards after full implementation of NPDES permit conditions due, in part or entirely, to point source discharges of §307(a) toxics; Blair Mills was the facility discharging the toxic effluent (chromium, copper, zinc and phenols) into Cupboard Creek (now tied into the

Belton/Breazeale plant). Cupboard Creek and Betsy Creek are both included on the §304(l) long list of impacted waterbodies due to point source concerns for ambient toxicity.

Cupboard Creek is currently included on the §303(d) list (low priority) for waters that may require TMDL development related to dissolved oxygen concerns. Downstream from Cupboard Creek, Lake Secession is also included on the §303(d) list (low priority) for impaired water quality due to elevated nutrient levels, and may require a TMDL.

The City of Belton has agreed to eliminate their discharges into Cupboard Creek and Cherokee Creek by building a new treatment system and pumping to the Saluda River. The Town of Honea Path (with four existing facilities) will be tied into the Town of Ware Shoals as part of an EPA Construction Grant sewer project. Flows from Honea Path will also end up in the Saluda River.

RECEIVING STREAM FACILITY NAME PERMITTED FLOW @ PIPE (MGD)	NPDES # TYPE COMMENT
CHEROKEE CREEK BELTON/MARSHALL PLANT PIPE #: 001 FLOW: 0.81	SC0021377 MINOR MUNICIPAL
CUPBOARD CREEK BELTON/BREAZEALE PLANT PIPE #: 001 FLOW: 0.45	SC0023761 MINOR MUNICIPAL
NESBIT CREEK DAVIDSON MINERAL/ANDERSON QU PIPE #: 001 FLOW: NO LIMIT	SC0037362 MINOR INDUSTRIAL QUARRY
BEAVER CREEK ELISKIM COMPANY PIPE #: 001 FLOW: NO LIMIT	SC0024210 MINOR INDUSTRIAL
BEAVER CREEK ELISKIM COMPANY PIPE #: 002 FLOW: NO LIMIT	SC0024210 MINOR INDUSTRIAL
BEAVER CREEK TRUE TEMPER HARDWARE COMPANY PIPE #: 003 FLOW: NO LIMIT	SC0024210 MINOR INDUSTRIAL
BEAVER CREEK WEST PT PEPPERELL/WELLINGTON PIPE #: 001 FLOW: NO LIMIT	SC0000345 MINOR INDUSTRIAL
BETSY CREEK OWENS-CORNING FIBERGLAS PIPE #: 001 FLOW: 0.15	SC0000400 MAJOR INDUSTRIAL
ROCKY RIVER TR WOODSIDE MILLS/HAYNSWORTH PLT PIPE #: 001 FLOW: NO LIMIT	SC0000256 MINOR INDUSTRIAL

ROCKY RIVER
ANDERSON/ROCKY RIVER PLANT
PIPE #: 001 FLOW: 6.1

SC0023744
MAJOR MUNICIPAL

**NO DISCHARGE SYSTEM
FACILITY NAME**

**ND#
TYPE**

LAND DISPOSAL
RIDGECREST S/D

ND0067067
MINOR COMMUNITY

Nonpoint Source Contributions

Broadway Creek is currently included on the list of waterbodies impacted by nonpoint source pollutants. SCDHEC personnel recorded elevated turbidity and nutrient levels from agriculturally based activities (non-irrigated crop production, pastureland management and animal holding practices). Broadway Creek is included on the §304(l) long list for waters impacted by nonpoint source nontoxic pollutants.

Lake Seccession is also listed as a waterbody impacted by nonpoint source pollutants. SCDHEC personnel recorded scattered pH excursions and elevated levels of toxic materials, nutrients, and ammonia in relation to non-irrigated crop production, pastureland management and land development. Lake Seccession is included on the §304(l) long list for waters impacted by nonpoint source nontoxics and ambient toxicity.

Ground Water Contamination

The ground water in the vicinity of the landfill owned by Owens Corning Fiberglas-Anderson Plant is contaminated with a volatile organic (1,4-Dioxane) as a result of industrial landfill seepage; this facility is under enforcement and is being assessed. Betsy Creek, which flows into the Rocky River, is the probable recipient of the contaminated ground water.

The Eliskim Company is another source of ground water contamination in the watershed with metals and volatile organics from surface impoundments. Eliskim is a RCRA facility (formerly True Temper Co.), and is being assessed; regulated units have been certified closed. The probable recipient of the contaminated discharge is an unnamed tributary to Beaver Creek.

Growth Potential

The Towns of Honea Path and Belton lie in this watershed, and are projected for industrial growth, along with the residential and commercial growth that follows. Projected industrial corridor development would occur along U.S. Highway 76 from Honea Path to Belton, and around the I-85 and S.C. Road 81 intersection. Overall development trends are predicted to occur between Belton and Anderson along U.S. Highway 76 (which runs alongside Broadway Lake), and between Honea

Path and Williamston (including Belton) along S.C. Road 20. Anderson County is in the process of developing long range plans for growth in this area.

03060103-080

General Description

Watershed 03060103-080 is located in Anderson and Abbeville Counties and consists primarily of **Wilson Creek** and its tributaries. The watershed occupies 28,792 acres of the Piedmont region of South Carolina. The predominant soil types consist of an association of the Cecil-Hiwassee series. The erodibility of the soil (K-factor) averages 0.26; the slope of the terrain averages 9.5%, with a range of 2-15%. Land use/land cover in the watershed includes: 0.70% urban land, 23.89% agricultural land, 31.95% scrub/shrub land, 0.71% barren land, 41.95% forested land and 0.82% water.

The Wilson Creek watershed incorporates Jordans Creek, East Beards Creek and Long Branch before joining the Rocky River downstream of Lake Secession. The watershed contains a total of 13.9 stream miles, all classified as FW.

Water Quality

No water quality data is available for this watershed. Water quality sampling is planned prior to the assessment update.

Point Source Contributions

RECEIVING STREAM FACILITY NAME PERMITTED FLOW @ PIPE (MGD)	NPDES # TYPE COMMENT
WILSON CREEK MAYFAIR MILLS/STARR MILL PIPE #: 001 FLOW: 0.0128	SC0037443 MINOR INDUSTRIAL
EAST BEARDS CREEK IVA/FACILITY A EASTSIDE PIPE #: 001 FLOW: 0.245	SC0025810 MINOR MUNICIPAL

Growth Potential

The Towns of Iva and Starr influence both this watershed and the Lake Richard B. Russell watershed (03060103-030), being located along the watershed boundaries. Industrial development in this watershed is projected to extend along the S.C. Road 81 corridor from Starr to Anderson; a rail line runs between Iva and Starr to Anderson.

03060103-100

General Description

Watershed 03060103-100 is located in Abbeville and McCormick Counties and consists primarily of **Lake Thurmond** and the tributaries forming the lake. The watershed occupies 101,298 acres of the Piedmont region of South Carolina. The predominant soil types consist of an association of the Cataula-Wilkes-Goldston-Cecil series. The erodibility of the soil (K-factor) averages 0.30; the slope of the terrain averages 10.7%, with a range of 2-45%. Land use/land cover in the watershed includes: 1.10% urban land, 6.33% agricultural land, 2.04% scrub/shrub land, 2.04% barren land, 61.19% forested land and 16.39% water.

This watershed contains a segment of the Savannah River, which flows into and through Lake Thurmond (Clarks Hill Reservoir) to the dam. There are a total of 61.05 stream miles in this watershed, all classified as FW. The Richard B. Russell Lake watershed (03060103-030) flows into the headwaters of Lake Thurmond; and the Little River (03060103-140) and Long Cane Creek (03060103-150) watersheds flow into the Buffalo Creek embayment midlake. Baker Creek (FW) and a tributary also named Buffalo Creek (FW) drain into the larger Buffalo Creek entering the lake.

Additional natural resources in the watershed include Hickory Knob State Park near the headwaters of Lake Thurmond, Baker Creek State Park on the Long Cane Creek embayment, and Hamilton Branch State Park near the dam. The Sumter National Forest encompasses the majority of the watershed and all of the State Parks.

Water Quality

Lake Thurmond - Aquatic life uses are fully supported for the two lake sampling locations. Recreational uses are fully supported, but may be threatened by the significantly increasing trends in fecal coliform bacteria occurring at both stations. Copper has been measured above the aquatic life criterion several times at both sites between 1988 and 1990. Both sites exhibited significantly increasing trends in turbidity, and one location also showed a significantly increasing trend in total suspended solids. These trends are indicative of increasing nonpoint source contributions by adjacent land areas.

Lake Water Quality Assessment

Lake Thurmond has a watershed covering 2,339.5 km² within South Carolina; a portion of the watershed extends into Georgia. Also draining into the lake is the Little River watershed (03060103-140) and the Long Cane Creek watershed (03060103-150). The reservoir stratifies in the summer and has a surface area of 31,768.5 hectares, and maximum and mean depths of 43m and

11.3m, respectively. There are no impaired usages of the lake. The reservoir drains into the Savannah River.

A single Algal Growth Potential Test, conducted in the summer of 1989, indicated that the headwaters of the lake were limited by phosphorus, and that both nitrogen and phosphorus were limiting in the Little River arm of the lake. Eutrophication studies classified the headwaters and the dam region as a Category III for exhibiting the highest water quality, and with preservation recommended. The Little River arm was placed in category I for its elevated nutrient and productivity levels; this embayment is targeted for further study.

Water Supply

WATER USER (TYPE)	STREAM	AMOUNT WITHDRAWN (MGD)
McCormick County Water Authority	Lake Thurmond	1.150

Point Source Contributions

RECEIVING STREAM FACILITY NAME PERMITTED FLOW @ PIPE (MGD)	NPDES # TYPE COMMENT
HAWE CREEK BARITE HILL GOLD MINE/GWALIA PIPE #: 001 FLOW: NO LIMIT	SC0043401 MINOR INDUSTRIAL
HAWE CREEK BARITE HILL GOLD MINE/NGF PIPE #: 002 FLOW: MR	SC0043401 MINOR INDUSTRIAL
HAWE CREEK BARITE HILL GOLD MINE/NGF PIPE #: 003 FLOW: MR	SC0043401 MINOR INDUSTRIAL
LAKE THURMOND SC DEPT PRT/HAMILTON CAMP AREA PIPE #: 001 FLOW: 0.009	SC0021466 MINOR COMMUNITY

Nonpoint Source Contributions

Lake Thurmond appears on the list of waterbodies impacted by nonpoint source pollutants. Data collected by other agencies and groups indicated elevated levels of suspended solids and turbidity resulting from pastureland activities.

Growth Potential

The Town of McCormick has experienced a population growth due to the establishment of a State Prison near the town. Future growth will occur with the completion of the Savannah Lakes Village Development, currently under construction, on Lake Thurmond. The development is a retirement village and would increase the population by 5,000. Planning is underway by McCormick County to construct a new facility on Stevens Creek (03060107-010). There is a remote possibility of a regional sewer connector is being discussed. It would serve southern Anderson County, run through Calhoun Falls to McCormick County and into Edgefield County, where it would be connected to the new collection system that would divert the waste to the Horse Creek Valley WWTP.

03060103-140

General Description

Watershed 03060103-140 is located in Anderson, Abbeville and McCormick Counties and consists primarily of the **Little River** and its tributaries. The watershed occupies 216,162 acres of the Piedmont region of South Carolina. The predominant soil types consist of an association of the Cecil-Hiwassee series. The erodibility of the soil (K-factor) averages 0.26; the slope of the terrain averages 9.3%, with a range of 2-15%. Land use/land cover in the watershed includes: 3.01% urban land, 20.21% agricultural land, 10.58% scrub/shrub land, 0.87% barren land, 65.07% forested land and 0.25% water.

There are a total of 179.83 stream miles contained in this watershed, all classified as FW. The Little River originates near the Town of Honea Path. Barkers Creek and Corners Creek join to form Little River and are joined downstream with the drainage from Long Branch, Hogskin Creek and Little Hogskin Creek. The Little River is then entered into by drainages from Chickasaw Creek, Johnson Creek, Spur Creek, Park Creek, Reeds Creek, Penny Creek and Shanklin Creek. Below these drainages, McKenley Creek (incorporating Clear Creek, Gill Creek and Morrow Creek) enters the river, and further downriver, Sawney Creek enters.

Calhoun Creek is a very large drainage entering the Little River. Calhoun Creek originates near the Town of Abbeville and is joined by Flagreed Creek, White Creek and Hilburn Creek before entering the Little River. Several other smaller creeks that include Conner Creek enters Little River at the base of the watershed. The Little River watershed merges with the Long Cane Creek watershed (03060103-150) before forming an arm of Lake Thurmond. The Sumter National Forest covers a portion of the lower end of the watershed.

Water Quality

Sawney Creek - Aquatic life uses are fully supported for this stream. Recreational uses are only partially supported due to fecal coliform bacteria excursions under Class FW standards, compounded by a significantly increasing trend in bacterial concentrations. The sampling location is downstream from the town of Calhoun Falls WWTP, which is currently under enforcement action to upgrade their system.

Little River - Macroinvertebrate collections from two sites indicate full support of aquatic life uses.

McKenley Creek - Macroinvertebrate community data indicates full support of aquatic life uses.

Calhoun Creek - No impact on the macroinvertebrate community was noted at this location; therefore, aquatic life uses are fully supported.

Point Source Contributions

RECEIVING STREAM FACILITY NAME PERMITTED FLOW @ PIPE (MGD)	NPDES # TYPE COMMENT
BLUE CREEK-BARKERS CK BELTON/HONEA PATH SCH/DIST 2 PIPE #: 001 FLOW: 0.02	SC0024911 MINOR COMMUNITY
CORNERS CREEK HONEA PATH/CORNER LAGOON PIPE #: 001 FLOW: 0.56	SC0020681 MINOR MUNICIPAL
HOGSKIN CREEK HUGGINS GARMET CO PIPE #: 001 FLOW: MR	SC0035149 MINOR INDUSTRIAL
PARK CREEK TOWN OF DUE WEST PIPE #: 001 FLOW: 0.30	SC0022403 MINOR MUNICIPAL
SAWNEY CREEK TOWN OF CALHOUN FALLS PIPE #: 001 FLOW: 0.55	SC0025721 MINOR MUNICIPAL
CALHOUN CREEK TR MILLIKEN & CO/SHARON MILL PIPE #: 001 FLOW: MR	SC0023477 MINOR INDUSTRIAL
DAVIS BRANCH BIBB COMPANY/ABBEVILLE PLANT PIPE #: 001 FLOW: MR	SC0003603 MINOR INDUSTRIAL

Nonpoint Source Contributions

Little River is currently included on the list of waterbodies impacted by nonpoint source pollutants. The river was evaluated from data collected by other agencies and citizen groups and found to have elevated levels of suspended solids and turbidity resulting from agricultural practices, including pastureland management.

Sawney Creek is also listed as an impaired waterbody due to nonpoint sources. The Department recorded scattered DO excursions related to agricultural activities (pastureland management). Sawney Creek is included on the §304(l) long list for impacted waterbodies due to nonpoint source concerns for nontoxic pollutants.

Growth Potential

A relatively high growth area lies between the Towns of Antreville and Lowndesville (03060103-030), and will be impacted by the proposed development in Calhoun Falls, which resides next to Sawney Creek. A multiple-use development on the west side of Calhoun Falls is planned that will create several hundred jobs and increase the population substantially. The Town of Calhoun Falls currently operates a lagoon treatment system to treat the domestic waste of roughly a thousand households and one large industry. Calhoun Falls is currently upgrading the treatment system in expectation of the new development; however, planning must be done to replace the system with a new, non-lagoon treatment plant.

The Calhoun Falls Industrial Park is located in Calhoun Falls on Highway 72 and serves as a source for future industrial growth. Sharing the same rail line is the Abbeville County Industrial Park, located on the southwest side of the City of Abbeville, another source of potential industrial growth within the watershed.

03060103-150

General Description

Watershed 03060103-150 is located in Abbeville, Greenwood and McCormick Counties and consists primarily of **Long Cane Creek** and its tributaries. The watershed occupies 137,544 acres of the Piedmont region of South Carolina. The predominant soil types consist of an association of the Cecil-Hiwassee series. The erodibility of the soil (K-factor) averages 0.26; the slope of the terrain averages 9.2%, with a range of 2-15%. Land use/land cover in the watershed includes: 2.35% urban land, 13.43% agricultural land, 10.92% scrub/shrub land, 0.29% barren land, 72.82% forested land and 0.18% water.

The Long Cane Creek watershed is a large drainage area that joins with the Little River watershed (03060103-140) to form Lake Thurmond. There are a total of 86.21 stream miles contained within this watershed, all classified as FW. Many smaller creeks flow into Long Cane Creek including: Norris Creek, Miller Branch, Grays Creek, Bailey Creek, Dry Creek, Johns Creek, McCord Creek, Blue Hill Creek and Double Branch. A larger drainage entering Long Cane Creek is the Big Curltail Creek and Little Curltail Creek drainage; additional drainages include the Reedy Branch and South Fork Creek drainage and Linkay Creek. The Bold Branch (incorporating Persimman Branch, Rock Branch and Welch Creek) drainage enters Long Cane Creek at the headwaters of the lake.

Water Quality

Blue Hill Creek - Aquatic life uses are fully supported. Recreational uses are not supported due to fecal coliform bacteria excursions under Class FW standards.

Double Branch - Macroinvertebrate community data indicates full support of aquatic life uses.

Long Cane Creek - There are two water quality sampling locations on Long Cane Creek and aquatic life uses were fully supported for both. Recreational uses are only partially supported due to fecal coliform bacteria excursions under Class FW standards, but a significantly decreasing trend in bacterial concentrations suggests improving conditions. The Abbeville/Long Cane Creek WTP has just upgraded and conditions are expected to improve. Copper has been measured above the aquatic life criterion three times between 1989 and 1991. Lead was measured above the aquatic life criterion once in 1987, at the detection limit. A significantly increasing trend in stream turbidity was detected, but actions have been taken to reduce nonpoint source impacts (see Nonpoint Sources below).

Point Source Contributions

Long Cane Creek is included on the §303(d) list (low priority) of waters that may require development of a TMDL in relation to elevated nutrient levels and potential ammonia toxicity.

RECEIVING STREAM FACILITY NAME PERMITTED FLOW @ PIPE (MGD)	NPDES # TYPE COMMENT
NORRIS CREEK ABBEVILLE CITY BARN PIPE #: 001 FLOW: MR	SC0043567 MINOR INDUSTRIAL
BLUE HILL CREEK ABBEVILLE/WATER TTMT PLT PIPE #: 001 FLOW: MR	SC0041017 MINOR INDUSTRIAL
BLUE HILL CREEK MILLIKEN & CO/ABBEVILLE MILL PIPE #: 001 FLOW: MR	SC0000353 MAJOR INDUSTRIAL
BLUE HILL CREEK MILLIKEN & CO/ABBEVILLE MILL PIPE #: 002 FLOW: NO LIMIT	SC0000353 MAJOR INDUSTRIAL
BIG CURLTAIL SWAMP GATEWOOD SD/TOWN&CNTRY RL EST PIPE #: 001 FLOW: 0.08	SC0023191 MINOR COMMUNITY
LONG CANE CREEK ABBEVILLE/LONG CANE CREEK PIPE #: 001 FLOW: 1.7	SC0040614 MAJOR MUNICIPAL

Nonpoint Source Contributions

Long Cane Creek is listed as a nonpoint source impacted waterbody from the Department monitoring reports and data collected from outside agencies and groups. Numerous elevated ammonia and nutrient levels have been recorded by the Department on this stream, together with scattered high levels of toxic materials and turbidity. Long Cane Creek is also included on the §304(l) long list for waters impacted by nonpoint source nontoxic pollutants. Long Cane Creek is listed in the NPS Management Program as a high priority for implementation action; the associated ongoing watershed project is described below.

Long Cane Creek Watershed Project

Increasing sediment deposition in the Long Cane Creek watershed was causing flooding, and reduction in wildlife and human usage. The Abbeville Soil and Water Conservation District demonstrated best management practices (BMPs) to protect stream water quality in a forested

watershed in terms of sediment reduction during timber harvesting, replanting site preparation, and new tree stand establishment.

To educate private landowners and the forest industry, model silvicultural operations were established that focused on the development of techniques needed for participants to increase planning and application of silvicultural BMPs. The silviculture project was conducted in conjunction with the USDA Agricultural Stabilization and Conservation Service (ASCS) special water quality project.

Growth Potential

Industrial development in the Saluda-Edisto Watershed may impact this watershed. In particular, there has been development within the Town of Hodges and the Sara Lee plant, which are located on the watershed boundary, together with the associated infrastructural and residential growth that runs along the U.S. Highway 178 corridor to the City of Greenwood. The Abbeville County Industrial Park and the supporting rail line are sources of potential industrial growth in the watershed. The Greenwood County Industrial Site is also located within this watershed, and with support from another rail line, has potential for industrial growth.

03060107-010

General Description

Watershed 03060107-010 is located in Greenwood and McCormick Counties and consists primarily of **Stevens Creek** and its tributaries. The watershed occupies 160,984 acres of the Piedmont region of South Carolina. The predominant soil types consist of an association of the Cecil-Tatum-Herndon-Georgeville-Helena series. The erodibility of the soil (K-factor) averages 0.33; the slope of the terrain averages 7.4%, with a range of 2-25%. Land use/land cover in the watershed includes: 1.84% urban land, 9.15% agricultural land, 11.46% scrub/shrub land, 0.33% barren land, 77.14% forested land and 0.08% water.

The Stevens Creek watershed contains a total of 128.44 stream miles, all classified as FW. Stevens Creek is formed by the confluence of Hard Labor Creek (incorporating Armstrong Branch, Cowhead Creek and Little Cowhead Creek, Beaverdam Branch, Cunning Ford Creek, Calabash Branch and Big Branch), Rocky Creek and Cuffytown Creek (incorporating Horsepen Creek, Beaverdam Creek, Reedy Creek, Little Creek and Cow Branch). Byrd Branch enters Stevens Creek at the base of the watershed prior to the Stevens Creek and Turkey Creek confluence. The Sumter National Forest covers the central portion of the watershed.

Water Quality

Hard Labor Creek - Aquatic life uses for this stream are only partially supported based on dissolved oxygen excursions, but a significantly increasing trend in dissolved oxygen, coupled with a significantly declining trend in five-day biochemical oxygen demand suggest improving conditions. Recreational uses are not supported due to fecal coliform bacteria excursions under Class FW standards, but significantly declining trend in bacterial concentrations suggest improving conditions. This creek was Class B until April, 1992 and bacterial conditions are expected to improve as new NPDES permit limits are instituted in the watershed.

Stevens Creek - There is one macroinvertebrate sampling location and one water chemistry station located on this portion of Stevens Creek. The macroinvertebrate station, located upstream of the chemistry station, showed a slight impact on the community; therefore, aquatic life uses are only partially supported at this location. Chemical evidence collected at the time of macroinvertebrate sampling suggested upstream discharges (in Hard Labor Creek and, perhaps, Rocky Creek - Greenwood Metropolitan Commission West Alexander WWTP) may have been contributing factors. At the chemical monitoring station downstream, aquatic life and recreational uses are fully supported. Cadmium was detected once in 1989 above the aquatic life criterion. Copper was measured above the aquatic life criterion three times in 1989 and once in 1990.

The operation of Lake Thurmond power generation and Stevens Creek Reservoir apparently creates a substantial backflow of water into Stevens Creek. Due to the potential impacts from elevated nutrients and low dissolved oxygen conditions, further evaluation of the area is recommended.

Water Supply

WATER USER (TYPE)	STREAM	AMOUNT WITHDRAWN (MGD)
McCormick County (M)	Rocky Creek	0.000
Greenwood Mills (I) -Chalmers Plt.	Panola Branch	0.400
Greenwood Mills (I) -Chalmers Plt.	Panola Branch	0.100
Greenwood Mills-Durst Plt.(I)	Panola Branch	0.400
Greenwood Mills-Durst Plt.(I)	Panola Branch	0.100
Greenwood Mills (I) -Mathews Plt.	Panola Branch	0.400
Greenwood Mills (I) -Mathews Plt.	Panola Branch	0.100

Point Source Contributions

Hard Labor Creek is included on the §304(l) long list of impacted waterbodies due to point source concerns for nontoxic pollutants.

RECEIVING STREAM FACILITY NAME PERMITTED FLOW @ PIPE (MGD)	NPDES # TYPE COMMENT
ARMSTRONG BRANCH CSX TRANSPORTATION/MAXWELL YD PIPE #: 001 FLOW: MR	SC0042650 MINOR INDUSTRIAL
COWHEAD CREEK AUGUSTA FIELDS SD PIPE #: 001 FLOW: 0.04	SC0026891 MINOR COMMUNITY
MUSKRAT POND BRANCH GREENWOOD MILLS/DURST PLANT #8 PIPE #: 001 FLOW: MR	SC0027308 MINOR INDUSTRIAL
MUSKRAT POND BRANCH GREENWOOD MILLS/DURST PLANT #8 PIPE #: 002 FLOW: MR	SC0027308 MINOR INDUSTRIAL

MUSKRAT POND BRANCH GREENWOOD MILLS/CHALMERS PLT PIPE #: 001 FLOW: MR	SC0040576 MINOR INDUSTRIAL
MUSKRAT POND BRANCH GREENWOOD MILLS/CHALMERS PLT PIPE #: 002 FLOW: MR	SC0040576 MINOR INDUSTRIAL
MUSKRAT POND BRANCH GREENWOOD MILLS/CHALMERS PLT PIPE #: 003 FLOW: MR	SC0040576 MINOR INDUSTRIAL
HARD LABOR CREEK GREENWOOD/WEST ALEXANDER PLT PIPE #: 001 FLOW: 2.2	SC0022870 MAJOR MUNICIPAL
HARD LABOR CREEK GREENWOOD MILLS/GREENWOOD PLT PIPE #: 001 FLOW: MR	SC0027278 MINOR INDUSTRIAL
HARD LABOR CREEK GREENWOOD MILLS/MATTHEWS PLT PIPE #: 001 FLOW: MR	SC0027260 MINOR INDUSTRIAL
HARD LABOR CREEK MEDICAL TEXTILES INC PIPE #: 001 FLOW: MR	SC0041874 MINOR INDUSTRIAL
PERSIMMON BRANCH TR MILLIKEN & CO/MCCORMICK MILL PIPE #: 001 FLOW: MR	SC0000396 MAJOR INDUSTRIAL
PERSIMMON BRANCH TR MILLIKEN & CO/MCCORMICK MILL PIPE #: 002 FLOW: MR	SC0000396 MAJOR INDUSTRIAL
PERSIMMON BRANCH MCCORMICK WATER PLANT #2 PIPE #: 001 FLOW: MR	SC0043460 MINOR INDUSTRIAL
ROCKY CREEK MCCORMICK/ROCKY CREEK PLANT PIPE #: 001 FLOW: 0.85	SC0030783 MINOR MUNICIPAL
STEVENS CREEK MCCORMICK COUNTY WWTP PIPE #: 001 FLOW: TO BE CANCELLED	SC0041751 MINOR MUNICIPAL
STEVENS CREEK MCCORMICK COUNTY/STEVENS CREEK PIPE #: 001 FLOW: 2.5	SC0044580 MAJOR MUNICIPAL

Nonpoint Source Contributions

Stevens Creek is listed in the NPS Management Program as a high priority for implementation action. No action is currently underway or in the planning stages. Cuffytown Creek is currently included on the list of waterbodies impacted by nonpoint source pollutants. The creek was evaluated from data collected by other agencies and citizen groups and found to have elevated levels of suspended solids and turbidity resulting from agricultural practices (pastureland management) and resource extraction (mining practices). Computer modelling by the SCLRCC indicated a high potential for NPS problems from agricultural and surface mining activities for this stream.

Hard Labor Creek was also evaluated from data collected by outside agencies and found to be impacted by nonpoint source pollutants, namely elevated levels of suspended solids and turbidity resulting from agricultural activities (specialty crop production and pastureland management). Hard Labor Creek is also included on the §304(l) long list for waters impacted by nonpoint source non-toxic pollutants.

Growth Potential

The Town of McCormick has experienced a population growth due to the establishment of a State Prison near the town. Future growth will occur with the completion of the Savannah Lakes Village Development, currently under construction, on Lake Thurmond (03060103-100). The development is a retirement village and would increase the population by 5,000. Planning is underway by McCormick County to construct a new facility on Stevens Creek. The Greenwood Industrial Park, just south of the City of Greenwood, is considered a source of potential industrial growth.

A regional sewer connector is being discussed that would serve southern Anderson County, run through Calhoun Falls to McCormick County and into Edgefield County, where it would be follow U.S. Highway 25 to the sewer system of the City of North Augusta for final connection to the Horse Creek Valley WWTP.

03060107-020

General Description

Watershed 03060107-020 is located in Saluda, Greenwood, McCormick and Edgefield Counties and consists primarily of **Turkey Creek** and its tributaries. The watershed occupies 149,262 acres of the Piedmont region of South Carolina. The predominant soil types consist of an association of the Herndon-Tatum-Georgeville series. The erodibility of the soil (K-factor) averages 0.35; the slope of the terrain averages 7.2%, with a range of 2-25%. Land use/land cover in the watershed includes: 0.56% urban land, 11.10% agricultural land, 12.97% scrub/shrub land, 0.12% barren land, 74.95% forested land, 0.14% forested wetland and 0.17% water.

The Turkey Creek watershed contains a total of 110.15 stream miles, all classified as FW. The watershed contains: Little Turkey Creek, Little Stevens Creek, Sleep Creek, Mountain Creek, Little Mountain Creek, Rocky Creek and Cyper Creek; the entire drainage flows into Stevens Creek. The Beaver Creek watershed (03060107-030) flows into this watershed. The Sumter National Forest covers a portion of the watershed.

Water Quality

No water quality data is available for this watershed. Water quality sampling is planned prior to the assessment update.

Point Source Contributions

RECEIVING STREAM FACILITY NAME PERMITTED FLOW @ PIPE (MGD)	NPDES # TYPE COMMENT
TURKEY CREEK TR MILLIKEN & CO/JOHNSTON MILL PIPE #: 001 FLOW: MR	SC0023531 MINOR INDUSTRIAL
LOG CREEK-TURKEY CREEK ECW&SA/PINE RIDGE ESTATES PIPE #: 001 FLOW: 0.015	SC0023248 MINOR MUNICIPAL

Nonpoint Source Contributions

Turkey Creek was evaluated by outside agencies and found to have elevated levels of suspended solids and turbidity resulting from agricultural activities (pastureland management).

Growth Potential

The proposed Edgefield County Water and Sewer Authority's Regional Sewer Collection System project would serve Edgefield County, and possibly Saluda County and the Town of Saluda where it would connect to the sewer system of the City of North Augusta for final connection to the Horse Creek Valley WWTP. The Town of Johnston would be able to tie into the system, which would allow for possible growth. A new industrial park has been proposed for the Town of Johnston between Highway 23 and Highway 121, and if built, would greatly increase industrial growth in this watershed. A new federal prison and state prison have been proposed for construction in Edgefield County which would also increase growth.

03060107-030

General Description

Watershed 03060107-030 is located in Edgefield County and consists primarily of **Beaverdam Creek** and its tributaries. The watershed occupies 27,569 acres of the Piedmont region of South Carolina. The predominant soil types consist of an association of the Cecil-Tatum-Herndon-Georgeville series. The erodibility of the soil (K-factor) averages 0.31; the slope of the terrain averages 7.0%, with a range of 2-25%. Land use/land cover in the watershed includes: 5.19% urban land, 13.18% agricultural land, 17.46% scrub/shrub land, 0.31% barren land, 62.79% forested land, 0.20% forested wetland and 0.86% water.

The Beaverdam Creek watershed contains a total of 19.10 stream miles, all classified as FW. Beaverdam Creek flows through the town of Edgefield and enters the Turkey Creek watershed (03060107-020), which flows into Stevens Creek (03060106-040). The Sumter National Forest covers the area where Beaverdam Creek flows into Turkey Creek.

Water Quality

Beaverdam Creek - Aquatic life uses are fully supported for this stream. Recreational uses are only partially supported due to fecal coliform bacteria excursions under Class FW standards. The municipal point source will eventually be eliminated and conditions should improve.

Point Source Contributions

RECEIVING STREAM FACILITY NAME PERMITTED FLOW @ PIPE (MGD)	NPDES # TYPE COMMENT
BEAVERDAM CREEK ECW&SA/BROOKS AVE PLANT PIPE #: 001 FLOW: 0.725	SC0025330 MINOR MUNICIPAL
BEAVERDAM CREEK STEVCOKNIT FAB/EDGEFIELD PIPE #: 001 FLOW: MR	SC0043893 MINOR INDUSTRIAL
BEAVERDAM CREEK STEVCOKNIT FAB/EDGEFIELD PIPE #: 002 FLOW: MR	SC0043893 MINOR INDUSTRIAL

Growth Potential

The Edgefield Industrial Park, located southeast of the Town of Edgefield, is supported by a rail system and serves as a source of potential industrial growth in the watershed. The proposed Edgefield County Water and Sewer Authority Regional Sewer Collection System project would serve

Edgefield County, and possibly Saluda County and the Town of Saluda where it would connect to the sewer system of the City of North Augusta for final connection to the Horse Creek Valley WWTP. The Town of Edgefield would be able to connect to the system, allowing for possible growth. A new federal prison and state prison have been proposed for construction in Edgefield County which would also increase growth.

03060107-040

General Description

Watershed 03060107-040 is located in Edgefield and McCormick Counties and consists primarily of **Stevens Creek** and its tributaries. The watershed occupies 144,020 acres of the Piedmont region of South Carolina. The predominant soil types consist of an association of the Cecil-Hiwassee-Lakeland series. The erodibility of the soil (K-factor) averages 0.24; the slope of the terrain averages 8.7%, with a range of 0-25%. Land use/land cover in the watershed includes: 1.39% urban land, 7.41% agricultural land, 21.40% scrub/shrub land, 0.06% barren land, 68.62% forested land, 0.42% forested wetland and 0.70% water.

This watershed contains a segment of Stevens Creek that flows from below the Turkey Creek confluence to the Stevens Creek dam at the Savannah River. There are a total of 97 stream miles in this watershed, all classified as FW. Smaller drainages that join into this segment of Stevens Creek include: Cuffy Branch, Gundy Creek, Lloyd Creek, Horn Creek (Double Branch and Cedar Creek), Dry Branch, Cheves Creek and Sweetwater Branch. The Sumter National Forest extends roughly over half of the watershed.

Water Quality

Stevens Creek - A macroinvertebrate sampling station, located downstream of the station in watershed 03060107-010, showed improvement relative to the upstream location. Aquatic life uses are fully supported based on the macroinvertebrate community data.

Point Source Contributions

RECEIVING STREAM FACILITY NAME PERMITTED FLOW @ PIPE (MGD)	NPDES # TYPE COMMENT
CHEVES CREEK ECW&SA/LAND-O-LAKES SD PIPE #: 001 FLOW: 0.015	SC0032492 MINOR MUNICIPAL
SWEETWATER BRANCH BP OIL INC/N AUGUSTA PLANT PIPE #: 001 FLOW: MR	SC0034673 MINOR INDUSTRIAL
SWEETWATER BRANCH CONOCO INC/N AUG TERM PIPE #: 001 FLOW: MR	SC0038628 MINOR INDUSTRIAL
SWEETWATER BRANCH AMOCO OIL/N AUG TERM PIPE #: 001 FLOW: MR	SC0038873 MINOR INDUSTRIAL

Nonpoint Source Contributions

Stevens Creek is listed in the NPS Management Program as a high priority for implementation action. No action is currently underway or in the planning stages. The creek was evaluated from data collected by other agencies and citizen groups and found to have elevated levels of suspended solids and turbidity resulting from agricultural practices (pastureland management) and resource extraction (mining practices). Computer modelling by the SCLRCC indicated a high potential for NPS problems from agricultural and surface mining activities for this stream.

Orchard BMP Demonstration

Best management practices were shown to peach growers in Edgefield County to demonstrate precision placement of pesticides that leave ground cover in place. The Ridge peach industry is located in South Carolina in an area proximal to the headwaters of many lakes and streams used for municipal water supplies and recreation. Peaches are a high input crop in terms of total fertilizer and pesticide application required.

The purpose of the demonstration was to educate growers in managing ground cover to reduce sediment loss and to reduce pesticide applications. Traditional and innovative ground cover types were demonstrated together with a trickle irrigation system as an alternative to high volume overhead systems. An orchard sprayer using ultrasonic sensors and computer control to detect the presence and size of trees was also demonstrated. The expense to the farmers for chemicals was reduced since pesticides were only released when trees were present; sediment loss was reduced due to uncultivated crop rows.

Growth Potential

The proposed Edgefield County Water and Sewer Authority's Regional Sewer Collection System project would serve Edgefield County, where it would connect to the sewer system of the City of North Augusta for final connection to the Horse Creek Valley WWTP.

The growth of North Augusta (03060106-030) is approaching the Stevens Creek area, particularly residential development. If the proposed sewer line project comes about, industrial development along U.S. Highway 25, between the Town of Trenton and North Augusta, will be enhanced.

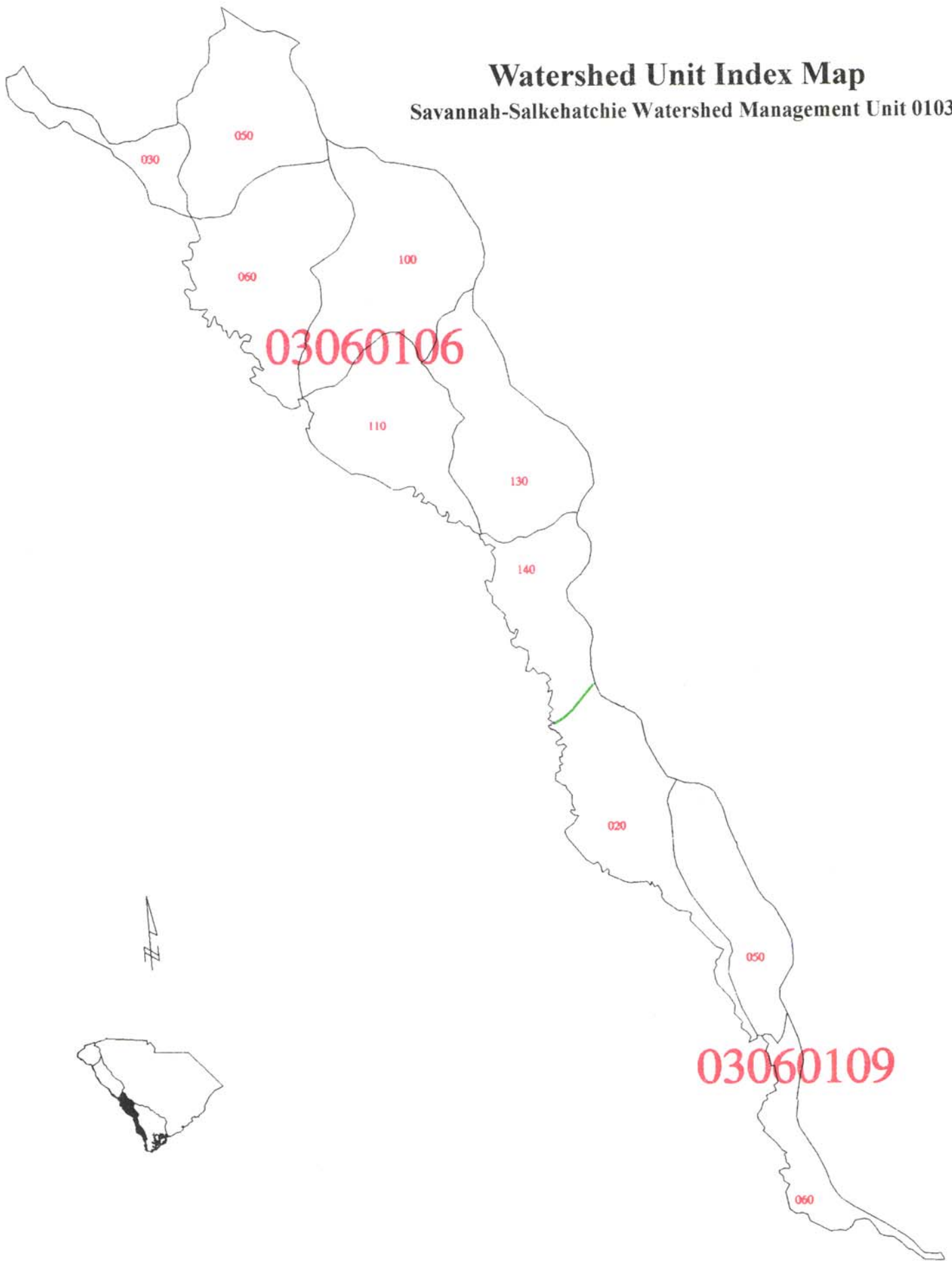
WATERSHED MANAGEMENT UNIT 0103

Climate

Normal annual rainfall in the WMU-1013 area was 47.82 inches, according to the S.C. historic climatological record (SCWRC 1990). The data were collected from National Weather Service stations in Aiken, Blackville and Hampton. The highest seasonal rainfall of 14.8 inches was in the summer related to the higher occurrence of thunderstorms in the area. The lowest rainfall occurred during the fall with 8.6 inches. Winter and spring rainfalls were 11.6 and 12.8 inches, respectively. The mean annual temperature for the watershed management unit was 64.2°F. Summer temperatures averaged 79.2°F; fall, winter and spring temperatures averaged 65.1, 48.3 and 64.3°F, respectively.

Watershed Unit Index Map

Savannah-Salkehatchie Watershed Management Unit 0103



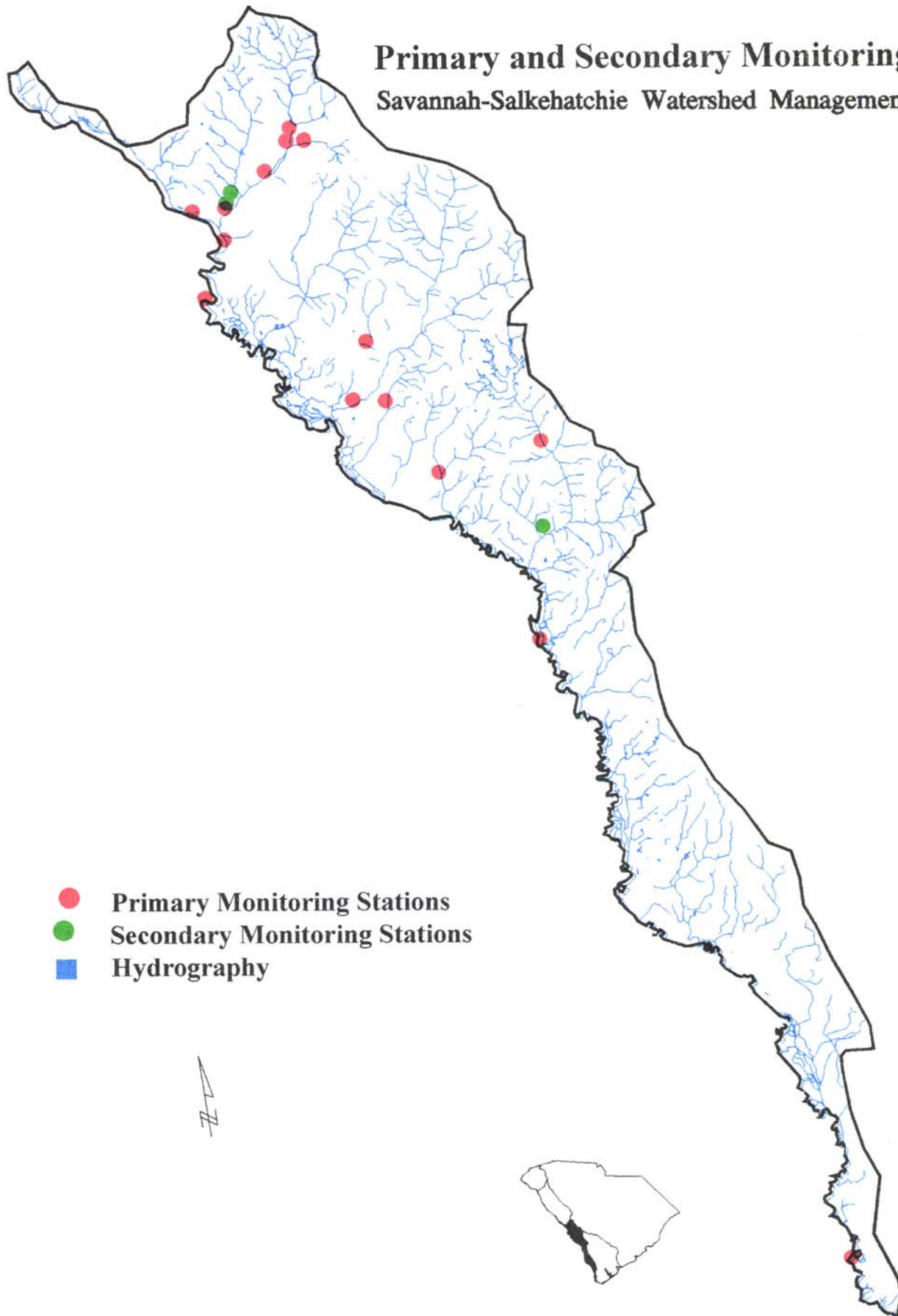
0 5 10 15
MILES

Monitoring Station Descriptions MU-0103

STATION		
NUMBER	STATION DESCRIPTION	TYPE
03060106-030		
SV-251	SAVANNAH RVR AT US 1 1.5 MI SW N. AUGUSTA	P
03060106-050		
SV-069	SAND RVR AT OLD US 1 1.2 MI SE WARRENVILLE	P
SV-329	HORSE CREEK AT ASCAUGA LAKE RD (S-02-33) IN GRANITEVILLE	P
SV-071	HORSE CK AT S-02-104 0.6 MI SW GRANITEVILLE	P
SV-096	HORSE CK BELOW LANGLEY POND AT S-02-254	P
SV-073	LITTLE HORSE CK AT SC 421 BL EFF OF CLEARWTR FIN	S
SV-072	HORSE CK AT S-02-145	S
SV-250	HORSE CK AT SC 125 1.5 MI SW CLEARWATER	P
03060106-060		
SV-252	SAVANNAH RVR AT SC 28 1.6 MI NNW OF BEACH ISLAND	P
SV-323	SAVANNAH RVR AT LOCK AND DAM	P
03060106-100		
SV-324	TIMS BR AT SRP ROAD C	P
SV-325	UPPER THREE RUNS CK AT SRP ROAD A	P
03060106-110		
SV-326	FOUR MILE CK AT SRP ROAD A-7	P
SV-327	STEEL CK AT SRP ROAD A	P
03060106-130		
SV-328	LOWER THREE RUNS CK AT S-06-20 7.5 MI SW BARNWELL	P
SV-175	LOWER THREE RUNS CK AT SC 125 11 MI NW OF ALLENDALE	S
03060106-140		
SV-118	SAVANNAH RVR AT US 301 12.5 MI SW ALLENDALE	P
03060109-060		
SV-191	SAVANNAH RVR AT US 17 8.9 MI SSW OF HARDEEVILLE	P

Primary and Secondary Monitoring Stations

Savannah-Salkehatchie Watershed Management Unit 0102

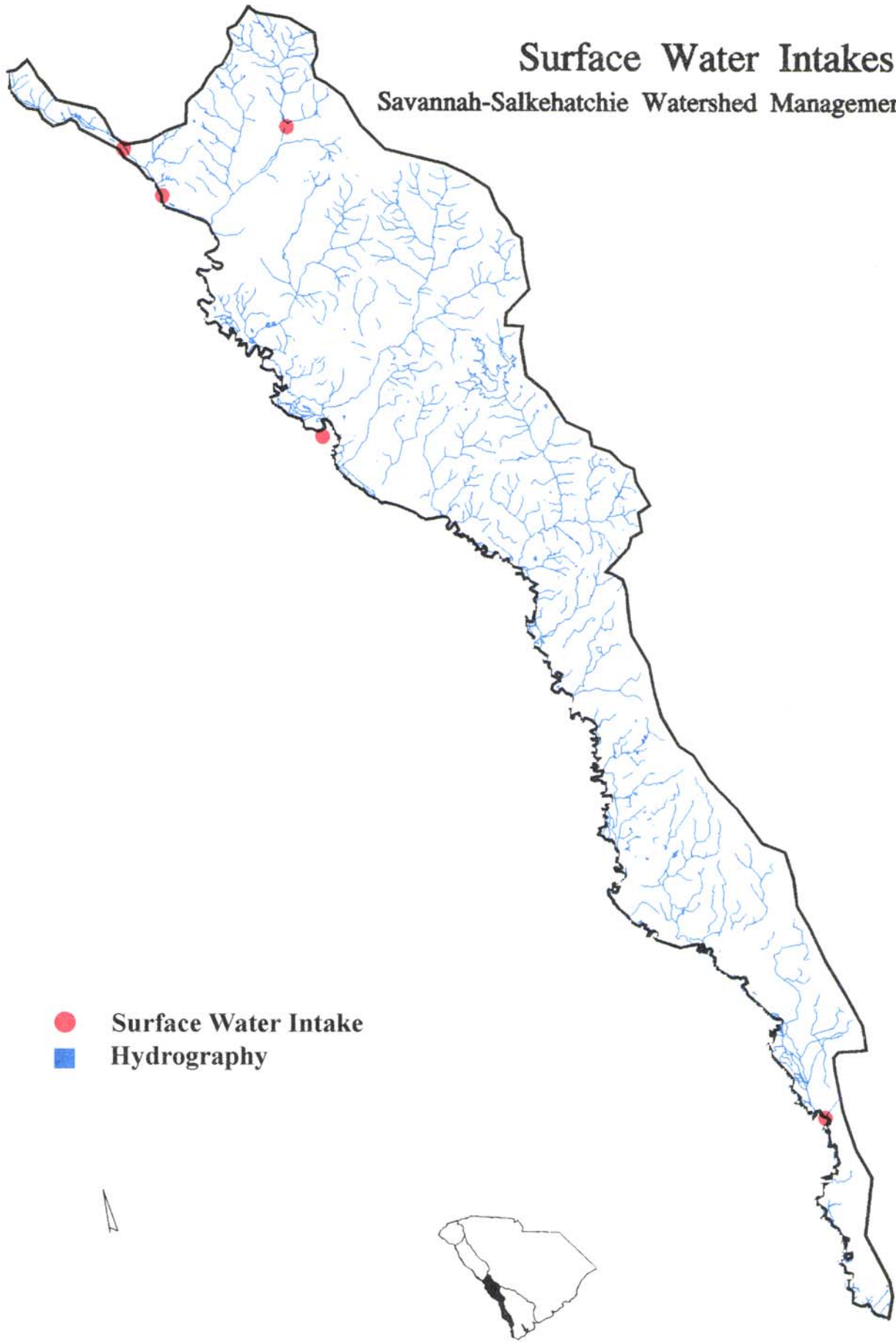


- Primary Monitoring Stations
- Secondary Monitoring Stations
- Hydrography

0 5 10 15 MILES

Surface Water Intakes

Savannah-Salkehatchie Watershed Management Unit 0103

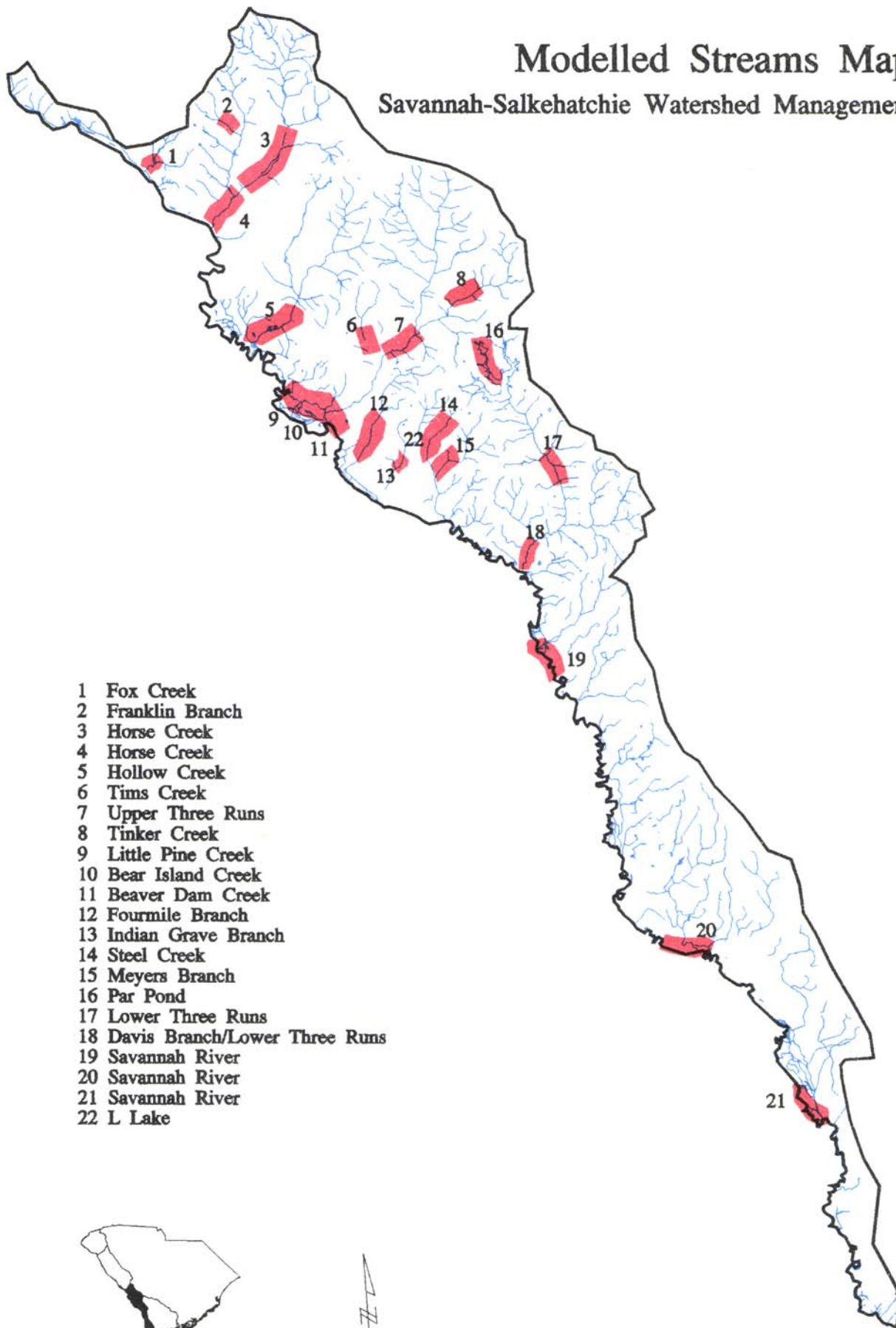


- Surface Water Intake
- Hydrography

0 5 10 15 MILES

Modelled Streams Map

Savannah-Salkehatchie Watershed Management Unit 0103

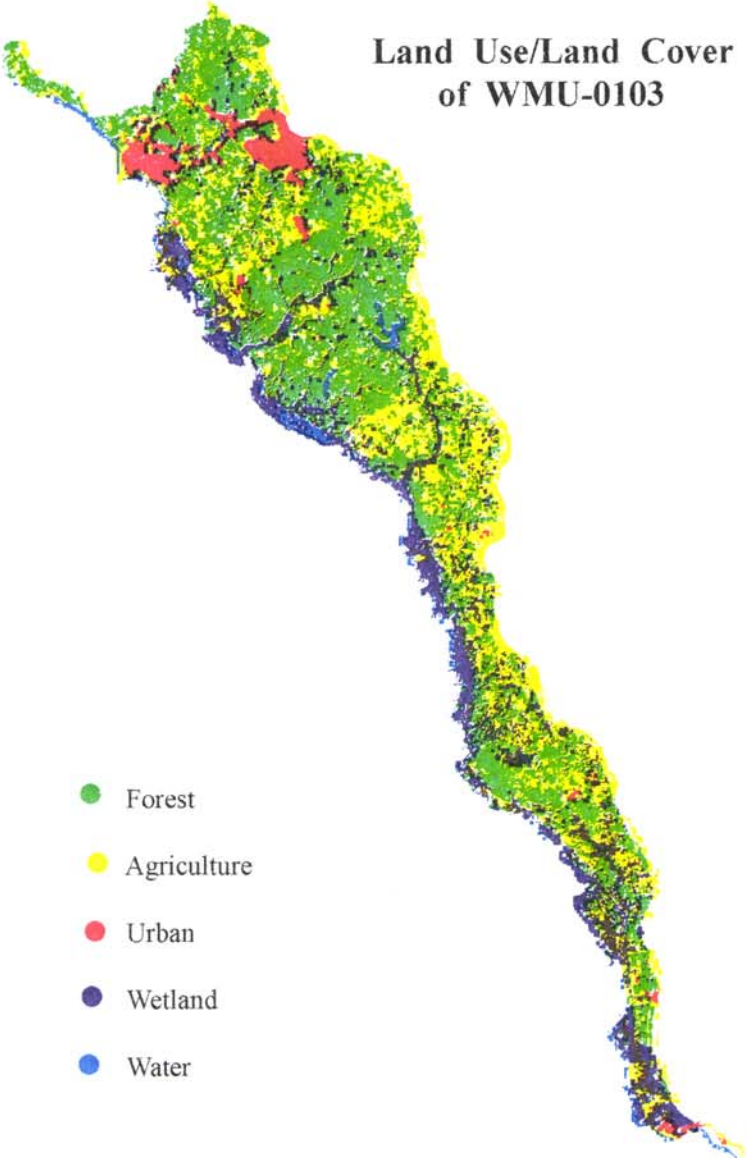


- 1 Fox Creek
- 2 Franklin Branch
- 3 Horse Creek
- 4 Horse Creek
- 5 Hollow Creek
- 6 Tims Creek
- 7 Upper Three Runs
- 8 Tinker Creek
- 9 Little Pine Creek
- 10 Bear Island Creek
- 11 Beaver Dam Creek
- 12 Fourmile Branch
- 13 Indian Grave Branch
- 14 Steel Creek
- 15 Meyers Branch
- 16 Par Pond
- 17 Lower Three Runs
- 18 Davis Branch/Lower Three Runs
- 19 Savannah River
- 20 Savannah River
- 21 Savannah River
- 22 L Lake

0 5 10 15 MILES

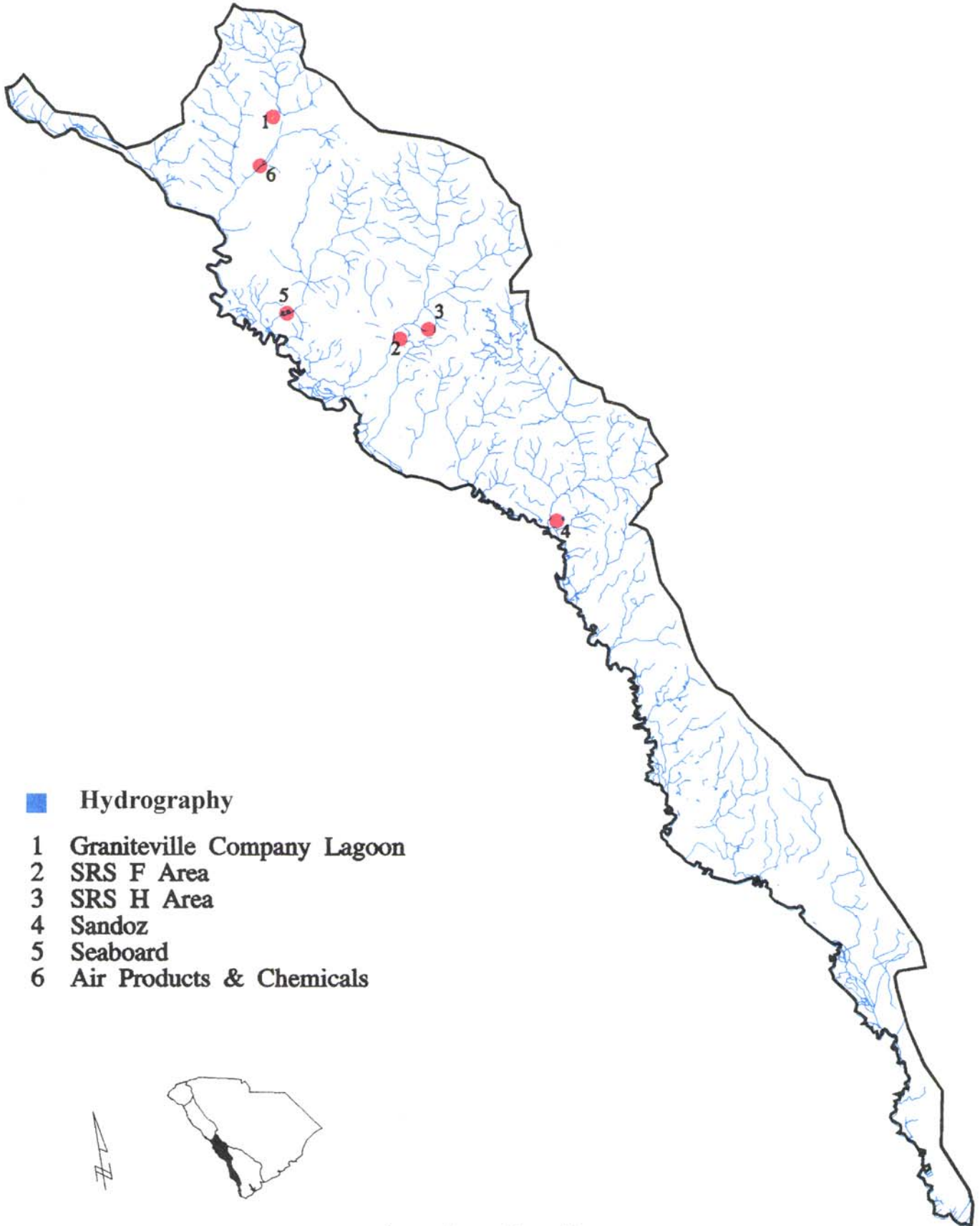
+

Land Use/Land Cover of WMU-0103



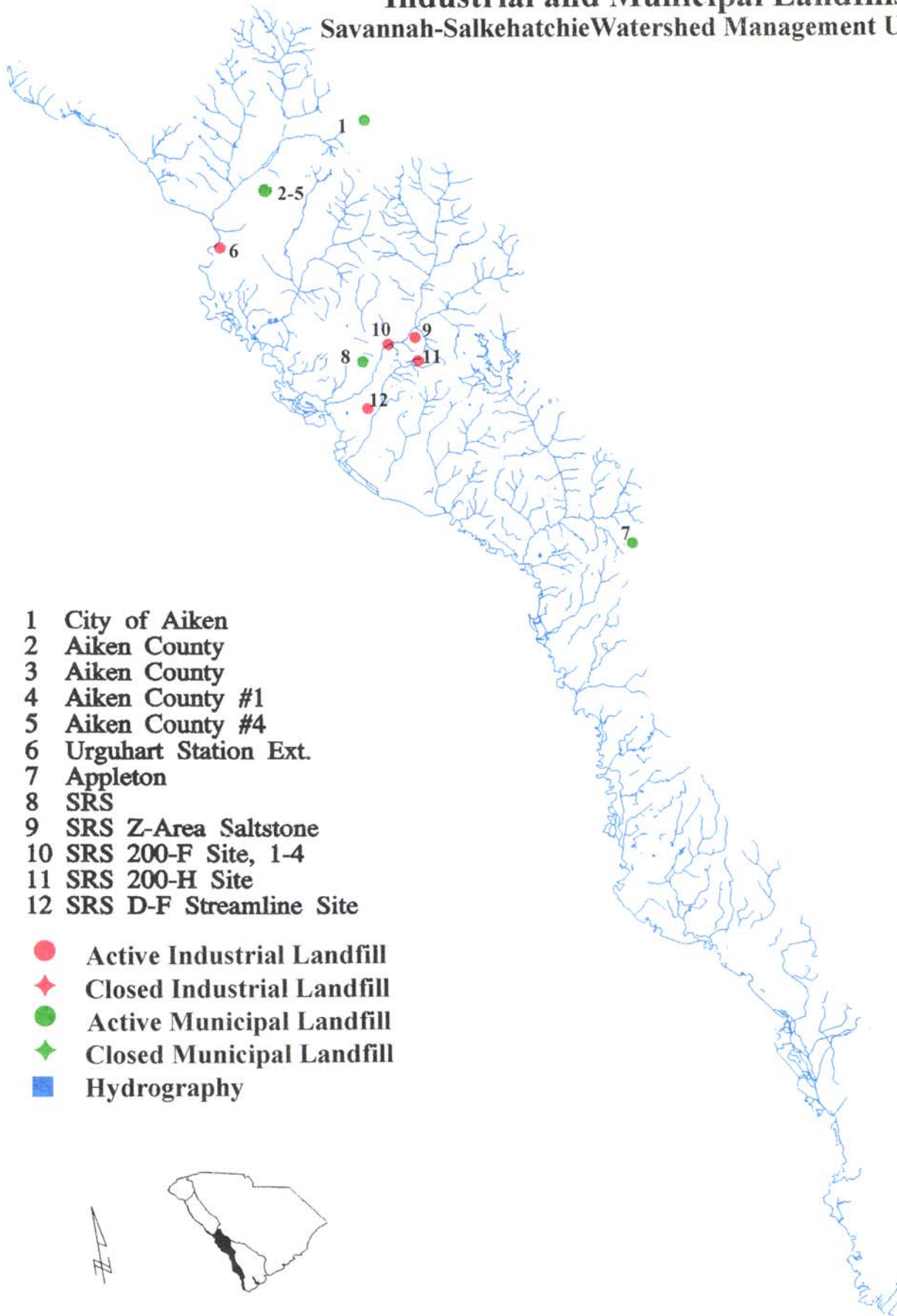
Groundwater Contaminated Sites

Savannah-Salkehatchie Watershed Management Unit 0103



Industrial and Municipal Landfills

Savannah-Salkehatchie Watershed Management Unit 0103



- 1 City of Aiken
- 2 Aiken County
- 3 Aiken County
- 4 Aiken County #1
- 5 Aiken County #4
- 6 Urganhart Station Ext.
- 7 Appleton
- 8 SRS
- 9 SRS Z-Area Saltstone
- 10 SRS 200-F Site, 1-4
- 11 SRS 200-H Site
- 12 SRS D-F Streamline Site

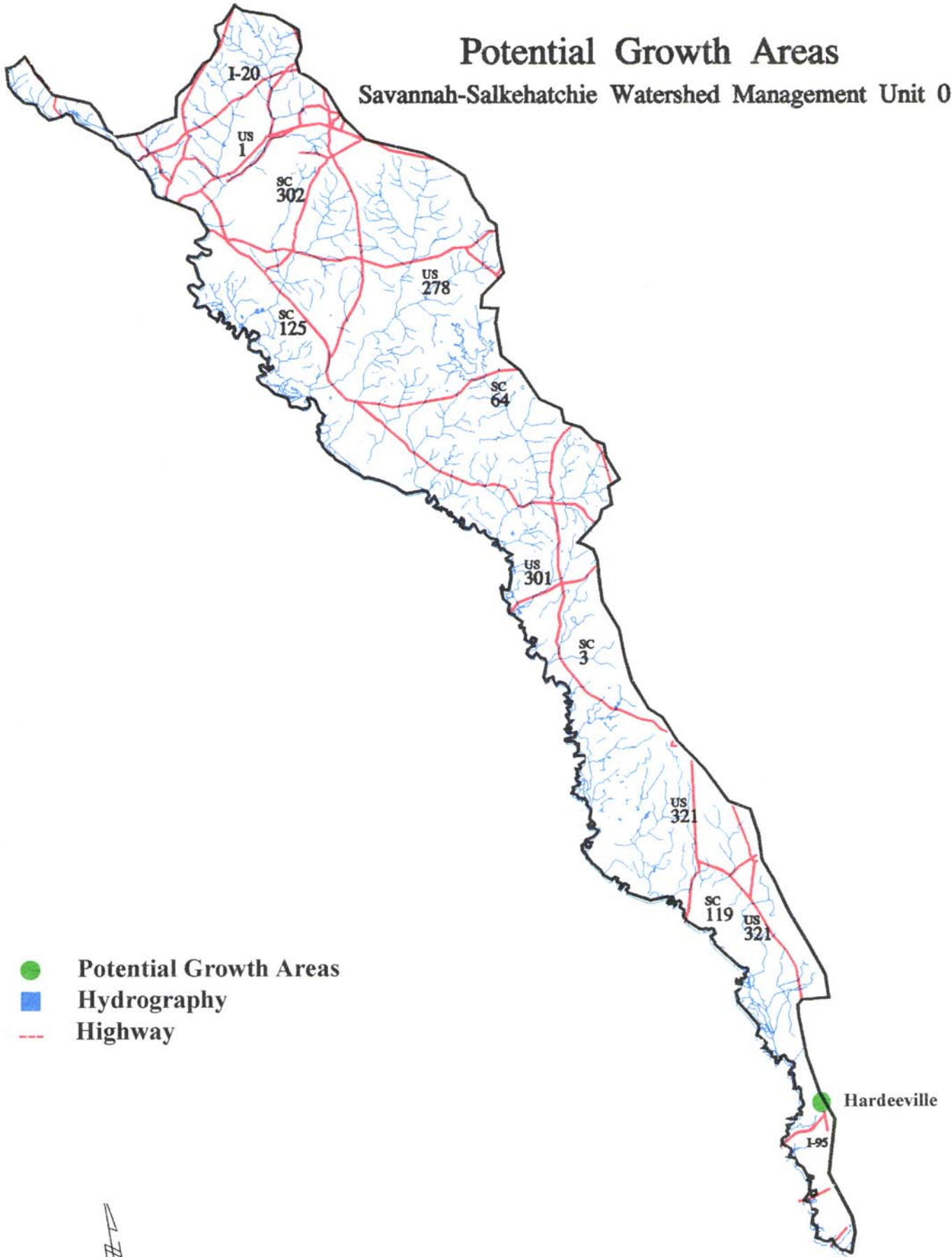
- Active Industrial Landfill
- ◆ Closed Industrial Landfill
- Active Municipal Landfill
- ◆ Closed Municipal Landfill
- Hydrography



0 5 10 15
 ─────────── MILES

Potential Growth Areas

Savannah-Salkehatchie Watershed Management Unit 0103



- Potential Growth Areas
- Hydrography
- Highway

Hardeeville

0 5 10 15 MILES

Watershed Descriptions Within WMU-0103

03060106-030

General Description

Watershed 03060106-030 is located in Edgefield and Aiken Counties and consists primarily of the **Savannah River** and its tributaries. The watershed occupies 33,235 acres of the Piedmont region of South Carolina. The predominant soil types consist of an association of the Fuquay-Troup-Cataula-Cecil series. The erodibility of the soil (K-factor) averages 0.20; the slope of the terrain averages 7.4%, with a range of 0-15%. Land use/land cover in the watershed includes: 26.01% urban land, 4.76% agricultural land, 14.80% scrub/shrub land, 0.13% barren land, 45.73% forested land, 2.15% forested wetland and 6.42% water.

This watershed includes a segment of the Savannah River, which flows from the Lake Thurmond dam through the Stevens Creek dam to the confluence with the Horse Creek watershed. There are a total of 32.02 stream miles in this watershed, all classified as FW. The watershed also includes Fox Creek and Pole Branch, which flow into the river below the Stevens Creek dam. As a reach of the Savannah River, this watershed accepts all upstream drainage, including the Stevens Creek watershed (03060107-040).

Water Quality

Savannah River - Aquatic life uses are fully supported for this stream. Recreational uses are only partially supported due to fecal coliform bacteria excursions under Class FW standards, but a significantly declining trend in bacterial concentrations suggest improving conditions. The river was Class B until April, 1992 and bacterial conditions are expected to improve as new NPDES permit limits are instituted in the watershed.

Water Supply

WATER USER (TYPE)	STREAM	AMOUNT WITHDRAWN (MGD)
City of North Augusta (M)	Savannah River	3.790
Edgefield Co. WSA (M)	Savannah River	2.430

Point Source Contributions

The Savannah River is currently identified on the §303(d) priority list as a waterbody requiring TMDL development. An extensive study (see watershed 03060106-060) is currently underway to determine the assimilative capacity of the river.

RECEIVING STREAM FACILITY NAME PERMITTED FLOW @ PIPE (MGD)	NPDES # TYPE COMMENT
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FOX CREEK TR
SC HWY DEPT/INFO CENTER I-20 E
PIPE #: 001 FLOW: 0.012

SC0029211
MINOR COMMUNITY

POLE BRANCH
EMRO MKTG/STARVIN MARVIN #51
PIPE #: 001 FLOW: NO LIMIT

SC0039888
MINOR INDUSTRIAL
GROUND WATER REMEDIATION

SAVANNAH RIVER TR
ECW&SA/WTP
PIPE #: 001 FLOW: 0.06

SC0034347
MINOR INDUSTRIAL

**NO DISCHARGE SYSTEM
FACILITY NAME**

**ND#
TYPE**

LAND DISPOSAL
MOBILE HOME EST. TRAILER PK

ND0000621
MINOR COMMUNITY

Nonpoint Source Contributions

The Savannah River is listed as an impacted waterbody from nonpoint sources that include urban storm sewer and surface runoff.

Growth Potential

The City of North Augusta is located in this watershed, and is currently experiencing a northward push towards I-20 and Augusta, Georgia. This growth is primarily residential and commercial; the trend is expected to continue. Projected growth includes the area surrounding the seven interchanges of I-20 in Aiken County, particularly the intersection I-20 and S.C. Highway 19, and that of I-20 and U.S. Highway 1. S.C. Highway 19 is expected to be widened to four lanes in the near future.

03060106-050

General Description

Watershed 03060106-050 is located in Edgefield and Aiken Counties and consists primarily of **Horse Creek** and its tributaries. The watershed occupies 100,993 acres of the Sandhills region of South Carolina. The predominant soil types consist of an association of the Lakeland-Fuquay-Troup series. The erodibility of the soil (K-factor) averages 0.12; the slope of the terrain averages 5.2%, with a range of 2-25%. Land use/land cover in the watershed includes: 19.92% urban land, 8.87% agricultural land, 8.40% scrub/shrub land, 0.04% barren land, 58.36% forested land, 2.91% forested wetland and 1.50% water.

The Horse Creek watershed runs alongside the City of Aiken and flows into the Savannah River. There are a total of 64.81 stream miles in this watershed, all classified as FW. There are also several ponds and small lakes that are fed by Horse Creek and Little Horse Creek. Some of the smaller creeks and ponds that drain into Horse Creek include: Little Horse Creek (a small tributary, not the major branch), Mathis Pond, Long Branch, Camp Branch, Spring Branch, Vaucluse Lake, Bridge Creek, Wilkinson Creek and Langley Pond. The Sand River merges with Horse Creek before flowing into Langley Pond.

Little Horse Creek flows into Horse Creek and accepts drainage from Eagleston Lake, Antique Lake, Hightower Creek, Franklin Branch, Sudlow Lake, Mathis Lake and Clearwater Pond.

Water Quality

All stations in this watershed exhibited a high frequency of pH values outside Class FW standards. All values were on the low end of the pH range (less than 6 SU), which is typical of natural conditions in swamp or black water drainages such as these. Due to apparent natural conditions, these are not considered standards excursions.

Sand River - Aquatic life uses are fully supported for this stream. Recreational uses are only partially supported due to fecal coliform bacteria excursions under Class FW standards. One cadmium sample was measured above the aquatic life criterion in 1987.

Little Horse Creek - Recreational uses are fully supported for this stream. Aquatic life uses are fully supported based on water chemistry and macroinvertebrate community data, but may be threatened by a significantly declining trend in dissolved oxygen. PCB-1254 was detected in sediment samples in 1987 and 1991. There is a significantly increasing trend in stream turbidity, which may be arising from adjacent agricultural and surface mining practices.

Horse Creek - There are five water quality monitoring stations located along this Creek. Aquatic life uses are fully supported at all five locations, but may be threatened based on significant declining trends in dissolved oxygen detected at the three mid-reach stations. Aquatic life uses are fully supported at the farthest downstream station based on macroinvertebrate community data. Recreational uses are fully supported at all five locations.

Metals are sampled at four of the five stations. These sites showed several copper values in excess of the aquatic life criterion. Numerous copper excursions occurred at the farthest downstream station. This location also had a cadmium value in excess of the aquatic life and human health criteria in 1990, and a lead value in excess of the aquatic life criterion in 1991. PCB-1254 was detected in the 1991 sediment sample from the station immediately downstream of the confluence with Little Horse Creek. All but the farthest upstream station showed significantly increasing trends in turbidity, resulting probably from urban runoff and surface mining activities.

Special Study of Langley Pond's Metal Contamination

Since the late 1800's, untreated or partially treated textile wastewater was discharged to Horse Creek and Langley Pond resulting in sediment contaminated with chromium, mercury and PCB. In 1979, a new regional wastewater treatment facility that discharged to the Savannah River was constructed providing proper wastewater treatment to Horse Creek dischargers. Since the treatment facility began operation, water quality in Langley Pond has improved; however, sediments in the pond remain contaminated and fish accumulate these contaminants.

In 1986, the Department issued a health advisory, warning people not to consume fish from Langley Pond. The advisement remains active. Monitoring data collected by the Department found mercury contamination (above 1.0ppm) in fish tissue, the recommended limit of the USFDA. The Department is currently working with former dischargers to Langley Pond, who are under orders from the Department to conduct a study to determine the sources, nature, degree and extent of sediment contamination in the pond. This information will be used to implement corrective action for Langley Pond.

Lake Water Quality Assessment

Horse Creek flows through **Vaucluse Lake**, which has a watershed encompassing 228 km². The surface area covers 50.6 hectares and the maximum and mean depths are 4.6m and 2.1m, respectively. Vaucluse Lake does not have any impaired recreational usages and has earned a category III eutrophication status for highest water quality.

Horse Creek also flows through **Langley Pond**, which has a watershed 346.5 km² in area. The pond has a surface area of 101.2 hectares and has a maximum depth of 5.8m and a mean depth of 1.5m. A lakewide fish consumption advisory is in effect due to elevated PCB and mercury levels in fish tissue. Overall water quality has improved and the pond has been placed into the higher

Category III water quality. Category III indicates the highest water quality and that preservation is recommended. Nonpoint source contributions to Horse Creek in the form of urban runoff and mining operations have been recorded.

Water Supply

WATER USER (TYPE)	STREAM	AMOUNT WITHDRAWN (MGD)
Graniteville Co. (M)	Horse Creek	1.100
Graniteville Company (I)	Graniteville Pond	1.927
Graniteville Company (I)	Horse Creek	7.920
Clearwater Finishing Plt.(I)	Horse Creek	5.000
Air Products&Chemicals Langley Plt. (I)	Horse Creek	3.000

Point Source Contributions

Langley Pond is included on the §304(l) long list for waterbodies with impaired water quality due to elevated levels of point source toxic pollutants.

RECEIVING STREAM FACILITY NAME PERMITTED FLOW @ PIPE (MGD)	NPDES # TYPE COMMENT
FRANKLIN BRANCH CHARTER TERMINAL COMPANY PIPE #: 001 FLOW: MR	SC0039519 MINOR INDUSTRIAL
LITTLE HORSE CREEK MARTIN MARIETTA/AIKEN QUARRY PIPE #: 001 FLOW: 1.4	SC0042307 MINOR INDUSTRIAL
LITTLE HORSE CREEK MARTIN MARIETTA/AIKEN QUARRY PIPE #: 002 FLOW: 1.4	SC0042307 MINOR INDUSTRIAL
HORSE CREEK GRANITEVILLE CO/GREGG WTR PLT PIPE #: 001 FLOW: MR	SC0000043 MINOR INDUSTRIAL
HORSE CREEK GRANITEVILLE CO/GREGG WTR PLT PIPE #: 001 FLOW: MR	SC0000043 MINOR INDUSTRIAL
HORSE CREEK GRANITEVILLE CO/HICKMAN DIV PIPE #: 001 FLOW: MR	SC0000086 MINOR INDUSTRIAL
HORSE CREEK GRANITEVILLE CO/STEVENS STEAM PIPE #: 001 FLOW: MR	SC0000094 MINOR INDUSTRIAL

HORSE CREEK GRANITEVILLE CO/WOODHEAD DIV PIPE #: 001 FLOW: MR	SC0000078 MINOR INDUSTRIAL
HORSE CREEK GREEN ACRES MHP/J D R CORP PIPE #: 001 FLOW: 0.017	SC0032638 MINOR COMMUNITY
HORSE CREEK J M HUBER CORP/CONGER MINE PIPE #: 001 FLOW: 0.04	SC0040096 MINOR INDUSTRIAL MINE DEWATERING
HORSE CREEK J M HUBER CORP/LANGLEY PLANT PIPE #: 001 FLOW: 0.015	SC0022675 MINOR INDUSTRIAL
HORSE CREEK TR T R FREEMAN CAR WASH PIPE #: 001 FLOW: NO LIMIT	SC0028240 MINOR INDUSTRIAL
HORSE CREEK CAROLINA CAR WASH PIPE #: 001 FLOW: NO LIMIT	SC0034908 MINOR INDUSTRIAL
HORSE CREEK AUGUSTA SAND & GRAVEL COMPANY PIPE #: 001 FLOW: MR	SC0027529 MINOR INDUSTRIAL
UNNAMED STREAM AIR PRODUCTS & CHEMICALS PIPE #: 001 FLOW: 3.0	SC0039730 MINOR INDUSTRIAL
NO DISCHARGE SYSTEM FACILITY NAME	ND# TYPE
LAND DISPOSAL GEM LAKES SD-CAROLINA WATER	ND0066893 MINOR COMMUNITY
LAND DISPOSAL AIKCO HOTEL PRTNRS/HOLIDAY INN	ND0065871 MINOR COMMUNITY

Nonpoint Source Contributions

Sudlow Lake is currently included on the list of waterbodies impacted by nonpoint source pollutants. The SCDHEC District personnel evaluations found elevated levels of suspended solids and turbidity resulting from land development and resource extraction. Computer modelling by the SCLRCC indicated a high potential for NPS problems from urban runoff and surface mining activities.

Bridge Creek is listed as a nonpoint source impacted waterbody from SCDHEC monitoring reports and data collected from other agencies. Numerous elevated ammonia levels have been recorded by the Department, along with scattered pH excursions and elevated levels of toxic materials

related to agricultural activities and resource extraction. Computer modelling by the SCLRCC indicated a high potential for NPS problems from agricultural and surface mining activities for this stream.

Horse Creek is listed as an impacted waterbody from nonpoint sources that include urban runoff from storm sewers and surfaces, and resource extraction. Numerous elevated nutrient and ammonia levels have been recorded by the Department on this stream, along with scattered pH excursions and elevated levels of toxic materials. Computer modelling by the SCLRCC indicated a high potential for NPS problems from urban runoff and surface mining activities for this stream. Horse Creek is also included on the §304(l) long list of impacted waterbodies for nonpoint source concerns of nontoxic pollutants. Langley Pond is listed as an impacted waterbody from nonpoint sources.

Little Horse Creek is listed as an impacted waterbody from nonpoint sources that include agricultural activities and resource extraction. Numerous elevated nutrient levels and scattered elevated ammonia levels have been recorded by the Department on this stream, together with scattered pH excursions. Computer modelling by the SCLRCC indicated a high potential for NPS problems from agricultural and surface mining activities for this stream. Little Horse Creek is also included on the §304(l) long list for waters impacted by nonpoint source nontoxic pollutants.

The Sand River is also listed as an impacted waterbody from nonpoint sources, namely urban runoff from storm sewers and surfaces. Numerous elevated levels of ammonia were recorded for this stream, together with scattered pH excursions and elevated levels of fecal coliform and nutrients. The Sand River is also included on the §304(l) long list for waters impacted by nonpoint source nontoxic pollutants.

Ground Water Contamination

The ground water in the vicinity of the surface impoundments owned by Air Products and Chemicals, Inc. (formally Valchem) is contaminated with volatile organics and metals as a result of spills and leaks from the impoundments. The contaminated plume is discharging to Horse Creek, which flows into the Savannah River; ground water is currently in the monitoring phase. The Graniteville Company lagoon is another source of ground water contamination in the watershed that adversely impacts the surface waters of an unnamed branch to Flat Rock Pond in the Horse Creek drainage.

Growth Potential

The City of Aiken is located in this watershed and is experiencing growth in a southwesterly direction toward the Savannah River Site. Growth is predominately residential; numerous subdivisions are being developed. Commercial centers are also being constructed in conjunction with

the population growth and residential development. Proposed major industrial facilities which may be located in Aiken County may require expansion of Aiken County's Horse Creek Treatment Plant.

S.C. Highways 19 (towards New Ellenton and SRS) and 302 (towards Augusta, and SRS) are the major commercial corridors serving the residential communities. Growth is expected to continue south and southwest instead of in previously established areas. Industrial growth is expected to occur along Highway 19 to New Ellenton and west towards North Augusta, along the Horse Creek drainage. As part of a long term planning effort, the Town of New Ellenton has expanded an existing private wastewater treatment facility with a spray irrigation system.

03060106-060

General Description

Watershed 03060106-060 is located in Aiken County and consists primarily of the **Savannah River** and its tributaries. The watershed occupies 121,666 acres of the Upper Coastal Plain region of South Carolina. The predominant soil types consist of an association of the Fuquay-Troup-Chewacla series. The erodibility of the soil (K-factor) averages 0.17; the slope of the terrain averages 4.2%, with a range of 0-25%. Land use/land cover in the watershed includes: 6.77% urban land, 21.27% agricultural land, 13.74% scrub/shrub land, 0.05% barren land, 35.33% forested land, 20.04% forested wetland, 0.43% nonforested wetland and 2.37% water.

There are a total of 53.37 stream miles in this watershed, all classified as FW. Hollow Creek incorporates the drainage from smaller creeks and ponds from both Hollow Creek (Little Hollow Creek) and Town Creek (McElmurrays Pond and Boyd Pond). Above the Hollow Creek drainage, Little Pine Creek enters the river, connecting several oxbow lakes. Below the Hollow Creek drainage are more river oxbows. Island Creek enters the river near the base of the watershed. As a reach of the Savannah River, this watershed also accepts the drainage of all streams entering the river upstream of the watershed. In addition to the water resources, another natural resource in the watershed is the Redcliffe Plantation State Park, located near the City of Augusta.

Water Quality

Savannah River - There are two monitoring locations on this portion of the river, and aquatic life uses are fully supported at both locations. Recreational uses are fully supported at the downstream location and only partially supported at the upstream station due to fecal coliform bacteria excursions under Class FW standards. The river was Class B until April, 1992 and bacterial conditions are expected to improve as new NPDES permit limits are instituted in the watershed. Cadmium was measured in excess of the aquatic life criterion once in 1990. Copper has been measured in excess of the aquatic life criterion numerous times at both sampling locations. A significantly increasing trend in turbidity was detected at the upstream location, possibly due to urban runoff.

Water Supply

WATER USER (TYPE)	STREAM	AMOUNT WITHDRAWN (MGD)
Kimberly-Clark Corp.- Beech Island Mill (I)	Savannah River	7.200

Point Source Contributions

The Savannah River is currently identified on the §303(d) priority list as a waterbody requiring the development of a TMDL. A study is currently underway to determine the assimilative capacity of the river (see below).

RECEIVING STREAM FACILITY NAME PERMITTED FLOW @ PIPE (MGD)	NPDES # TYPE COMMENT
LITTLE PINE CREEK AMOCO FOAM PRODUCTS CO PIPE #: 001 FLOW: 0.0013	SC0040045 MINOR INDUSTRIAL
LITTLE PINE CREEK AMOCO FOAM PRODUCTS CO PIPE #: 002 FLOW: 0.008	SC0040045 MINOR INDUSTRIAL
LITTLE PINE CREEK AMOCO FOAM PRODUCTS CO PIPE #: 003 FLOW: 0.0013	SC0040045 MINOR INDUSTRIAL
LITTLE PINE CREEK AMOCO FOAM PRODUCTS CO PIPE #: 004 FLOW: 0.0008	SC0040045 MINOR INDUSTRIAL
HOLLOW CREEK SEABOARD SYSTEM RAILROAD PIPE #: 001 FLOW: 0.0216	SC0040444 MINOR INDUSTRIAL
SAVANNAH RIVER AIKEN PSA/HORSE CREEK PIPE #: 001 FLOW: 20	SC0024457 MAJOR MUNICIPAL
SAVANNAH RIVER TODDS CAR WASH PIPE #: 001 FLOW: NO LIMIT	SC0034894 MINOR INDUSTRIAL
SAVANNAH RIVER KIMBERLY-CLARK CORP PIPE #: 001 FLOW: 6.46	SC0000582 MAJOR INDUSTRIAL
SAVANNAH RIVER SCE&G/URQUHART STM STA PIPE #: 001 FLOW: NO LIMIT	SC0000574 MAJOR INDUSTRIAL
SAVANNAH RIVER SCE&G/URQUHART STM STA PIPE #: 002 FLOW: NO LIMIT	SC0000574 MAJOR INDUSTRIAL
SAVANNAH RIVER SCE&G/URQUHART STM STA PIPE #: 003 FLOW: NO LIMIT	SC0000574 MAJOR INDUSTRIAL

**NO DISCHARGE SYSTEM
FACILITY NAME**

**ND#
TYPE**

LAND DISPOSAL
BEECHWOOD S/D

ND0067113
MINOR COMMUNITY

LAND DISPOSAL
SILVER BLUFF

ND0014010
MINOR COMMUNITY

Savannah River Water Quality Study

The USEPA, Region IV, participated with the States of South Carolina and Georgia in documenting current loadings to the Savannah River and in developing, calibrating and verifying a water quality model to be used in future wasteload allocation work.

The initial Savannah River field study was conducted in September 1990, with a second, somewhat more extensive study occurring in September 1991. The U.S. Army Corps of Engineers controlled the flow of the headwaters during both studies, holding them as constant as possible. Both studies included a time-of-travel study that extended from the Augusta area to Savannah, a distance of 180 miles. Compliance monitoring of all significant point sources to the river was conducted, together with sampling of significant tributaries in each state for both flow and water quality.

The 1991 study was expanded to include analyses of community metabolism, sediment oxygen demand and radionuclides, together with more intensive flow sampling. A reaeration study was conducted in June of 1993 as part of the overall analysis of the Savannah River; it has not yet been conducted.

Nearly all work associated with gathering and preparing the field data base has been completed; and a base model has been constructed. The final calibration and verification models are expected to be completed by January 1994. The resulting model will be used by the States of Georgia and South Carolina in determining allowable wasteload allocations for the river. The model will also be used as an input to the Savannah Harbor model, which should be developed over the next several years.

Initial sampling and modelling work on the non-tidal portion of the Savannah system indicates a significant portion of waste discharged to the river entering the harbor, where it is probably exerted. It is possible that conditions in the harbor, not the river, will be the limiting factor for dischargers to the Savannah River, even upstream to the Augusta area. It is expected that modelling for the tidal portion of the Savannah River system will be complete prior to the Savannah-Salkehatchie Watershed update.

Nonpoint Source Contributions

The Savannah River is listed as an impacted waterbody from nonpoint sources that include urban storm sewer and surface runoff.

Ground Water Contamination

The Seaboard System Railroad Company has contaminated ground water with volatile organics as a result of a spill from a tanker carrying cyclohexane; the remediation phase is in progress.

Growth Potential

Proposed major industrial facilities which may be located in Aiken County may require expansion of Aiken County's Horse Creek Treatment Plant.

03060106-100

General Description

Watershed 03060106-100 is located in Aiken and Barnwell Counties and consists primarily of **Upper Three Runs Creek** and its tributaries. The watershed occupies 140,783 acres of the Sandhills region of South Carolina. The predominant soil types consist of an association of the Fuquay-Troup-Ailey-Vaucluse series. The erodibility of the soil (K-factor) averages 0.13; the slope of the terrain averages 5.8%, with a range of 0-25%. Land use/land cover in the watershed includes: 3.63% urban land, 9.85% agricultural land, 12.44% scrub/shrub land, 0.04% barren land, 64.50% forested land, 9.34% forested wetland, 0.01% nonforested wetland and 0.21% water.

The Upper Three Runs Creek watershed, which drains into the Savannah River, contains a total of 58.4 stream miles, all classified as FW. Tributaries of the Upper Three Runs Creek watershed include: Cedar Creek, Jackson Branch, Tinker Creek, Mill Creek and Tims Branch. The lower half of the watershed is within the boundaries of the U.S. Department of Energy's Savannah River Site.

Water Quality

Tims Branch - Aquatic life uses are fully supported for this stream. Recreational uses are only partially supported due to fecal coliform bacteria excursions under Class FW standards, compounded by a significantly increasing trend in bacterial concentrations. This stream was Class B until April, 1992 and bacterial conditions are expected to improve as new NPDES permit limits are instituted in the watershed. A significantly increasing trend in total phosphorus was detected, which could contribute to algal or aquatic weed problems in downstream impoundments. A significantly increasing trend in turbidity was detected, possibly due to adjacent land use practices.

Upper Three Runs Creek - This creek exhibited a high frequency of pH values below Class FW standards (less than 6 SU), which is typical of natural conditions in swamp or black water drainages. Since this appears to represent natural conditions, these are not considered standards excursions. Aquatic life and recreational uses are fully supported. Two macroinvertebrate stations, located upstream of the water quality station, were the least impacted stations of the coastal plains regional sites. Cadmium was measured above the aquatic life criterion once in 1990, at the detection limit, and mercury was measured above the human health criterion once in 1989. Turbidity exhibited a significantly increasing trend, possibly due to adjacent land use practices.

Point Source Contributions

RECEIVING STREAM FACILITY NAME PERMITTED FLOW @ PIPE (MGD)	NPDES # TYPE COMMENT
TINKER CREEK U.S. DEPART OF ENERGY/SRS PIPE #: S01 FLOW: 0.05	SC0000175 MAJOR INDUSTRIAL
TINKER CREEK U.S. DEPART OF ENERGY/SRS PIPE #: S02 FLOW: 0.03	SC0000175 MAJOR INDUSTRIAL
TIMS BRANCH U.S. DEPART OF ENERGY/SRS PIPE #: A03 FLOW: 0.075	SC0000175 MAJOR INDUSTRIAL
TIMS BRANCH U.S. DEPART OF ENERGY/SRS PIPE #: A05 FLOW: 0.12	SC0000175 MAJOR INDUSTRIAL
TIMS BRANCH U.S. DEPART OF ENERGY/SRS PIPE #: A11 FLOW: 0.007	SC0000175 MAJOR INDUSTRIAL
TIMS BRANCH U.S. DEPART OF ENERGY/SRS PIPE #: A14 FLOW: 2.0	SC0000175 MAJOR INDUSTRIAL
TIMS BRANCH U.S. DEPART OF ENERGY/SRS PIPE #: A15 FLOW: 0.08	SC0000175 MAJOR INDUSTRIAL
TIMS BRANCH U.S. DEPART OF ENERGY/SRS PIPE #: A1A FLOW: 0.14	SC0044903 MAJOR INDUSTRIAL
TIMS BRANCH U.S. DEPART OF ENERGY/SRS PIPE #: A28 FLOW: 0.453	SC0044903 MAJOR INDUSTRIAL
TIMS BRANCH U.S. DEPART OF ENERGY/SRS PIPE #: A29 FLOW: 0.089	SC0044903 MAJOR INDUSTRIAL
TIMS BRANCH U.S. DEPART OF ENERGY/SRS PIPE #: A01 FLOW: 0.40	SC0000175 MAJOR INDUSTRIAL
TIMS BRANCH U.S. DEPART OF ENERGY/SRS PIPE #: M05 FLOW: 0.86	SC0000175 MAJOR INDUSTRIAL

TIMS BRANCH U.S. DEPART OF ENERGY/SRS PIPE #: M04 FLOW: 0.093	SC0000175 MAJOR INDUSTRIAL
UPPER THREE RUNS CREEK TR U.S. DEPART OF ENERGY/SRS PIPE #: F03 FLOW: 0.05	SC0000175 MAJOR INDUSTRIAL
UPPER THREE RUNS CREEK TR U.S. DEPART OF ENERGY/SRS PIPE #: F05 FLOW: 0.09	SC0000175 MAJOR INDUSTRIAL
UPPER THREE RUNS CREEK TR U.S. DEPART OF ENERGY/SRS PIPE #: F07 FLOW: NO LIMIT	SC0000175 MAJOR INDUSTRIAL
UPPER THREE RUNS CREEK TR U.S. DEPART OF ENERGY/SRS PIPE #: H02 FLOW: 0.07	SC0000175 MAJOR INDUSTRIAL
UPPER THREE RUNS CREEK TR U.S. DEPART OF ENERGY/SRS PIPE #: H04 FLOW: 0.17	SC0000175 MAJOR INDUSTRIAL
UPPER THREE RUNS CREEK TR U.S. DEPART OF ENERGY/SRS PIPE #: H06 FLOW: NO LIMIT	SC0000175 MAJOR INDUSTRIAL
UPPER THREE RUNS CREEK TR U.S. DEPART OF ENERGY/SRS PIPE #: H07 FLOW: 0.05	SC0000175 MAJOR INDUSTRIAL
UPPER THREE RUNS CREEK TR U.S. DEPART OF ENERGY/SRS PIPE #: H15 FLOW: 0.11	SC0000175 MAJOR INDUSTRIAL
UPPER THREE RUNS CREEK TR U.S. DEPART OF ENERGY/SRS PIPE #: F02 FLOW: 0.08	SC0000175 MAJOR INDUSTRIAL
UPPER THREE RUNS CREEK TR U.S. DEPART OF ENERGY/SRS PIPE #: S03 FLOW: 0.008	SC0000175 MAJOR INDUSTRIAL
UPPER THREE RUNS CREEK TR U.S. DEPART OF ENERGY/SRS PIPE #: S04 FLOW: 0.063	SC0000175 MAJOR INDUSTRIAL
UPPER THREE RUNS CREEK U.S. DEPART OF ENERGY/SRS PIPE #: FS1 FLOW: 0.014	SC0000175 MAJOR INDUSTRIAL
UPPER THREE RUNS CREEK U.S. DEPART OF ENERGY/SRS PIPE #: FS2 FLOW: 0.038	SC0000175 MAJOR INDUSTRIAL

UPPER THREE RUNS CREEK U.S. DEPART OF ENERGY/SRS PIPE #: H16 FLOW: 0.34	SC0000175 MAJOR INDUSTRIAL
UPPER THREE RUNS CREEK U.S. DEPART OF ENERGY/SRS PIPE #: F01 FLOW: 0.11	SC0000175 MAJOR INDUSTRIAL
UPPER THREE RUNS CREEK U.S. DEPART OF ENERGY/SRS PIPE #: B01 FLOW: 0.03	SC0000175 MAJOR INDUSTRIAL
UPPER THREE RUNS CREEK U.S. DEPART OF ENERGY/SRS PIPE #: B05 FLOW: 0.002	SC0000175 MAJOR INDUSTRIAL
UPPER THREE RUNS CREEK U.S. DEPART OF ENERGY/SRS PIPE #: B07 FLOW: 0.005	SC0000175 MAJOR INDUSTRIAL
SAVANNAH RIVER U.S. DEPART OF ENERGY/SRS PIPE #: X8A FLOW: 0.02 MAX	SC0044903 MAJOR INDUSTRIAL
NO DISCHARGE SYSTEM FACILITY NAME	ND# TYPE
LAND DISPOSAL CEDAR CREEK WTP	ND0068454 MINOR COMMUNITY

Growth Potential

There was no known or projected growth for this watershed, but the Savannah River Site (SRP) employs 25,000 people from nearby counties and is responsible for the overall growth in proximity to the site.

03060106-110

General Description

Watershed 03060106-110 is located in Aiken, Barnwell and Allendale Counties, and consists of the **Savannah River** and its tributaries between Upper and Lower Three Runs Creek. The watershed occupies 92,062 acres of the Sandhills region of South Carolina. The predominant soil types consist of an association of the Fuquay-Dothan-Troup series. The erodibility of the soil (K-factor) averages 0.15; the slope of the terrain averages 3.3%, with a range of 0-10%. Land use/land cover in the watershed includes: 0.26% urban land, 7.43% agricultural land, 7.59% scrub/shrub land, 0.10% barren land, 56.91% forested land, 20.50% forested wetland, 0.61% nonforested wetland and 6.60% water.

The watershed draining into this segment of the Savannah River contains 80.41 stream miles, all classified as FW. Fourmile Creek enters the Savannah River at the top of the watershed. Further downstream, the Steel Creek drainage, consisting of Pen Branch (Indian Grave Branch) and Meyers Branch, enters the river. With the exception of a small drainage area that includes Boggy Gut Branch and Briar Branch, the entire watershed is within the boundaries of the U.S. Department of Energy's Savannah River Site. As a reach of the Savannah River, this watershed also accepts the drainage of all streams entering the river upstream of the watershed.

Water Quality

Fourmile Creek - Aquatic life and recreational uses are fully supported for this stream.

Steel Creek - Aquatic life and recreational uses are fully supported for this stream.

Water Supply

WATER USER (TYPE)	STREAM	AMOUNT WITHDRAWN (MGD)
Westinghouse Co. SRS (M)	Savannah River	0.130
Westinghouse Co. SRS (I)	Savannah River	360.000
Westinghouse Co. SRS (I)	Savannah River	360.000
Westinghouse Co. SRS (I)	Savannah River	64.800
Westinghouse Co. SRS (I)	Steel Creek	252.000

Point Source Contributions

The Savannah River is currently identified on the 303(d) priority list as a waterbody requiring TMDL development. An extensive study (see watershed 03060106-060) is currently underway to determine the assimilative capacity of the river.

RECEIVING STREAM FACILITY NAME PERMITTED FLOW @ PIPE (MGD)	NPDES # TYPE COMMENT
FOURMILE BRANCH TR U.S. DEPART OF ENERGY/SRS PIPE #: F08 FLOW: 0.8	SC0000175 MAJOR INDUSTRIAL
FOURMILE BRANCH TR U.S. DEPART OF ENERGY/SRS PIPE #: F12 FLOW: 0.1	SC0000175 MAJOR INDUSTRIAL
FOURMILE BRANCH TR U.S. DEPART OF ENERGY/SRS PIPE #: F13 FLOW: 0.1	SC0000175 MAJOR INDUSTRIAL
FOURMILE BRANCH TR U.S. DEPART OF ENERGY/SRS PIPE #: F3A FLOW: 0.007	SC0000175 MAJOR INDUSTRIAL
FOURMILE BRANCH TR U.S. DEPART OF ENERGY/SRS PIPE #: H18 FLOW: 0.1	SC0000175 MAJOR INDUSTRIAL
FOURMILE BRANCH TR U.S. DEPART OF ENERGY/SRS PIPE #: H08 FLOW: 1.0	SC0000175 MAJOR INDUSTRIAL
FOURMILE BRANCH TR U.S. DEPART OF ENERGY/SRS PIPE #: CS02 FLOW: 0.03	SC0000175 MAJOR INDUSTRIAL
FOURMILE BRANCH TR U.S. DEPART OF ENERGY/SRS PIPE #: CS14 FLOW: 0.002	SC0000175 MAJOR INDUSTRIAL
FOURMILE BRANCH U.S. DEPART OF ENERGY/SRS PIPE #: C01 FLOW: 0.07	SC0000175 MAJOR INDUSTRIAL
FOURMILE BRANCH U.S. DEPART OF ENERGY/SRS PIPE #: C03 FLOW: 0.20	SC0000175 MAJOR INDUSTRIAL
FOURMILE BRANCH U.S. DEPART OF ENERGY/SRS PIPE #: C04 FLOW: 0.19	SC0000175 MAJOR INDUSTRIAL
FOURMILE BRANCH U.S. DEPART OF ENERGY/SRS PIPE #: C4A FLOW: 0.01	SC0000175 MAJOR INDUSTRIAL
FOURMILE BRANCH U.S. DEPART OF ENERGY/SRS PIPE #: F8A FLOW: 0.09	SC0000175 MAJOR INDUSTRIAL

FOURMILE BRANCH U.S. DEPART OF ENERGY/SRS PIPE #: H12 FLOW: 0.84	SC0000175 MAJOR INDUSTRIAL
FOURMILE BRANCH U.S. DEPART OF ENERGY/SRS PIPE #: H12A FLOW: 0.90	SC0000175 MAJOR INDUSTRIAL
FOURMILE BRANCH U.S. DEPART OF ENERGY/SRS PIPE #: H17 FLOW: 0.10	SC0000175 MAJOR INDUSTRIAL
FOURMILE BRANCH U.S. DEPART OF ENERGY/SRS PIPE #: H8A FLOW: 0.08	SC0000175 MAJOR INDUSTRIAL
INDIAN GRAVE BRANCH U.S. DEPART OF ENERGY/SRS PIPE #: K01 FLOW: 0.04	SC0000175 MAJOR INDUSTRIAL
INDIAN GRAVE BRANCH U.S. DEPART OF ENERGY/SRS PIPE #: K06 FLOW: 0.3	SC0000175 MAJOR INDUSTRIAL
INDIAN GRAVE BRANCH U.S. DEPART OF ENERGY/SRS PIPE #: K18 FLOW: 29.0	SC0044903 MAJOR INDUSTRIAL
INDIAN GRAVE BRANCH U.S. DEPART OF ENERGY/SRS PIPE #: K08 FLOW: 0.6	SC0000175 MAJOR INDUSTRIAL
INDIAN GRAVE BRANCH U.S. DEPART OF ENERGY/SRS PIPE #: K10 FLOW: 0.6	SC0000175 MAJOR INDUSTRIAL
INDIAN GRAVE BRANCH U.S. DEPART OF ENERGY/SRS PIPE #: K11 FLOW: 240	SC0000175 MAJOR INDUSTRIAL
INDIAN GRAVE BRANCH U.S. DEPART OF ENERGY/SRS PIPE #: K11A FLOW: 0.009	SC0000175 MAJOR INDUSTRIAL
PEN BRANCH U.S. DEPART OF ENERGY/SRS PIPE #: CS08 FLOW: 0.03	SC0000175 MAJOR INDUSTRIAL
PEN BRANCH U.S. DEPART OF ENERGY/SRS PIPE #: CS11 FLOW: 0.019	SC0000175 MAJOR INDUSTRIAL
MEYERS BRANCH U.S. DEPART OF ENERGY/SRS PIPE #: CY01 FLOW: 0.001	SC0000175 MAJOR INDUSTRIAL

MEYERS BRANCH TR U.S. DEPART OF ENERGY/SRS PIPE #: P05 FLOW: 0.14	SC0000175 MAJOR INDUSTRIAL
MEYERS BRANCH TR U.S. DEPART OF ENERGY/SRS PIPE #: P07 FLOW: 0.7	SC0000175 MAJOR INDUSTRIAL
STEEL CREEK U.S. DEPART OF ENERGY/SRS PIPE #: P13 FLOW: NO FLOW	SC0000175 MAJOR INDUSTRIAL
STEEL CREEK U.S. DEPART OF ENERGY/SRS PIPE #: P13A FLOW: 0.007	SC0000175 MAJOR INDUSTRIAL
L-LAKE U.S. DEPART OF ENERGY/SRS PIPE #: L07 FLOW: 240	SC0000175 MAJOR INDUSTRIAL
L-LAKE U.S. DEPART OF ENERGY/SRS PIPE #: L08 FLOW: 0.8	SC0000175 MAJOR INDUSTRIAL
L-LAKE U.S. DEPART OF ENERGY/SRS PIPE #: L10 FLOW: 0.006	SC0000175 MAJOR INDUSTRIAL
L-LAKE U.S. DEPART OF ENERGY/SRS PIPE #: L7A FLOW: 0.006	SC0000175 MAJOR INDUSTRIAL
BEAVERDAM CREEK U.S. DEPART OF ENERGY/SRS PIPE #: D1B FLOW: NO LIMIT	SC0000175 MAJOR INDUSTRIAL
BEAVERDAM CREEK U.S. DEPART OF ENERGY/SRS PIPE #: D1C FLOW: 3.1	SC0000175 MAJOR INDUSTRIAL
BEAVERDAM CREEK U.S. DEPART OF ENERGY/SRS PIPE #: D01 FLOW: 55.0	SC0000175 MAJOR INDUSTRIAL
BEAVERDAM CREEK U.S. DEPART OF ENERGY/SRS PIPE #: D03 FLOW: NO LIMIT	SC0000175 MAJOR INDUSTRIAL
BEAVERDAM CREEK U.S. DEPART OF ENERGY/SRS PIPE #: D1A FLOW: 0.02	SC0000175 MAJOR INDUSTRIAL
SAVANNAH RIVER U.S. DEPART OF ENERGY/SRS PIPE #: X08 FLOW: 0.30	SC0000175 MAJOR INDUSTRIAL

SAVANNAH RIVER U.S. DEPART OF ENERGY/SRS PIPE #: D05 FLOW: NO LIMIT	SC0000175 MAJOR INDUSTRIAL
SAVANNAH RIVER U.S. DEPART OF ENERGY/SRS PIPE #: D06 FLOW: NO LIMIT	SC0000175 MAJOR INDUSTRIAL
SAVANNAH RIVER U.S. DEPART OF ENERGY/SRS PIPE #: X11 FLOW: 0.003	SC0000175 MAJOR INDUSTRIAL
SAVANNAH RIVER U.S. DEPART OF ENERGY/SRS PIPE #: X8A FLOW: 0.005	SC0000175 MAJOR INDUSTRIAL
SAVANNAH RIVER U.S. DEPART OF ENERGY/SRS PIPE #: X8B FLOW: 0.06	SC0000175 MAJOR INDUSTRIAL
SAVANNAH RIVER SWAMP U.S. DEPART OF ENERGY/SRS PIPE #: X04 FLOW: 0.05	SC0000175 MAJOR INDUSTRIAL

Nonpoint Source Contributions

The Savannah River is listed as an impacted waterbody from nonpoint sources that include urban storm sewer and surface runoff.

Ground Water Contamination

Ground water contamination resulting from the F-Area seepage basin and the H-Area seepage basin at the Savannah River Site (U.S. Department of Energy) is adversely impacting the surface waters of Fourmile Branch, which flows into the Savannah River. Both areas are contaminated with radionuclides, metals and nitrates. The F-Area is currently under enforcement and monitoring and the H-Area is under enforcement and assessment.

Growth Potential

There was no known or projected growth for this watershed, but SRS employs 25,000 people and is responsible for the overall growth in proximity to the site.

03060106-130

General Description

Watershed 03060106-130 is located in Barnwell and Allendale Counties and consists primarily of **Lower Three Runs Creek** and its tributaries. The watershed occupies 112,619 acres of the Sandhills region of South Carolina. The predominant soil types consist of an association of the Blanton-Fuquay series. The erodibility of the soil (K-factor) averages 0.13; the slope of the terrain averages 3.1%, with a range of 0-10%. Land use/land cover in the watershed includes: 0.11% urban land, 12.08% agricultural land, 29.52% scrub/shrub land, 0.18% barren land, 42.10% forested land, 12.70% forested wetland, 0.16% nonforested wetland and 3.15% water.

The Lower Three Runs Creek watershed contains a total of 46.74 stream miles that drain into the Savannah River, all classified as FW. The creek drainage consists of Par Pond, near the Town of Barnwell, together with Mill Creek and Davis Branch. Par Pond and the upper portion of Lower Three Runs Creek lie within the grounds of the U.S. Department of Energy's Savannah River Site.

Water Quality

Lower Three Runs Creek - There are two monitoring locations on Lower Three Runs Creek. Aquatic life uses are fully supported at both sites. Macroinvertebrate community data at the downstream site showed moderate impacts, but this was due to natural habitat differences and the difficulty in obtaining representative samples at this location. Recreational uses are fully supported. A significantly increasing trend in total phosphorus at the downstream station could contribute to algal or aquatic weed problems in impoundments downstream. A significantly increasing trend in turbidity at the downstream location may be due to a combination of point and nonpoint source contributions. The Whitlock Combing Company documented large numbers of BOD, TSS, and fecal coliform bacteria permit limit violations in 1992. This facility is working towards closure in 1993.

Point Source Contributions

Lower Three Runs Creek is included on the §304(l) long list of impacted waterbodies for point source concerns for toxic pollution.

RECEIVING STREAM FACILITY NAME PERMITTED FLOW @ PIPE (MGD)	NPDES # TYPE COMMENT
PAR POND U.S. DEPART OF ENERGY/SRS PIPE #: P19 FLOW: 240.38	SC0000175 MAJOR INDUSTRIAL
PAR POND U.S. DEPART OF ENERGY/SRS PIPE #: PP1 FLOW: NO LIMIT	SC0000175 MAJOR INDUSTRIAL

DAVIS BRANCH
WHITLOCK COMBING COMPANY
PIPE #: 001 FLOW: 0.316

SC0000221
MAJOR INDUSTRIAL

LOWER THREE RUNS CREEK TR
CAROLINA METALS INC
PIPE #: 001 FLOW: NO LIMIT

SC0038351
MINOR INDUSTRIAL

LOWER THREE RUNS CREEK TR
CAROLINA METALS INC
PIPE #: 002 FLOW: NO LIMIT

SC0038351
MINOR INDUSTRIAL

Nonpoint Source Contributions

Lower Three Runs Creek is listed as an impacted waterbody from nonpoint sources that include agricultural activities (nonirrigated crop and specialty crop production and pastureland management). Numerous elevated nutrient levels were recorded for this stream, together with scattered elevated levels of ammonia.

Growth Potential

There has been a small increase in residential growth in the non-SRS area of the watershed as a result of SRS activities.

03060106-140

General Description

Watershed 03060106-140 is located in Allendale County consists of the **Savannah River** and its tributaries below Lower Three Runs Creek to Gall Branch. The watershed occupies 60,892 acres of the Lower Coastal Plain region of South Carolina. The predominant soil types consist of an association of the Blanton-Ogeechee-Chisolm series. The erodibility of the soil (K-factor) averages 0.16; the slope of the terrain averages 1.9%, with a range of 0-6%. Land use/land cover in the watershed includes: 0.40% urban land, 8.28% agricultural land, 11.24% scrub/shrub land, 0.17% barren land, 78.24% forested land and 1.67% water.

This watershed contains a total of 47.5 stream miles, all classified as FW. Brier Creek (consisting of Stoney Creek and Little Brier Creek) flows into the Savannah River at the top of the watershed; and, farther downriver, the Gaul Branch (King Creek) enters. At the base of the watershed, the Gall Branch drains into the river. As a reach of the Savannah River, this watershed also accepts the drainage of all streams entering the river upstream of the watershed.

Water Quality

Savannah River - Recreational and aquatic life uses are fully supported in this portion of the river; however, aquatic life uses may be threatened by a significantly declining trend in dissolved oxygen. Turbidity exhibited a significantly increasing trend, possibly due to urban and surface runoff.

Point Source Inputs

The Savannah River is currently identified on the §303(d) priority list as a waterbody requiring TMDL development. An extensive study (see watershed 03060106-060) is currently underway to determine the assimilative capacity of the river.

RECEIVING STREAM FACILITY NAME PERMITTED FLOW @ PIPE (MGD)	NPDES # TYPE COMMENT
SAVANNAH RIVER TOWN OF ALLENDALE PIPE #: 001 FLOW: 1.7	SC0039918 MAJOR MUNICIPAL
SAVANNAH RIVER SANDOZ CHEMICAL CORP/MARTIN PIPE #: 001 FLOW: 3.0	SC0042803 MINOR INDUSTRIAL

Nonpoint Source Contributions

The Savannah River is listed as an impacted waterbody from nonpoint sources that include urban storm sewer and surface runoff.

Ground Water Contamination

The ground water in the vicinity of the spray fields owned by Sandoz Colors and Chemicals Company is contaminated with nitrates and metals. A remediation system has been installed and the company plans to connect the spray system to a point source discharge to the Savannah River in 1993.

Growth Potential

Due to additional growth in the Allendale-Fairfax area, the Town of Allendale's treatment facility may be expanded.

03060109-020

General Description

Watershed 03060109-020 is located in Allendale, Hampton and Jasper Counties and consists of the **Savannah River** and its tributaries between Gall Branch and Cypress Branch. The watershed occupies 99,732 acres of the Lower Coastal Plain region of South Carolina. The predominant soil types consist of an association of the Chastain-Rains-Argent-Norfolk-Tawcaw series. The erodibility of the soil (K-factor) averages 0.21; the slope of the terrain averages 1.3%, with a range of 0-6%. Land use/land cover in the watershed includes: 0.41% urban land, 11.10% agricultural land, 11.37% scrub/shrub land, 0.05% barren land, 40.93% forested land, 11.37% forested wetland, 29.51% nonforested wetland and 2.09% water.

This watershed contains a total of 84.3 stream miles, all classified as FW. Long Branch enters the river at the top of the watershed. The Boggy Swamp drainage, which incorporates Mill Bay Creek, enters the river further downstream. As a reach of the Savannah River, this watershed also accepts the drainage of all streams entering the river upstream of the watershed.

Water Quality

No water quality data is available for this watershed. Water quality sampling is planned prior to the assessment update.

Point Source Contributions

The Savannah River is currently identified on the §303(d) priority list as a waterbody requiring TMDL development. An extensive study (see watershed 03060106-060) is currently underway to determine the assimilative capacity of the river. There are no point source dischargers in this watershed.

Nonpoint Source Contributions

The Savannah River is listed as an impacted waterbody from nonpoint sources that include urban storm sewer and surface runoff.

Growth Potential

There was no serious growth projected for this watershed.

03060109-050

General Description

Watershed 03060106-050 is located in Hampton and Jasper Counties and consists of a segment of the Savannah River with **Cypress Creek** draining into the top of the reach, and Lakes Coleman and Mayers draining into the base of the reach. The watershed occupies 79,239 acres of the Lower Coastal region of South Carolina. The predominant soil types consist of an association of the Santee-Argent-Rains-Lynchburg-Goldsboro series. The erodibility of the soil (K-factor) averages 0.20; the slope of the terrain averages 1.2%, with a range of 0-2%. Land use/land cover in the watershed includes: 1.94% urban land, 17.55% agricultural land, 5.19% scrub/shrub land, 0.49% barren land, 41.56% forested land, 26.08% forested wetland, 6.95% nonforested wetland and 0.24% water.

There are a total of 18.5 stream miles in this watershed. Cypress Branch flows into Cypress Creek (SA), which flows into the Savannah River. Further downstream, several unnamed creeks drain into Coleman Lake and Mayers Lake, which drain into the river.

Water Quality

No water quality data is available for this watershed. Water quality sampling is planned prior to the assessment update.

Point Source Contributions

RECEIVING STREAM FACILITY NAME PERMITTED FLOW @ PIPE (MGD)	NPDES # TYPE COMMENT
BLACK SWAMP YOUUMAN'S FISH PONDS PIPE #: 001 FLOW: 0.5	SC0042374 MINOR INDUSTRIAL
SAVANNAH RIVER AMOCO SERVICE STATION #489 PIPE #: 001 FLOW: 0.023	SC0044385 MINOR INDUSTRIAL GROUND WATER REMEDIATION

Growth Potential

There was no serious growth projected for this watershed.

03060109-060

General Description

Watershed 03060109-060 is located in Jasper County and consists of the lowest segment of the **Savannah River**. The watershed occupies 39,298 acres of the Coastal Zone region of South Carolina. The predominant soil types consist of an association of the Bohicket-Argent series. The erodibility of the soil (K-factor) averages 0.13; the slope of the terrain averages 1.0%, with a range of 0-2%. Land use/land cover in the watershed includes: 7.95% urban land, 13.62% agricultural land, 2.70% scrub/shrub land, 1.10% barren land, 17.10% forested land, 9.84% forested wetland, 40.32% nonforested wetland and 7.36% water.

This watershed contains a total of 18.0 stream miles, which includes the Savannah River Estuary, and empties into the Atlantic Ocean. The river segment is classified as FW until the Seaboard Coastline Railroad crossing above the Savannah National Wildlife Refuge, below this point the river is Class SA. Meyer Lake drains into the river at the top of the watershed. Downriver, Union Creek joins the Savannah at the upper edge of the Savannah River Wildlife Refuge. Within the refuge, Vermezobre Creek and Clydale Creek flow into the Back River, which reconnects with the Savannah River before draining into the ocean. Saltwater Creek connects the Savannah River to the Wright River (03050208-140) via the Back River; and downstream, the Mud River (Fields Cut) has a similar connection. All streams in the watershed below the railroad crossing are classified SA. As a reach of the Savannah River, this watershed also accepts the drainage of all streams entering the river upstream of the watershed.

Water Quality

Savannah River - This portion of the river exhibited a high frequency of pH values below standards (less than 6.5 SU). The station is located in the transition area between freshwater and saltwater and the low pH values exemplify the natural transition of the river; therefore, these are not considered standards excursions. Aquatic life uses are only partially supported due to dissolved oxygen excursions. Recreational uses are only partially supported due to fecal coliform bacteria excursions. One cadmium value was measured in excess of the aquatic life criterion in 1990, at the detection limit. Turbidity exhibited a significantly increasing trend, probably originating from urban runoff.

SAVANNAH HARBOR

Restoration of the Back River

In 1965, Congress authorized the construction of a tide gate across the Back River, as part of the Savannah Harbor Navigation Project, for the purpose of sediment control in relation to maintenance dredging of the harbor. Mitigations were required for the environmental alterations that

resulted from the project. Of particular concern were the effect of saltwater intrusion on the Savannah National Wildlife Refuge and the impact of the project on migration of anadromous fish. Numerous studies investigated the effectiveness of the mitigation measures and whether operational modifications were necessary or effective.

The studies have shown the impacts associated with the project to be significant and mitigative measures to be ineffective. The decision has been made to permanently remove the tide gate and block the diversion canal, restoring the river to a natural flow regime. Realteration of the inflowing river to the harbor, however, will nullify all existing water quality models related to the harbor. New modelling efforts will be required.

National Estuary Program

The Savannah Harbor estuary was recently nominated by the Governors of the States of South Carolina and Georgia to participate in the National Estuary Program (SCDHEC 1992f), but was not selected. The National Estuary Program (NEP) was established under sections 317 and 320 of the Clean Water Act (CWA), as amended by the Water Quality Act of 1987, to promote long-term planning and management in nationally significant estuaries that are threatened by various forms of pollution, development or overuse. If the harbor had been selected by the USEPA, a Comprehensive Conservation and Management Plan (CCMP) would have been developed at a management conference arranged to document estuarine problems, including recommendations of approaches to correct these problems and identifications of problem-prevention mechanisms.

The rationale behind the proposal to study the Savannah Harbor Estuary as an estuary of national significance is related to the recreation, tourism, commercial port usage and wildlife resources of the area. According to the nomination proposal, there are four primary environmental management issues in the Savannah Harbor estuary which include: water quality modeling, dredging operations, protection of fishery and endangered species, and restoration of lost habitat related to altered salinity patterns. Development of a Savannah Harbor water quality model to predict dissolved oxygen concentrations under various conditions is essential, together with resolving and determining the attainable dissolved oxygen criteria for the harbor which would incorporate a cost/benefit analysis. Documentation of water quality and fish population changes in relation to dredging activities would be necessary, together with development of protection strategies for declining populations of striped bass and shortnose sturgeon. Also in need of examination is the mitigation of waterfowl habitat losses due to altered salinity patterns from hydrologic modifications. Cooperation between the States of South Carolina and Georgia and the USEPA may lead to problem resolution in these areas without the aid of NEP status.

Water Supply

WATER USER (TYPE)	STREAM	AMOUNT WITHDRAWN (MGD)
Beaufort-Jasper WS (M)	Savannah River	6.580

Point Source Contributions

The Savannah River is currently identified on the §303(d) list as a waterbody that may require development of a TMDL. An extensive study (see watershed 03060106-060) is currently underway to determine the assimilative capacity of the river. There are no point source dischargers in this watershed.

Nonpoint Source Contributions

The Savannah River is listed in the NPS Management Program as a high priority for implementation action. Reasons for the priority status nonpoint source inputs from urban storm sewer and surface runoff. Data collected by outside agencies indicated that toxic materials were entering the river from dredge spoil area runoff. No action is currently underway or in the planning stages.

Shellfish Harvesting Status

The South Carolina portion of the Savannah River incorporates 1,839 acres classified as tidal saltwaters (SA), that have prohibited access to shellfish harvesting due to adjacent point source pollutants. The U.S. Army Corps of Engineers uses a dredge spoil disposal site adjacent to Fields Cut that impacts both the Savannah River and the Wright River in the next watershed. The Savannah River also has heavy ship and boat traffic that poses a potential impact to the shellfish waters.

Growth Potential

The Town of Hardeeville is located in this watershed and is projected to continue experiencing growth. However, the current and proposed growth lies in areas with inadequate sewer service. Less than 25% of the total land area is suitable for septic system installations; and another 25% or less is classified as marginally suitable. The marginally suitable areas pose the greatest threat to ground water quality; the shallow septic system design required for these marginal areas is likely to be inadequate and result in ground water pollution. Also, growth in the area tends to be spread out over a large area not served by a sewer system. The Town of Hardeeville is under a SCDHEC Consent Order and has expanded the wastewater treatment facility (1.01 MGD) that should improve the quality of the effluent and increase growth potential.

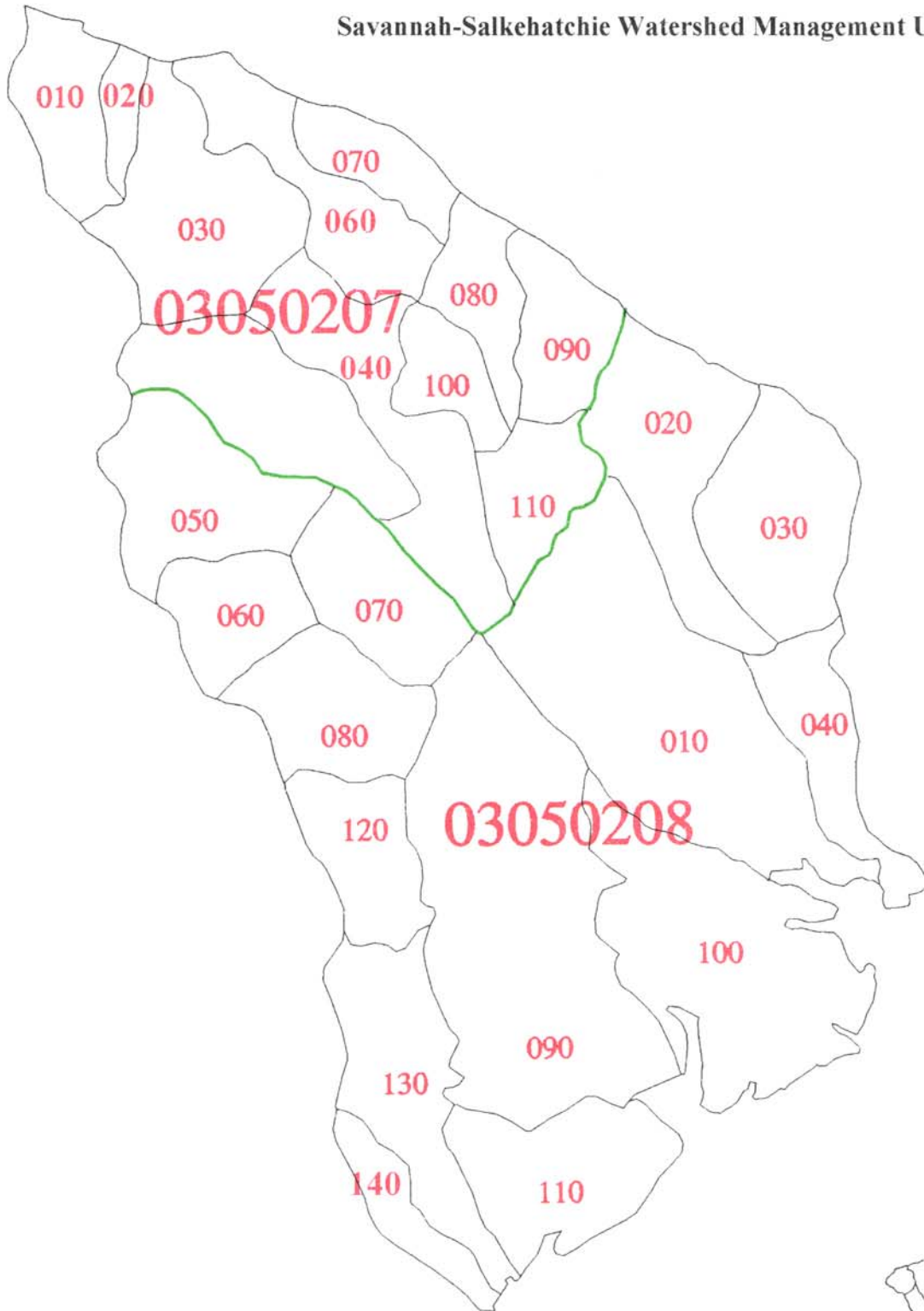
WATERSHED MANAGEMENT UNIT 0104

Climate

Data from National Weather Service stations in Bamberg, Blackville, Hampton, Walterboro, Yemassee, Ridgeland and Beaufort were compiled to determine seasonal climatic information for the WMU-0104 area. Historical climatological records were compiled (SCWRC 1990) to provide the normal values. The normal annual rainfall was 49.52 inches. The highest seasonal rainfall occurred in the summer with 17.22 inches due to the higher occurrences of thunderstorms in the coastal plain. The average fall, winter and spring rainfall totals were 9.38, 10.67 and 12.25 inches, respectively. The mean annual daily temperature was 64.7°F, the warmest of the four drainage basins. Summer temperatures averaged 79.3°F; fall, winter and spring temperatures averaged 65.6, 49.1 and 64.8°F, respectively.

Watershed Unit Index Map

Savannah-Salkehatchie Watershed Management Unit 0104

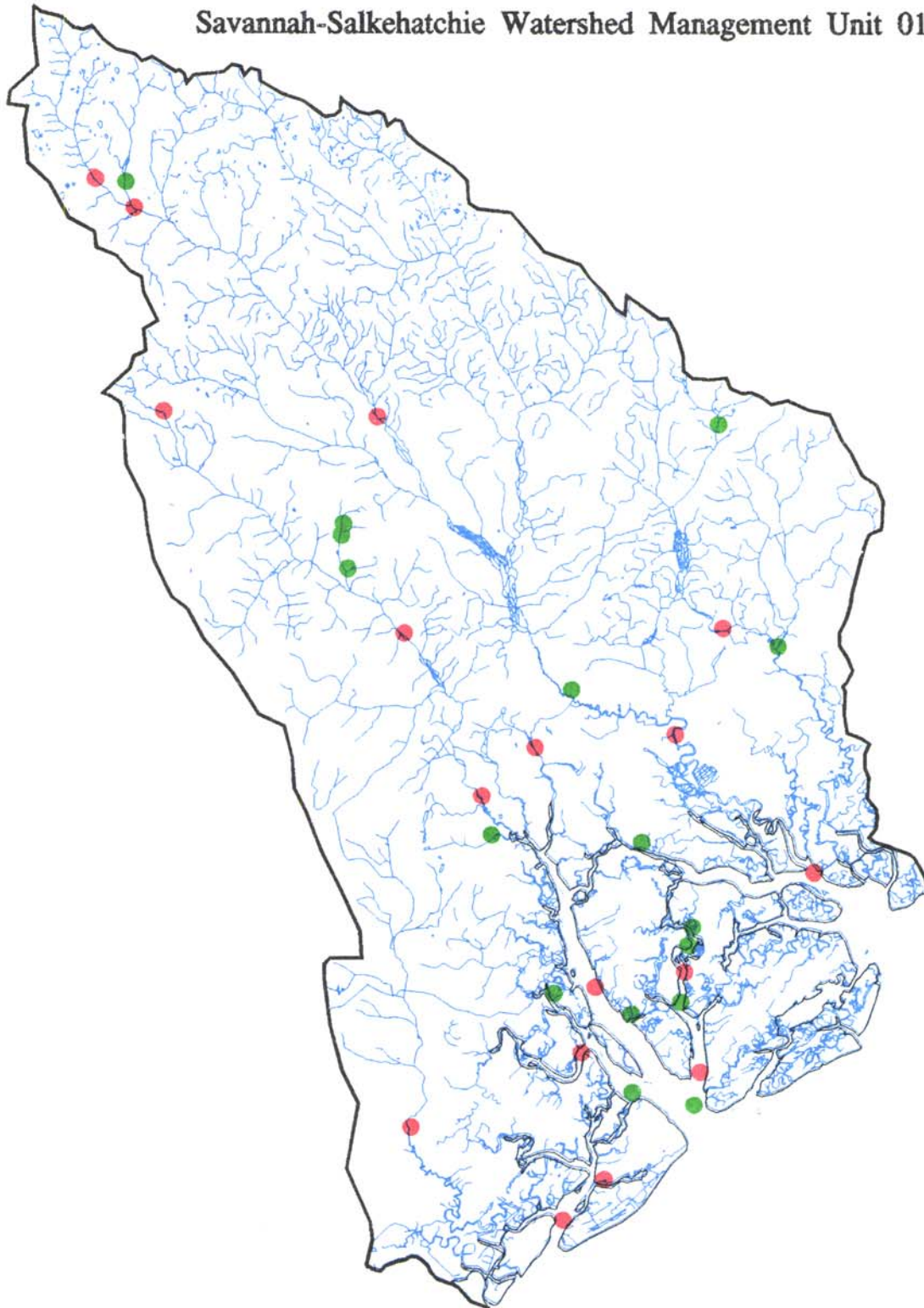


Monitoring Station Descriptions MU-0104

STATION NUMBER	STATION DESCRIPTION	TYPE
03050207-010 ✓		
CSTL-028	SALKEHATCHIE RVR AT SC 64 2 MI W OF BARNWELL	P
03050207-020 ✓		
CSTL-001B	TURKEY CK 1 MI BL MILLIKEN BARNWELL OUTFALL AT CLINTON ST.	S
03050207-030 ✓		
CSTL-003	SALKEHATCHIE RVR AT SC 278 2.5 MI S BARNWELL	P
03050207-040 ✓		
CSTL-006	SALKEHATCHIE RVR AT 601 9 MI NE HAMPTON	P
03050208-020 ✓		
CSTL-044	IRELAND CK AT S-15-116 5 1/2 MI N OF WALTERBORO	S
CSTL-068	ASHEPOO RVR AT SC 303 10 MI SSW OF WALTERBORO	P
03050208-040 ✓		
CSTL-069	ASHEPOO RVR AT US 17 3.4 MI ESE OF GREEN POND	S
03050208-010 ✓		
CSTL-007	COMBAHEE SWP BL YEMASSEE SEWAGE OUTFALL	I*
CSTL-098	COMBAHEE RVR AT US 17 10 MI ESE YEMASSEE	P
03050208-050		
CSTL-110	COOSAWHATCHIE RVR AT S-03-47	P
03050208-060		
CSTL-075	LAKE WARREN, BLACK CK ARM, AT S-25-41 5 MI SW OF HAMPTON	S
03050208-070		
CSTL-108	SANDERS BRANCH AT SC RD 363	S
CSTL-010	SANDERS BR AT SC 278	S
CSTL-011	SANDERS BR AT S-25-50	S
CSTL-109	COOSAWHATCHIE RVR AT S-25-27 2.5 MI SW CUMMINGS	P
03050208-090		
CSTL-107	COOSAWHATCHIE RVR AT US 17 AT COOSAWHATCHIE	P
MD-128	BEEES CK AT SC 462 5.9 MI NE OF RIDGELAND	S
MD-007	POCOTALIGO RVR AT US 17 AT POCOTALIGO	P
MD-116	BROAD RVR AT SC 170 7.5 MI SW OF BEAUFORT	P
MD-172	BROAD RVR AT MOUTH OF ARCHER CK ON SW SIDE OF USMC	S
MD-117	CHECHESSEE RVR AT SC 170 10.5 MI SW OF BEAUFORT	S
MD-176	COLLETON RVR AT COLLETON NECK-AT JCT WITH CHECHESSEE RV	I*
MD-006	PORT ROYAL BTWN BUOY 25 & 24 W OF BAY PT ISLAND	S
03050208-100		
MD-001	BEAUFORT RVR AB BEAUFORT AT CHANNEL MARKER 231	S
MD-002	BEAUFORT RVR AT DRAWBRDG ON US 21	S
MD-003	BEAUFORT RVR BL BEAUFORT AT CHANNEL MARKER 244	P
MD-004	BEAUFORT RVR AT JCT WITH BATTERY CK NR MARKER 42	S
MD-005	BEAUFORT RVR BL OUTFALL OF PARRIS ISL MB AT BUOY 29	P
MD-010	WHALE BR AT US 21	I*
MD-194	WHALE BR AT JCT WITH CAMPBELL'S CK-3/4 MI W OF MD-010	S
03050208-110		
MD-016	MOUTH OF MAY RVR 1.0 MI W OF CHANNEL MARKER 29	I*
MD-013	MOUTH OF SKULL CK BTWN CHANNEL MARKERS 3 & 4 NEAR REDBO	S
MD-175	CALIBOGUE SD AT MOUTH OF COOPER RVR NR RED BUOY 32	P
03050208-130		
MD-118	NEW RVR AT SC 170 9 MI W OF BLUFFTON	P

Primary and Secondary Monitoring Stations

Savannah-Salkehatchie Watershed Management Unit 0104



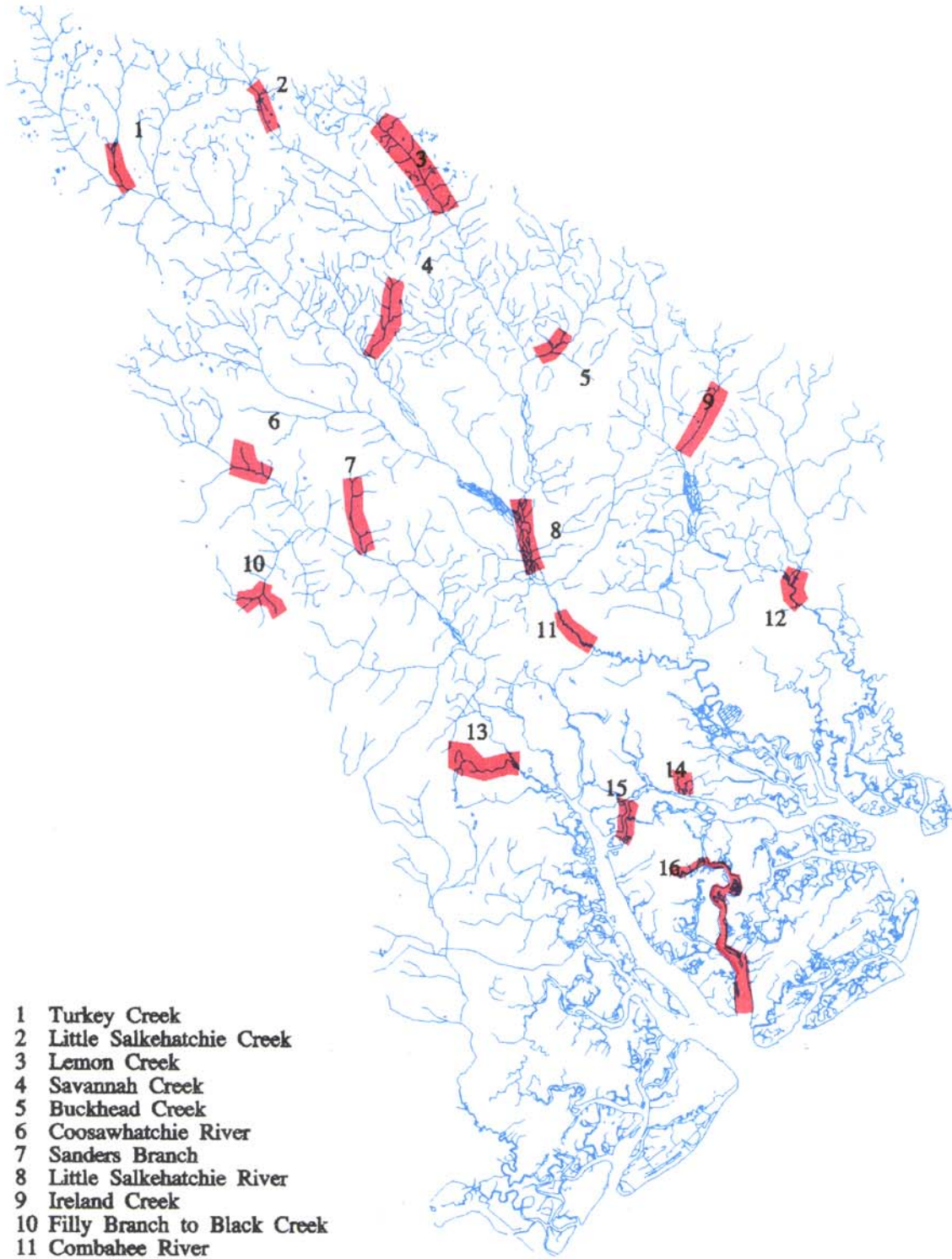
- Primary Monitoring Stations
- Secondary Monitoring Stations
- Hydrography

0 5 10 15 MILES



Modelled Streams Map

Savannah-Salkehatchie Watershed Management Unit 0104



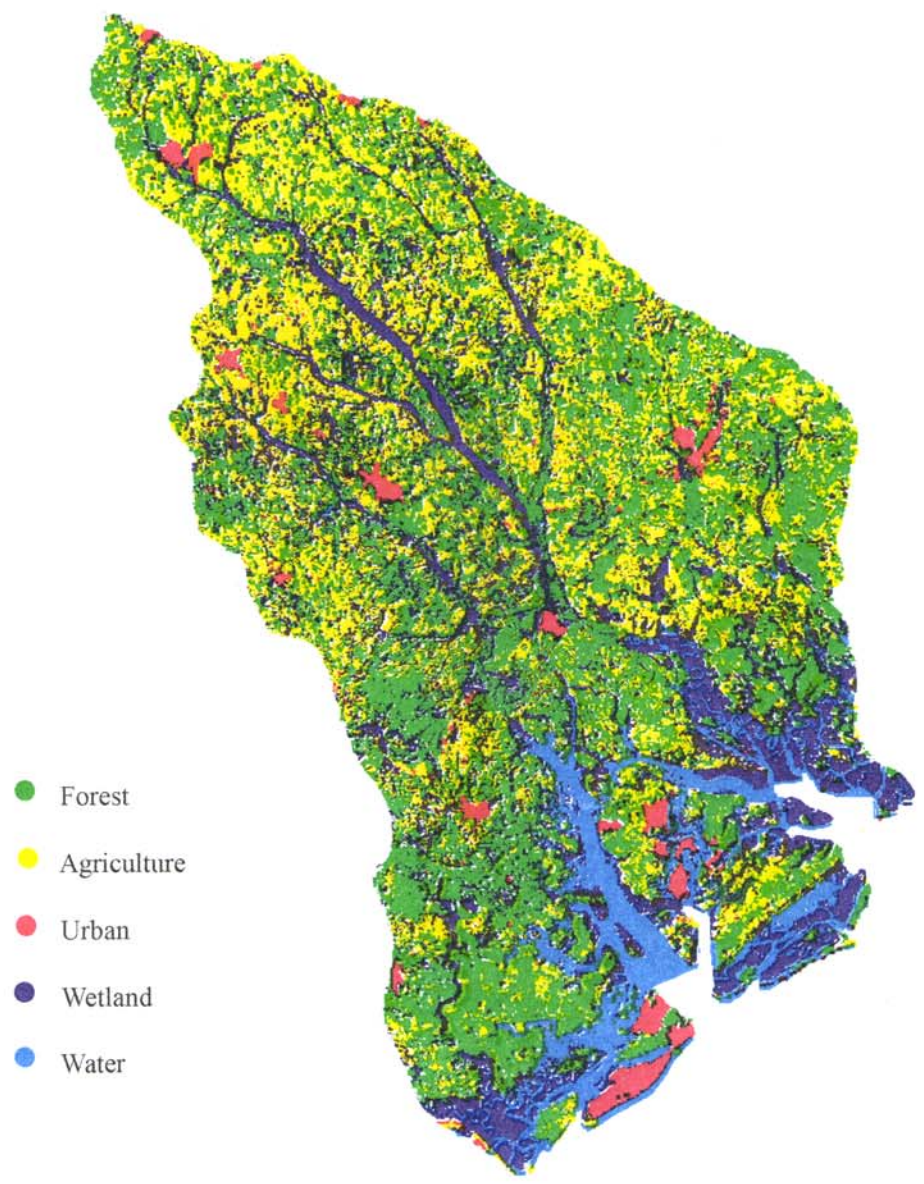
- 1 Turkey Creek
- 2 Little Salkehatchie Creek
- 3 Lemon Creek
- 4 Savannah Creek
- 5 Buckhead Creek
- 6 Coosawhatchie River
- 7 Sanders Branch
- 8 Little Salkehatchie River
- 9 Ireland Creek
- 10 Filly Branch to Black Creek
- 11 Combahee River
- 12 Ashepoo River
- 13 Little Bees Creek
- 14 Halfmoon Creek
- 15 Whale Branch
- 16 Beaufort River



0 5 10 15
MILES

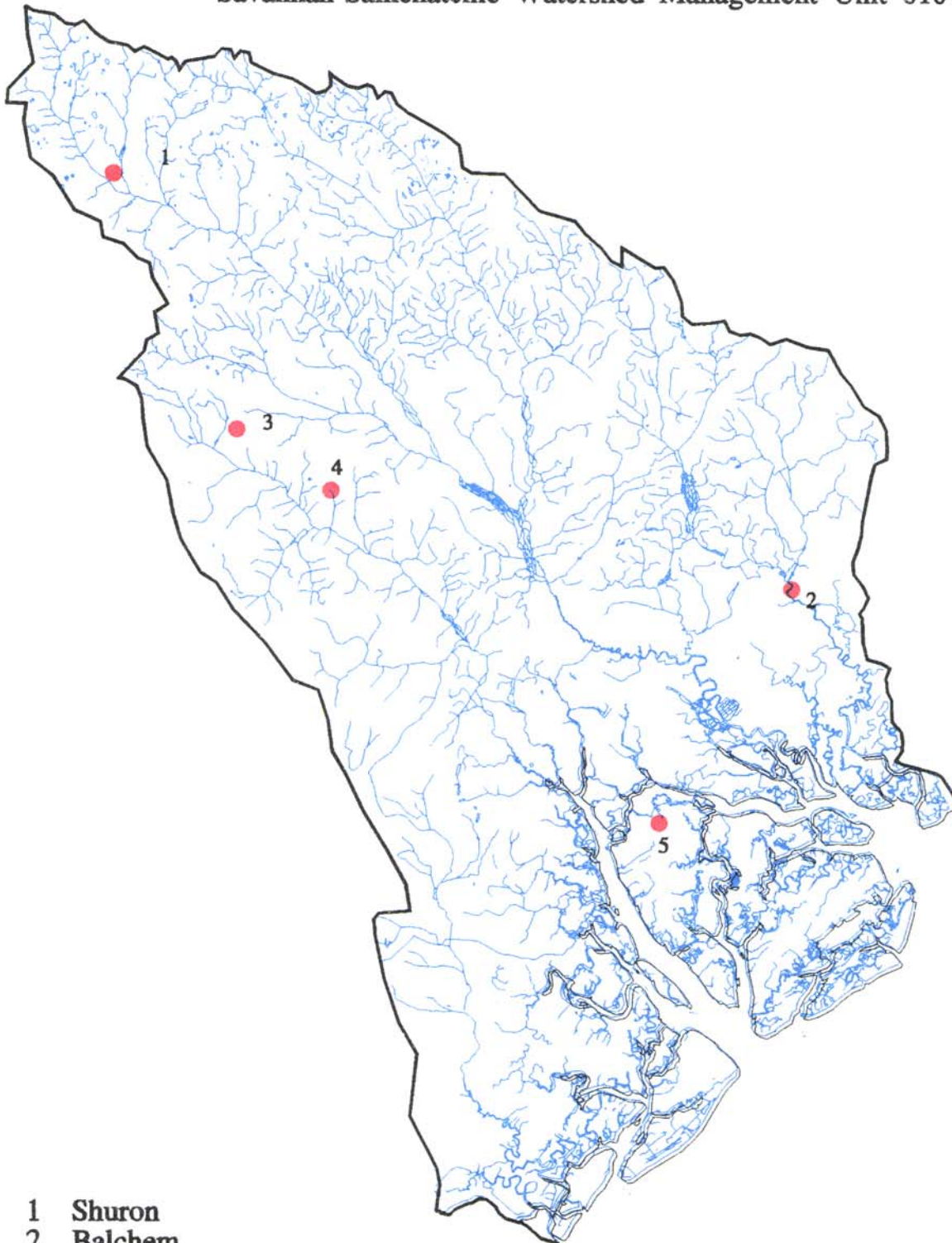
†

Land Use/Land Cover of WMU-0104



Groundwater Contaminated Sites

Savannah-Salkehatchie Watershed Management Unit 0104



- 1 Shuron
- 2 Balchem
- 3 Helena Chemical - Fairfax
- 4 Reichold Westinghouse
- 5 Wamchem

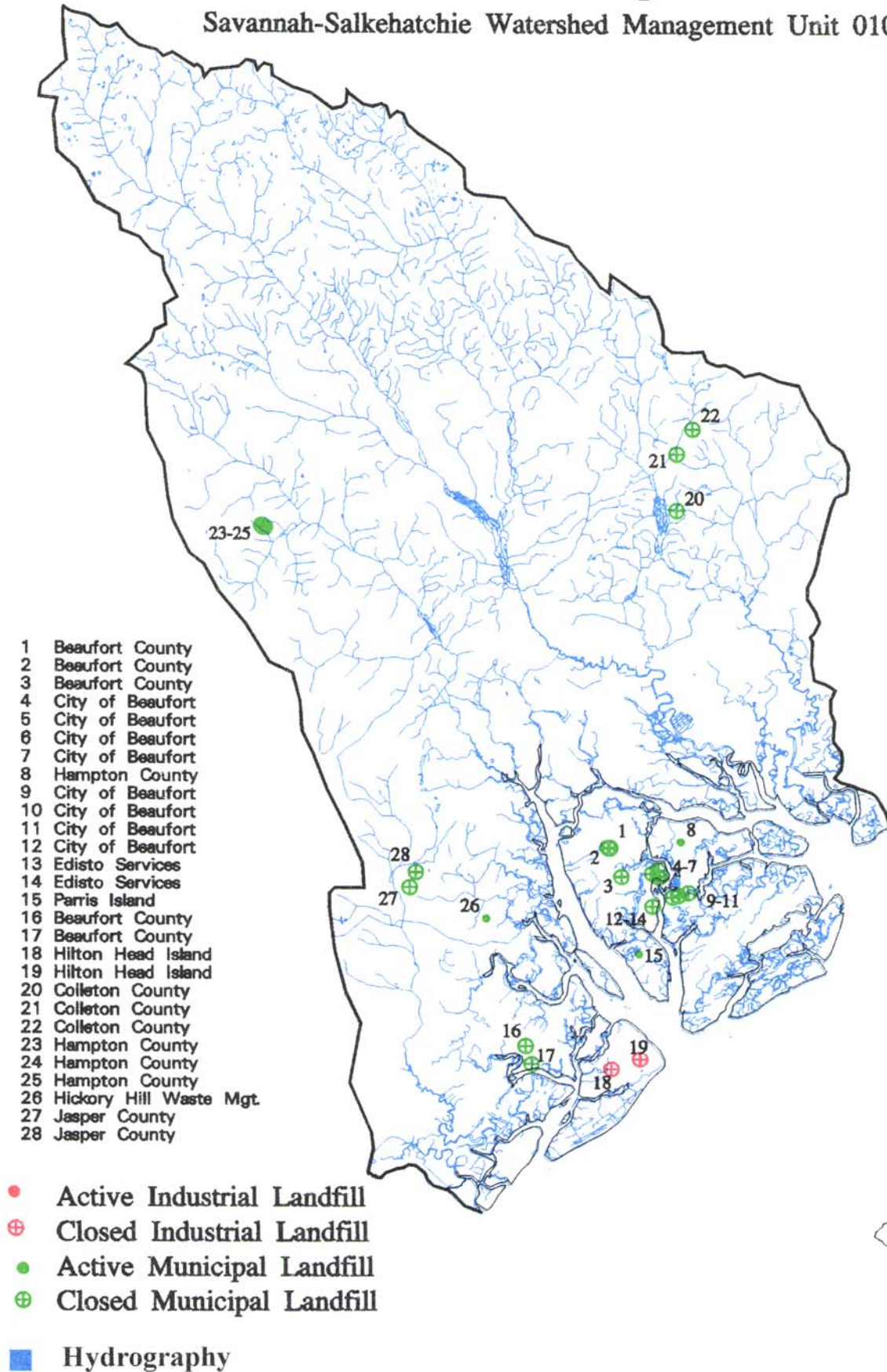
 Hydrography

0 5 10 15
MILES



Industrial and Municipal Landfills

Savannah-Salkehatchie Watershed Management Unit 0104



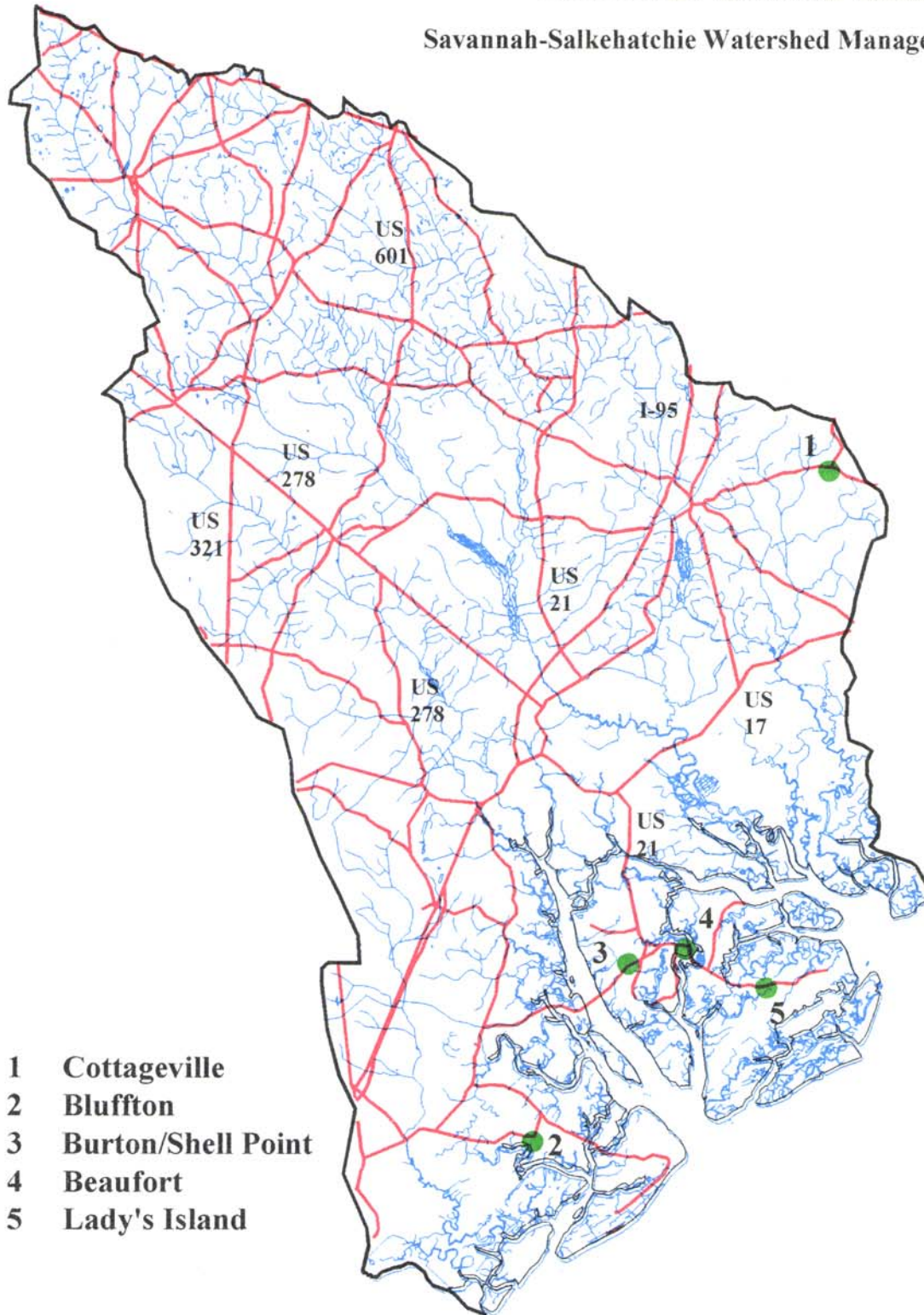
- 1 Beaufort County
- 2 Beaufort County
- 3 Beaufort County
- 4 City of Beaufort
- 5 City of Beaufort
- 6 City of Beaufort
- 7 City of Beaufort
- 8 Hampton County
- 9 City of Beaufort
- 10 City of Beaufort
- 11 City of Beaufort
- 12 City of Beaufort
- 13 Edisto Services
- 14 Edisto Services
- 15 Parris Island
- 16 Beaufort County
- 17 Beaufort County
- 18 Hilton Head Island
- 19 Hilton Head Island
- 20 Colleton County
- 21 Colleton County
- 22 Colleton County
- 23 Hampton County
- 24 Hampton County
- 25 Hampton County
- 26 Hickory Hill Waste Mgt.
- 27 Jasper County
- 28 Jasper County

- Active Industrial Landfill
- ⊕ Closed Industrial Landfill
- Active Municipal Landfill
- ⊕ Closed Municipal Landfill
- Hydrography



0 5 10 15 MILES

Potential Growth Areas

Savannah-Salkehatchie Watershed Management Unit 0104



- 1 Cottageville
- 2 Bluffton
- 3 Burton/Shell Point
- 4 Beaufort
- 5 Lady's Island

-  Potential Growth Areas
-  Hydrography

0 5 10 15
MILES



Watershed Descriptions Within WMU-0104

General Description

Watershed 03050207-010 is located in Barnwell County and consists of the upper **Salkehatchie River** and its tributaries above Turkey Creek. The watershed occupies 51,701 acres of the Sandhills region of South Carolina. The predominant soil types consist of an association of the Fuquay-Dothan-Varina-Blanton series. The erodibility of the soil (K-factor) averages 0.14; the slope of the terrain averages 4.0%, with a range of 0-10%. Land use/land cover in the watershed includes: 5.46% urban land, 20.42% agricultural land, 23.28% scrub/shrub land, 0.05% barren land, 39.50% forested land, 10.92% forested wetland, 0.08% nonforested wetland and 0.29% water.

The upper Salkehatchie River originates with the confluence of Rosemary Creek (Gin Branch) and Buck Creek, and flows past the Town of Barnwell. There are a total of 25.1 stream miles in this watershed, all classified as FW.

Water Quality

Salkehatchie River - Recreational uses are fully supported in this portion of the river. Aquatic life uses are also fully supported based on water chemistry and macroinvertebrate community data, but may be threatened by a significantly declining trend in dissolved oxygen. One cadmium value was measured in excess of aquatic life standards in 1989, one mercury value above the human health criteria in 1988, and two copper values above the aquatic life criterion in 1989. Turbidity exhibited a significantly increasing trend, possibly due to adjacent land use practices.

Point Source Contributions

The Salkehatchie River is currently listed on the §303(d) list for waters that may require TMDL development in relation to elevated nutrient levels and potential ammonia toxicity. The Salkehatchie River is also included on the §304(l) long list of impacted waterbodies due to point source concerns for nontoxic pollution.

RECEIVING STREAM FACILITY NAME PERMITTED FLOW @ PIPE (MGD)	NPDES # TYPE COMMENT
GIN BRANCH MULTITEX CORP PIPE #: 001 FLOW: 0.003	SC0004073 MINOR INDUSTRIAL
NO DISCHARGE SYSTEM FACILITY NAME	ND# TYPE
LAND DISPOSAL WILLISTON/ROSEMARY CREEK WWTP	ND0063061 MINOR MUNICIPAL

Nonpoint Source Contributions

The Salkehatchie River is listed in the NPS Management Program as a high priority for implementation action due to nonpoint sources that include agricultural activities and resource extraction. No action is currently underway or in the planning stages. Numerous elevated nutrient and ammonia levels have been recorded by the Department on this stream. Computer modelling by the SCLRCC indicated a high potential for NPS problems from agricultural and surface mining activities for this stream. The Salkehatchie River is included on the §304(l) long list for waterbodies impacted by nonpoint source nontoxic pollution.

Growth Potential

The Town of Snelling is located directly adjacent to the Savannah River Site where S.C. Highway 64 terminates at a controlled access/employee entrance to the Site. The town and area adjacent to S.C. 64 are expected to continue experiencing slight growth due to their location to the Site's entrance.

03050207-020

General Description

Watershed 03050207-020 is located in Barnwell County and consists of **Turkey Creek** and its tributaries. The watershed occupies 16,179 acres of the Sandhills region of South Carolina. The predominant soil types consist of an association of the Dothan-Fuquay-Varina series. The erodibility of the soil (K-factor) averages 0.15; the slope of the terrain averages 3.8%, with a range of 0-6%. Land use/land cover in the watershed includes: 13.43% urban land, 18.76% agricultural land, 35.07% scrub/shrub land, 0.29% barren land, 17.66% forested land, 13.59% forested wetland, 0.05% nonforested wetland and 1.15% water.

Turkey Creek is joined by Long Branch and flows through the Town of Barnwell and into the upper Salkehatchie River. The Turkey Creek watershed contains a total of 12.0 stream miles, all classified as FW. In addition to the water resources, Barnwell State Park is a natural resource located in this watershed.

Water Quality

Turkey Creek - Aquatic life uses are only partially supported for this stream due to dissolved oxygen excursions. Recreational uses are only partially supported due to fecal coliform bacteria excursions under Class FW standards. The creek was Class B until April, 1992 and bacterial conditions are expected to continue to improve as new NPDES permit limits are instituted in the watershed. A significantly increasing trend in total phosphorus was detected, which could contribute to algal or aquatic weed problems in impoundments downstream. Turbidity exhibited a significantly increasing trend, possibly due to adjacent land use practices. Due to the growth potential within this watershed, and the resulting expansion of the wastewater treatment facility, it is recommended that this monitoring station be converted from a secondary to a primary station.

Lake Water Quality Assessment

Lake Edgar A. Brown is a 53.8 hectare lake created by damming off a portion of the Turkey Creek floodplain. It has a watershed of 0.4 km² and does not have an inflowing stream system. It has a maximum depth of 3m and a mean depth of 1m. Swimming is impaired due to lakewide elevated chlorophyll-a concentrations. The lake drains into Turkey Creek.

A single Algal Growth Potential Test, conducted in the summer of 1989, indicated that the limiting nutrient in the lake was phosphorus. Eutrophication studies classified the lake as a Category II, with intermediate water quality. A Clean Lakes Phase I diagnostic/feasibility study was conducted on Lake Edgar Brown as a result of high nutrient levels and abundant aquatic plant biomass. The study revealed poor flushing of the lake system resulting in nutrient reserves bound in the sediments,

available for recurring release. Additional monitoring of lake condition will continue as restoration mechanisms are identified.

Lake Edgar Brown is currently included on the §303(d) priority list for impaired water quality related to the elevated nutrient content of the lake; development of a TMDL will be required.

Point Source Contributions

RECEIVING STREAM FACILITY NAME PERMITTED FLOW @ PIPE (MGD)	NPDES # TYPE COMMENT
TURKEY CREEK CITY OF BARNWELL PIPE #: 001 FLOW: 1.5	SC0025143 MAJOR MUNICIPAL
TURKEY CREEK SHURON INC PIPE #: 001 FLOW: MR	SC0003999 MINOR INDUSTRIAL
TURKEY CREEK MILLIKEN & CO/BARNWELL MILL PIPE #: 001 FLOW: 1.3	SC0003093 MAJOR INDUSTRIAL

Ground Water Contamination

The ground water in the vicinity of Shuron Inc. is contaminated with volatile organics. The facility is actively assessing the extent of contamination. The wetlands adjacent to Turkey Creek are the probable recipient of the contaminated discharge.

Growth Potential

The City of Barnwell, which houses 58% of the population of Barnwell County, lies in this watershed. Trends show a slowly decreasing population. Barnwell has the most commerce in the county, particularly the western end at junction S.C. Highway 64 and U.S. Highway 278, en route to SRS. U.S. Highway 278 is projected to be widened and could support commerce, and perhaps industry, in the Williston and Blackville areas. A substantial industrial customer is locating in the City of Barnwell, which will increase growth in the area. To locate the industry will require expansion of the wastewater treatment facility.

03050207-030

General Description

Watershed 03050207-030 is located in Barnwell, Bamberg and Allendale Counties and consists primarily of the **Salkehatchie River** and its tributaries from Turkey Creek to just below Wells Branch. The watershed occupies 110,799 acres of the Sandhills region of South Carolina. The predominant soil types consist of an association of the Fuquay-Dothan-Troup-Blanton series. The erodibility of the soil (K-factor) averages 0.15; the slope of the terrain averages 3.6%, with a range of 1-10%. Land use/land cover in the watershed includes: 0.69% urban land, 28.21% agricultural land, 30.81% scrub/shrub land, 0.92% barren land, 23.99% forested land, 14.45% forested wetland, 0.60% nonforested wetland and 0.32% water.

This segment of the Salkehatchie River includes the drainage of Toby Creek (Jordan Branch), Georges Juniper Creek, Birds Branch and Wells Branch. There are a total of 69.04 stream miles in this watershed, all classified as FW. This watershed accepts drainage from the upper Salkehatchie watershed (03050207-010) and from the Turkey Creek watershed (03050207-020).

Water Quality

Salkehatchie River - Aquatic life uses are fully supported for this stream, but are threatened by a significantly declining trend in dissolved oxygen. Recreational uses are not supported due to fecal coliform bacteria excursions, but a significantly decreasing trend in bacterial concentrations suggests improving conditions. Turbidity exhibited a significantly increasing trend, possibly due to adjacent land use practices.

Point Source Contributions

The Salkehatchie River is currently listed on the §303(d) list (low priority) for waters that may require TMDL development in relation to elevated nutrient levels and possible ammonia toxicity. The Salkehatchie River is also included on the §304(1) long list of impacted waterbodies for point source concerns of nontoxic pollution. There are currently no point source dischargers to this watershed, but upstream dischargers may be contributing to the nutrient and ammonia levels seen.

Nonpoint Source Contributions

The Salkehatchie River is listed in the NPS Management Program as a high priority for implementation action due to nonpoint sources that include agricultural activities and resource extraction. No action is currently underway or in the planning stages. Numerous elevated nutrient and ammonia levels have been recorded by the Department on this stream. Computer modelling by the SCLRCC indicated a high potential for NPS problems from agricultural and surface mining

activities for this stream. The Salkehatchie River is included on the §304(l) long list for waterbodies impacted by nonpoint source nontoxic pollution.

Growth Potential

No growth is projected in this watershed; however, the widening of U.S. Highway 278 would make growth possible, in part due to existing rail lines that run through the Town of Blackville.

03050207-040

General Description

Watershed 03050207-040 is located in Bamberg, Allendale, Hampton and Colleton Counties and consists of the **Salkehatchie River** and its tributaries from just below Wells Branch to the Little Salkehatchie River. The watershed occupies 105,330 acres of the Lower Coastal Plain region of South Carolina. The predominant soil types consist of an association of the Rains-Torhunta-Lynchburg-Goldsboro series. The erodibility of the soil (K-factor) averages 0.15; the slope of the terrain averages 1.5%, with a range of 0-2%. Land use/land cover in the watershed includes: 0.24% urban land, 21.84% agricultural land, 10.96% scrub/shrub land, 0.16% barren land, 27.47% forested land, 36.06% forested wetland, 3.20% nonforested wetland and 0.07% water.

There are a total of 75.99 stream miles in this watershed, all classified as FW. The streams draining into this reach of the Salkehatchie River include Kirkland Creek, Three Mile Branch, Tenanis Branch and Savannah Creek. This segment of the river also accepts drainage from the upper Salkehatchie River (03050207-030) and the Jackson Branch watershed (03050207-050). River's Bridge State Park on the Salkehatchie River is another natural resource in the watershed.

Water Quality

Salkehatchie River - Aquatic life uses are only partially supported for this stream due to dissolved oxygen excursions. Recreational uses are only partially supported due to fecal coliform bacteria excursions, compounded by a significantly increasing trend in bacterial concentrations. Turbidity exhibited a significantly increasing trend, possibly due to adjacent land use practices.

Point Source Contributions

The Salkehatchie River is currently listed on the §303(d) list for waters that may require TMDL development in relation to elevated nutrient levels and possible ammonia toxicity. The Salkehatchie River is also included on the §304(l) long list of impacted waterbodies for point source concerns of nontoxic pollution.

RECEIVING STREAM
FACILITY NAME
PERMITTED FLOW @ PIPE (MGD)

SAVANNAH CREEK
TOWN OF EHRHARDT
PIPE #: 001 FLOW: 0.05

NPDES #
TYPE
COMMENT

SC0042099
MINOR MUNICIPAL

Nonpoint Source Contributions

The Salkehatchie River is listed in the NPS Management Program as a high priority for implementation action due to nonpoint sources that include agricultural activities and resource extraction. No action is currently underway or in the planning stages. Numerous elevated nutrient and ammonia levels have been recorded by the Department on this stream. Computer modelling by the SCLRCC indicated a high potential for NPS problems from agricultural and surface mining activities for this stream. The Salkehatchie River is included on the §304(l) long list for waterbodies impacted by nonpoint source nontoxic pollution.

Growth Potential

No growth is projected for this watershed.

03050207-050

General Description

Watershed 03050207-050 is located in Allendale and Hampton Counties and consists primarily of **Jackson Branch** and its tributaries. The watershed occupies 96,924 acres of the Lower Coastal Plain region of South Carolina. The predominant soil types consist of an association of the Rains-Norfolk-Coxville series. The erodibility of the soil (K-factor) averages 0.16; the slope of the terrain averages 1.4%, with a range of 0-6%. Land use/land cover in the watershed includes: 1.78% urban land, 40.34% agricultural land, 13.29% scrub/shrub land, 19.84% forested land, 21.30% forested wetland, 3.13% nonforested wetland and 0.31% water.

The **Jackson Branch** watershed contains a total of 50.4 miles, all classified as FW, and drains into the Salkehatchie River. Jackson Branch incorporates the drainages of Log Branch (near the Town of Allendale), Miller Creek, Caw Swamp (near the Town of Fairfax), and Cope Creek, all of which flow through Whippy Swamp en route to the Salkehatchie River.

Water Quality

No water quality data is available for this watershed. Water quality sampling is planned prior to the assessment update.

Point Source Contributions

There are currently no point source dischargers in this watershed. The Towns of Allendale and Fairfax are working on inflow and infiltration correction along with an expansion of the existing treatment facility. There has been discussion of a new discharge location near the Town of Allendale as a Hydrographic Controlled Release (HCR) system; however, no final decision has been made.

Growth Potential

Slight growth is possible due to the rail lines and sewer system already in place in the Town of Allendale. Note, however, that the Allendale Sewer system discharges to the Savannah River (03060106-140).

03050207-060

General Description

Watershed 03050207-060 is located in Barnwell and Bamberg Counties and consists of the upper **Little Salkehatchie River** and its tributaries. The watershed occupies 72,716 acres of the Lower Coastal Plain region of South Carolina. The predominant soil types consist of an association of the Fuquay-Dothan-Troup-Rains series. The erodibility of the soil (K-factor) averages 0.16; the slope of the terrain averages 2.6%, with a range of 0-10%. Land use/land cover in the watershed includes: 1.23% urban land, 30.26% agricultural land, 26.32% scrub/shrub land, 0.36% barren land, 26.00% forested land, 15.29% forested wetland, 0.39% nonforested wetland and 0.15% water.

The upper Little Salkehatchie River watershed contains a total of 46.42 stream miles, all classified as FW. The Little Salkehatchie River originates near the Towns of Blackville and Denmark, with Little Salkehatchie Creek being joined by Ghants Branch and later by Halfmoon Branch. Farther downstream, the river is joined by Gall Branch, and much farther downstream, by Colston Branch (Indian Camp Branch) and Long Branch.

Water Quality

No water quality data is available for this watershed. Water quality sampling is planned prior to the assessment update.

Point Source Contributions

RECEIVING STREAM FACILITY NAME PERMITTED FLOW @ PIPE (MGD)	NPDES # TYPE COMMENT
LITTLE SALKEHATCHIE RIVER CITY OF DENMARK PIPE #: 001 FLOW: 0.388	SC0040215 MINOR MUNICIPAL
LITTLE SALKEHATCHIE RIVER CITY OF DENMARK PIPE #: 002 FLOW: 1.0	SC0040215 MINOR MUNICIPAL LAND APPLICATION
NO DISCHARGE SYSTEM FACILITY NAME	ND# TYPE
LAND DISPOSAL MEADOW BROOK HEALTH CARE CTR	ND0067024 MINOR COMMUNITY

Nonpoint Source Contributions

The Little Salkehatchie River is listed as an impacted waterbody from nonpoint sources that include agricultural and silvicultural activities. The river was evaluated from data collected by other agencies and citizen groups and found to have elevated levels of suspended solids. Computer modelling by the SCLRCC indicated a high potential for NPS problems from agricultural and surface mining activities for this stream.

Growth Potential

The Town of Denmark resides on the boundary between this watershed, the Lemon Creek watershed (03050207-070) and the Saluda-Edisto Watershed. The rail and sewer systems already in place may encourage minor growth.

03050207-070

General Description

Watershed 03050207-070 is located in Bamberg County and consists of **Lemon Creek** and its tributaries. The watershed occupies 38,168 acres of the Lower Coastal Plain region of South Carolina. The predominant soil types consist of an association of the Rains-Fuquay-Coxville-Troup-Dothan series. The erodibility of the soil (K-factor) averages 0.15; the slope of the terrain averages 2.6%, with a range of 0-10%. Land use/land cover in the watershed includes: 2.56% urban land, 20.00% agricultural land, 20.92% scrub/shrub land, 0.41% barren land, 37.66% forested land, 18.41% forested wetland and 0.05% water.

The Lemon Creek watershed drains into the Little Salkehatchie River, incorporating the drainages of Grapevine Creek and Halfmoon Creek. There are a total of 24.72 stream miles in this watershed. Lemon Creek is classified as FW* (site specific classification requires DO not less than 4.0 mg/l and pH between 5.0-8.5) and the remaining streams in the watershed are classified as FW. The watershed lies between the Towns of Denmark and Bamberg.

Water Quality

No water quality data is available for this watershed. Water quality sampling is planned prior to the assessment update.

Point Source Contributions

The Town of Bamberg is under a Consent Order due to impact from an industrial contributor on the treatment facility. An expansion of the treatment facility (which has a spray irrigation system) is planned.

RECEIVING STREAM FACILITY NAME PERMITTED FLOW @ PIPE (MGD)	NPDES # TYPE COMMENT
LEMON CREEK BAMBERG BOARD OF PUBLIC WORKS PIPE #: 001 FLOW: 0.3	SC0042595 MINOR MUNICIPAL
LEMON CREEK GRIFFIN OIL CO/BAMBERG TEXACO PIPE #: 001 FLOW: 0.0144	SC0042137 MINOR INDUSTRIAL
NO DISCHARGE SYSTEM FACILITY NAME	ND# TYPE
LAND DISPOSAL TOWN OF BAMBERG	ND0063398 MINOR MUNICIPAL

Growth Potential

The Towns of Bamberg and Denmark are located on the line dividing the Savannah-Salkehatchie Watershed and the Saluda-Edisto Watershed. The only commerce in the area is along U.S. Highway 78, which is projected to be widened and could serve to increase commerce. Rail lines run through Bamberg to Denmark, and another through Denmark to Columbia in one direction and toward the Savannah River in the other; the rail system already in place may encourage industrial growth. Growth is currently limited by the treatment system capacity.

03050207-080

General Description

Watershed 03050207-080 is located in Bamberg and Colleton Counties and consists of the **Little Salkehatchie River** and its tributaries from just below Lemon Creek to Buckhead Creek. The watershed occupies 42,249 acres of the Lower Coastal Plain region of South Carolina. The predominant soil types consist of an association of the Lynchburg-Torhunta-Rains-Goldsboro-Coxville series. The erodibility of the soil (K-factor) averages 0.16; the slope of the terrain averages 1.5%, with a range of 0-10%. Land use/land cover in the watershed includes: 0.20% urban land, 20.62% agricultural land, 18.90% scrub/shrub land, 0.65% barren land, 31.44% forested land, 26.03% forested wetland, 1.78% nonforested wetland and 0.37% water.

This watershed incorporates a total of 20.3 stream miles, all classified as FW. Drainages from the upper Little Salkehatchie River watershed (03050207-060), the Lemon Creek watershed (03050207-070) and the Buckhead Creek watershed (03050207-090) flow into this segment of the Little Salkehatchie River.

Water Quality

No water quality data is available for this watershed. Water quality sampling is planned prior to the assessment update.

Point Source Contributions

There are currently no point source dischargers to this watershed.

Growth Potential

No growth is projected for this watershed.

03050207-090

General Description

Watershed 03050207-090 is located in Bamberg and Colleton Counties and consists of **Buckhead Creek** and its tributaries. The watershed occupies 50,612 acres of the Lower Coastal Plain region of South Carolina. The predominant soil types consist of an association of the Rains-Lynchburg-Goldsboro series. The erodibility of the soil (K-factor) averages 0.16; the slope of the terrain averages 1.2%, with a range of 0-3%. Land use/land cover in the watershed includes: 1.66% urban land, 15.43% agricultural land, 33.66% scrub/shrub land, 3.50% barren land, 36.35% forested land, 8.96% forested wetland, 0.35% nonforested wetland and 0.08% water.

The Buckhead Creek watershed contains a total of 26.7 stream miles, all classified as FW, and drains into the Little Salkehatchie River. Buckhead incorporates drainages from Bear Creek, Hog Branch and Deep Bottom Creek.

Water Quality

No water quality data is available for this watershed. Water quality sampling is planned prior to the assessment update.

Point Source Contributions

RECEIVING STREAM
FACILITY NAME
PERMITTED FLOW @ PIPE (MGD)

NPDES #
TYPE
COMMENT

BUCKHEAD CREEK
RUFFIN HIGH SCH/COLLETON BD ED
PIPE #: 001 FLOW: 0.015

SC0033766
MINOR COMMUNITY

Growth Potential

No growth is projected for this watershed.

03050207-100

General Description

Watershed 03050207-100 is located in Bamberg and Colleton Counties and consists primarily of the **Willow Swamp** and its tributaries. The watershed occupies 34,049 acres of the Lower Coastal Plain region of South Carolina. The predominant soil types consist of an association of the Rains-Lynchburg-Goldsboro-Torhunta series. The erodibility of the soil (K-factor) averages 0.16; the slope of the terrain averages 1.3%, with a range of 0-2%. Land use/land cover in the watershed includes: 0.19% urban land, 30.89% agricultural land, 13.52% scrub/shrub land, 0.06% barren land, 26.17% forested land, 27.41% forested wetland, 1.71% nonforested wetland and 0.05% water.

The Willow Swamp watershed incorporates the drainages from McCurren Branch, Fender Creek and Dry Branch before flowing into the Little Salkehatchie River. There are a total of 16.14 stream miles in this watershed, all classified as FW.

Water Quality

No water quality data is available for this watershed. Water quality sampling is planned prior to the assessment update.

Point Source Contributions

There are currently no point source dischargers in this watershed.

Growth Potential

No growth is projected for this watershed.

03050207-110

General Description

Watershed 03050207-110 is located in Colleton County and consists of the lower **Little Salkehatchie River** and its tributaries from Willow Swamp to its confluence with the Salkehatchie River. The watershed occupies 46,417 acres of the Lower Coastal Plain region of South Carolina. The predominant soil types consist of an association of the Rains-Lynchburg-Goldsboro-Torhunta series. The erodibility of the soil (K-factor) averages 0.15; the slope of the terrain averages 1.3%, with a range of 0-2%. Land use/land cover in the watershed includes: 1.94% urban land, 13.47% agricultural land, 25.29% scrub/shrub land, 3.49% barren land, 39.89% forested land, 15.29% forested wetland, 0.45% nonforested wetland and 0.17% water.

This Little Salkehatchie River watershed contains a total of 29.3 stream miles, all classified as FW, and drains into the Salkehatchie River. Before joining the Salkehatchie River, this river segment accepts the drainages of Indian Creek and Deep Creek, together with the drainages of the upstream watersheds (03050207-060, 070, 080, 090 and 100).

Water Quality

No water quality data is available for this watershed. Water quality sampling is planned prior to the assessment update.

Point Source Contributions

RECEIVING STREAM
FACILITY NAME
PERMITTED FLOW @ PIPE (MGD)

NPDES #
TYPE
COMMENT

LITTLE SALKEHATCHIE RIVER
RAHN CATFISH PONDS
PIPE #: 001 FLOW: 1.224

SC0043346
MINOR INDUSTRIAL

Nonpoint Source Contributions

Silvicultural practices (clear-cut harvesting of hardwood forests) in the watershed have increased turbidity levels in the river and surrounding wetlands.

Growth Potential

No growth is projected for this watershed.

03050208-010

General Description

Watershed 03050208-010 is located in Colleton, Hampton and Beaufort Counties and consists primarily of the **Combahee River** and its tributaries. The watershed occupies 223,344 acres of the Lower Coastal Plain (upper third) and Coastal Zone (lower two-thirds) regions of South Carolina. The predominant soil types consist of an association of the Bohicket-Bladen-Coosaw-Capers-Wahee series. The erodibility of the soil (K-factor) averages 0.12; the slope of the terrain averages 1.1%, with a range of 0-6%. Land use/land cover in the watershed includes: 1.27% urban land, 5.43% agricultural land, 17.31% scrub/shrub land, 0.36% barren land, 35.49% forested land, 17.91% forested wetland, 16.06% nonforested wetland and 6.17% water.

The confluence of the Salkehatchie River and the Little Salkehatchie River form the Combahee River, which flows into St. Helena Sound and the Atlantic Ocean. There are a total of 50.43 stream miles in this watershed. Black Creek and Sandy Run Creek (FW) flow into the Combahee River in the upper area of the watershed; and much farther downstream the river accepts drainage from Calfpn Swamp. Calfpn Swamp drains into the river in the brackish zone, where the river classification changes from FW to SFH. The Combahee River Estuary accepts drainage from the Old Chehaw River (SFH) and the New Chehaw River (SFH) before flowing into the sound. The Winbee Creek drainage and the Channel Williman Creek drainage merge to form the Bull River (SFH), which runs parallel to the Combahee and flows into the sound.

Water Quality

Combahee Swamp - Aquatic life uses are not supported for this stream due to dissolved oxygen excursions. Since this is a secondary monitoring station, sampling is purposely biased towards periods with potentially low dissolved oxygen concentrations. Recreational uses are only partially supported due to fecal coliform bacteria excursions. A significantly increasing trend in total phosphorus was detected, which could contribute to algal or aquatic weed problems in downstream impoundments. Turbidity exhibited a significantly increasing trend, possibly due to adjacent land use practices.

Combahee River - The monitoring station is located in the freshwater-saltwater mixing zone. The low pH values exemplify the natural transition of the river; therefore, these are not considered standards excursions. Aquatic life uses are fully supported. One value in excess of the freshwater chromium criterion for aquatic life was measured in 1988. The base-neutral and acid extractable organic compound Bis (2-ethylhexyl) phthalate, a liquid used in vacuum pumps, was detected once in sediment in 1991. Recreational uses are fully supported under Class SA FC standards. All shellfish

harvesting areas are open, therefore shellfish consumption uses are fully supported. A significantly declining trend in bacterial concentrations suggests improving conditions.

Point Source Contributions

RECEIVING STREAM FACILITY NAME PERMITTED FLOW @ PIPE (MGD)	NPDES # TYPE COMMENT
BLACK CREEK TR SC HWY DEPT/REST AREA I-95 N&S PIPE #: 001 FLOW: 0.040	SC0034215 MINOR COMMUNITY
COMBAHEE RIVER TOWN OF YEMASSEE PIPE #: 001 FLOW: 0.240	SC0025950 MINOR MUNICIPAL

Shellfish Harvesting Status

The St. Helena Sound shellfish harvesting area incorporates 53,578 acres and includes parts of watersheds 03050208-040 and 03050208-100 together with the Combahee River in this watershed. All harvesting areas were classified as shellfish harvesting waters (SFH) and approved for harvesting.

Growth Potential

The Town of Yemassee has a proposed expansion to their wastewater treatment plant. There are plans for a multi-county industrial park outside of Yemassee. If the park is built, there would be increased growth in the area and a further need to expand the Yemassee Treatment Facility.

03050208-020

General Description

Watershed 03050208-020 is located in Colleton County and consists primarily of the **Ashepoo River** and its tributaries, above its confluence with Horseshoe Creek. The watershed occupies 102,314 acres of the Lower Coastal Plain region of South Carolina. The predominant soil types consist of an association of the Rains-Lynchburg-Goldsboro-Echaw-Blanton series. The erodibility of the soil (K-factor) averages 0.15; the slope of the terrain averages 1.3%, with a range of 0-6%. Land use/land cover in the watershed includes: 7.80% urban land, 10.22% agricultural land, 20.01% scrub/shrub land, 0.54% barren land, 47.27% forested land, 12.78% forested wetland, 0.55% nonforested wetland and 0.83% water.

The upper Ashepoo River watershed contains a total of 27.0 stream miles, all classified as FW. Jones Swamp (Wolf Creek) and Ireland Creek (Allen Creek) merge near the Town of Walterboro to form the headwaters of the Ashepoo River, which flows through the Great Swamp.

Water Quality

Ireland Creek - Ireland creek exhibited a high frequency of pH values below Class FW standards (less than 6 SU), which is typical of natural conditions in swamp or black water drainages such as this. Since this appears to represent natural conditions, these are not considered standards excursions. Aquatic life uses are not supported due to dissolved oxygen excursions; however, low dissolved oxygen levels is typical of swamp and black water drainages and may represent natural conditions. Recreational uses are not supported due to fecal coliform bacteria excursions under Class FW standards. The creek was Class B until April, 1992 and bacterial conditions are expected to improve as new NPDES permit limits are instituted in the watershed. Turbidity exhibited a significantly increasing trend, possibly due to adjacent land use practices.

Ashepoo River - The sampling station is located at the base of the watershed, at the break point between Class FW and Class SFH waters, and the river exhibited a high frequency of pH values below both Class FW standards, which is typical of natural conditions in swamp or black water drainages such as this. Since this appears to represent natural conditions, these are not considered standards excursions. Aquatic life uses are fully supported. Recreational uses are fully supported. There are no shellfish beds in the vicinity of this station. The entire Ashepoo River is on the 304(l) long list of impacted waterbodies due to point and nonpoint source concerns for nontoxics.

Point Source Contributions

Ireland Creek is currently included on the §303(d) list (low priority) of waters that may require TMDL development in relation to DO and pH levels. The Ashepoo River is included on the §304(l) long list of impacted waterbodies for point source concerns of nontoxic pollution.

RECEIVING STREAM FACILITY NAME PERMITTED FLOW @ PIPE (MGD)	NPDES # TYPE COMMENT
IRELAND CREEK DAYCO PRODUCTS INC PIPE #: 001 FLOW: 0.450	SC0027545 MINOR INDUSTRIAL
IRELAND CREEK CCX FIBERGLASS PRODUCTS INC PIPE #: 001 FLOW: 0.037	SC0002135 MAJOR INDUSTRIAL
IRELAND CREEK CCX FIBERGLASS PRODUCTS INC PIPE #: 002 FLOW: 0.0171	SC0002135 MAJOR INDUSTRIAL
IRELAND CREEK CITY OF WALTERBORO PIPE #: 001 FLOW: 2.64	SC0040436 MAJOR MUNICIPAL
ASHEPOO RIVER TR IVENIA BROWN ELEM/COLLETON CO PIPE #: 001 FLOW: 0.004	SC0038989 MINOR COMMUNITY
NO DISCHARGE SYSTEM FACILITY NAME	ND# TYPE
LAND DISPOSAL BENNETT MHP	ND0067423 MINOR COMMUNITY
LAND DISPOSAL COLLETON AIRPORT COMMISSION	ND0003654 MINOR MUNICIPAL
LAND DISPOSAL KOA/LEVESQUE CAMPGROUND	ND0063134 MINOR COMMUNITY

Nonpoint Source Contributions

Ireland Creek is listed as an impacted waterbody from nonpoint sources related to agricultural activities. Numerous pH excursions and elevated nutrient levels have been recorded by the Department on this stream, along with scattered fecal coliform and DO excursions. Ireland Creek has incurred standards violations for pH and DO. Ireland Creek is also included on the §304(l) long list for waterbodies impacted by nonpoint source nontoxic pollution.

The Ashepoo River is also included on the list of waterbodies impacted by nonpoint sources, and is included on the §304(l) long list for waterbodies impacted by nonpoint source non-toxic

pollution. The river was evaluated from data collected by other agencies and citizen groups and found to have elevated levels of suspended solids resulting from agricultural activities and urban surface runoff.

Another source of turbidity to the Ashepoo River system is the silvicultural practices ongoing in the Great Swamp. The winch-drawn sled method was used to remove timber from the harvesting site. The sled trails created channels through the swamp, and when these channels crossed a streambed turbidity was introduced and flow was diverted. The USEPA has ordered the timber company to plug up the channels where streams were crossed and restore natural flow. The winch-drawn sled method is not currently addressed in the "Best Management Practices in Forested Wetlands", but specific guidelines are being devised.

Growth Potential

No growth is projected for this watershed; however, the rail lines already in place through the Town of Walterboro make industrial growth a possibility, as well as proximity to Interstate 95.

03050208-030

General Description

Watershed 03050208-030 is located in Colleton County and consists primarily of **Horseshoe Creek** and its tributaries. The watershed occupies 96,469 acres of the Lower Coastal Plain region of South Carolina. The predominant soil types consist of an association of the Wahee-Bladen-Ogeechee-Argent-Santee series. The erodibility of the soil (K-factor) averages 0.16; the slope of the terrain averages 1.1%, with a range of 0-2%. Land use/land cover in the watershed includes: 0.70% urban land, 8.73% agricultural land, 21.58% scrub/shrub land, 0.31% barren land, 53.73% forested land, 13.90% forested wetland, 0.22% nonforested wetland and 0.85% water.

The Horseshoe Creek watershed contains a total of 25.87 stream miles, all classified as FW, and flows into the upper Ashepoo River. This watershed consists of smaller Chessey Creek and Fuller Swamp Creek combining to form the Horseshoe Creek headwaters, and another, larger Chessey Creek flowing into Horseshoe Creek farther downstream, prior to the Ashepoo River confluence.

Water Quality

No water quality data is available for this watershed. Water quality sampling is planned prior to the assessment update.

Point Source Contributions

There are currently no point source dischargers in this watershed.

Growth Potential

The Town of Cottageville is located in this watershed and is projected to continue experiencing residential and commercial growth, spilling over from the City of Charleston. However, the current and proposed growth lies in areas with inadequate sewer service. Less than 25% of the total land area is suitable for septic system installation; and another 25-50% is classified as marginally suitable. These marginally suitable areas pose the greatest threat to ground water quality; the shallow septic system design required for the marginal areas is most likely to be inadequate and result in the pollution of the ground water. Also, growth in the area tends to be spread out over a large area not served by a sewer system; not only is the potential for impaired ground water widespread, but also there is less chance that a sewer system will be built to replace the failing septic systems.

03050208-040

General Description

Watershed 03050208-040 is located in Colleton County and consists primarily of the lower **Ashepool River** and its tributaries between Horseshoe Creek and St. Helena Sound. The watershed occupies 57,275 acres of the Coastal Zone region of South Carolina. The predominant soil types consist of an association of the Bohicket-Pungo-Bladen-Wahee series. The erodibility of the soil (K-factor) averages 0.10; the slope of the terrain averages 1.0%, with a range of 0-2%. Land use/land cover in the watershed includes: 0.09% urban land, 1.77% agricultural land, 10.77% scrub/shrub land, 34.16% forested land, 22.18% forested wetland, 20.37% nonforested wetland and 10.66% water.

The lower Ashepool River watershed contains a total of 36.27 stream miles, classified as SFH, which drains into St. Helena Sound and the Atlantic Ocean. A cut connects the Ashepool River to the South Edisto River Watershed near Fenwick Island prior to entering the sound. This watershed accepts the drainage from the upper Ashepool River watershed (03050208-020) and the Horseshoe Creek watershed (03050208-030).

Water Quality

Ashepool River - The portion of the river within this watershed exhibited a high frequency of pH values below Class SFH standards (less than 6.5 SU), which is typical of natural conditions in swamp or black water drainages such as this. Since this appears to represent natural conditions, these are not considered standards excursions. Aquatic life uses are fully supported. Recreational uses are fully supported under Class SA fecal coliform bacteria standards. All shellfish harvesting areas in this watershed are open; therefore, shellfish consumption uses are fully supported.

Point Source Contributions

The Ashepool River is included on the §304(l) long list for waterbodies impacted by point source nontoxic pollution.

RECEIVING STREAM
FACILITY NAME
PERMITTED FLOW @ PIPE (MGD)

ASHEPOOL RIVER
BOLEN POINT SD/CARGILSELL & CO
PIPE #: 001 FLOW: 0.010

NPDES #
TYPE
COMMENT

SC0037788
MINOR COMMUNITY

Nonpoint Source Contributions

The Ashepoo River is included on the §304(l) long list for waterbodies impacted by nonpoint source nontoxic pollution.

Groundwater Contamination

The groundwater in the vicinity of the surface impoundments owned by Balchem Corporation is contaminated with metals and volatile organics.

Shellfish Harvesting Status

The St. Helena Sound shellfish harvesting area incorporates 53,578 acres and includes the Ashepoo River from this watershed. The waters of the Ashepoo River are restricted from its confluence with St. Helena Sound upstream to Bennetts Point due to elevated fecal coliform levels.

Growth Potential

No growth is projected for this watershed.

03050208-050

General Description

Watershed 03050208-050 is located in Allendale and Hampton Counties and consists primarily of the upper **Coosawhatchie River** and its tributaries down to Black Creek. The watershed occupies 88,530 acres of the Lower Coastal Plain region of South Carolina. The predominant soil types consist of an association of the Rains-Bonneau-Ogeechee-Norfolk series. The erodibility of the soil (K-factor) averages 0.14; the slope of the terrain averages 1.4%, with a range of 0-6%. Land use/land cover in the watershed includes: 3.11% urban land, 25.31% agricultural land, 14.56% scrub/shrub land, 0.04% barren land, 28.40% forested land, 26.07% forested wetland, 1.67% nonforested wetland and 0.83% water.

The Coosawhatchie River headwaters originate near the Towns of Allendale and Fairfax and incorporates drainage from Duck Creek, Beach Branch, Bloodhill Creek and Cedar Branch. The upper Coosawhatchie River watershed contains a total of 33.50 stream miles, all classified as FW.

Water Quality

Coosawhatchie River - Aquatic life and recreational uses are fully supported for this stream.

Point Source Contributions

The Town of Allendale is under a Consent Order and flow moratorium for excessive flows from both the Towns of Allendale and Fairfax. There are overflows from the emergency holding lagoon into the old discharge location near the Allendale wastewater facility (Coosawhatchie River). The Towns of Allendale and Fairfax are working on inflow and infiltration correction along with an expansion of the existing treatment facility; however, no final decision has been made.

The Town of Brunson has completed a treatment facility upgrade funded by an EPA construction grant. The treatment was converted to a Hydrographic Controlled Release (HCR) system, which should improve water quality conditions.

**RECEIVING STREAM
FACILITY NAME
PERMITTED FLOW @ PIPE (MGD)**

COOSAWHATCHIE RIVER
TOWN OF BRUNSON
PIPE #: 001 FLOW: 0.11

**NPDES #
TYPE
COMMENT**

SC0042382
MINOR MUNICIPAL

Nonpoint Source Contributions

The Coosawhatchie River is listed in the NPS Management Program as a high priority for implementation action. No action is currently underway or in the planning stages.

Ground Water Contamination

The ground water in the vicinity of the landfill owned by Helena Chemical Company is contaminated with pesticides, herbicides and metals as a result of industrial landfill seepage and unpermitted disposal. This facility is a USEPA NPL site; remedial investigation is nearing completion. The probable recipient of the contamination would be the wetland that discharges into Duck Creek.

Growth Potential

Half of Allendale County's population live in the Towns of Allendale and Fairfax, which are located in this watershed. U.S. Highway 278 runs between the towns and is projected to support increased commercial growth. There is no indication of industrial growth; but Allendale and Fairfax are the only towns in the county with sewer systems and a rail line to support industry. Note, however, that the Allendale Sewer system discharges to the Savannah River (03060106-140). Growth from the Town of Gifford (which connects to Fairfax and then Allendale) along with potential growth in Allendale County is highly possible.

03050208-060

General Description

Watershed 03050208-060 is located in Allendale and Hampton Counties and consists primarily of **Black Creek** and its tributaries. The watershed occupies 51,137 acres of the Lower Coastal Plain region of South Carolina. The predominant soil types consist of an association of the Bonneau-Rains-Norfolk-Lynchburg series. The erodibility of the soil (K-factor) averages 0.15; the slope of the terrain averages 1.4%, with a range of 0-6%. Land use/land cover in the watershed includes: 2.72% urban land, 36.36% agricultural land, 9.64% scrub/shrub land, 27.10% forested land, 19.81% forested wetland, 3.82% nonforested wetland and 0.55% water.

The Black Creek watershed originates near the Town of Estill and flows into the Coosawhatchie River, incorporating Filly Branch, Briar Creek and several unnamed tributaries. Lake George Warren is located on Black Creek at the confluence with Briar Creek. There are a total of 21.04 stream miles in this watershed, all classified as FW.

Water Quality

Lake George Warren - The sampling station exhibited a high frequency of pH values below Class FW standards (less than 6 SU), which is typical of natural conditions in swamp or black water drainages such as this. Since this appears to represent natural conditions, these are not considered standards excursions. Aquatic life uses are not supported due to dissolved oxygen excursions. Recreational uses are fully supported for this stream. Turbidity exhibited a significantly increasing trend, possibly due to adjacent agricultural practices.

Lake Water Quality Assessment

Black Creek and Briar Creek drain into **Lake George Warren**, which has a watershed covering 183.3 km². The surface area of the lake is 242.8 hectares. The maximum and mean depths are 2.1m and 1.8m, respectively. There are no impaired recreational usages on the lake. The lake drains into Black Creek.

A single Algal Growth Potential Test, conducted in the summer of 1989, indicated that the limiting nutrient in the lake was nitrogen. Eutrophication studies classified the lake as a Category I due to high nutrient and productivity levels.

Point Source Contributions

Lake Warren is currently included on the §303(d) list (low priority) for impaired water quality due to the elevated nutrient content of the lake; establishing a TMDL may be appropriate. The Town

of Estill's discharge to Black Creek has been eliminated and replaced with a spray irrigation system as part of an upgrade to serve the Federal Correctional Institution that has been constructed.

RECEIVING STREAM FACILITY NAME PERMITTED FLOW @ PIPE (MGD)	NPDES # TYPE COMMENT
BLACK CREEK SOUTHERN SOYA CORP PIPE #: 001 FLOW: STORM	SC0039098 MINOR INDUSTRIAL
BLACK CREEK SOUTHERN SOYA CORP PIPE #: 002 FLOW: STORM	SC0039098 MINOR INDUSTRIAL
BLACK CREEK SOUTHERN SOYA CORP PIPE #: 003 FLOW: STORM	SC0039098 MINOR INDUSTRIAL
BLACK CREEK LOW COUNTRY AQUACULTURE PROC PIPE #: 001 FLOW: 0.15	SC0042951 MINOR INDUSTRIAL
BLACK CREEK PROPST AQUA FARMS INC. PIPE #: 001 FLOW: 0.864	SC0044041 MINOR INDUSTRIAL
NO DISCHARGE SYSTEM FACILITY NAME	ND# TYPE
LAND DISPOSAL TOWN OF ESTILL	ND0069701 MINOR MUNICIPAL

Nonpoint Source Contributions

Lake George Warren and Black Creek are both included on the list of nonpoint source impacted waterbodies. The waters were evaluated from data collected by outside agencies and found to have elevated suspended solid levels resulting from agricultural activities.

Growth Potential

Slight growth is projected for this watershed associated with the Federal Correctional Institution.

03050208-070

General Description

Watershed 03050208-070 is located in Hampton and Jasper Counties and consists of the middle reach of the **Coosawhatchie River** and its tributaries between Black Creek and Cypress Branch. The watershed occupies 65,639 acres of the Lower Coastal Plain region of South Carolina. The predominant soil types consist of an association of the Rains-Lynchburg-Albany-Goldsboro-Pelham series. The erodibility of the soil (K-factor) averages 0.15; the slope of the terrain averages 1.2%, with a range of 0-2%. Land use/land cover in the watershed includes: 6.05% urban land, 13.70% agricultural land, 10.34% scrub/shrub land, 38.78% forested land, 28.02% forested wetland, 3.07% nonforested wetland and 0.05% water.

There are a total of 29.19 stream miles in this watershed, all classified as FW. The middle reach of the Coosawhatchie River flows past the Towns of Hampton and Varnville, and incorporates the drainage from Sanders Branch, Camp Branch, Cowpen Branch and Broadwater Creek. This watershed also accepts the drainage from the upper Coosawhatchie River watershed (03050208-050) and the Black Creek watershed (03050208-060).

Water Quality

Sanders Branch - There are three secondary monitoring stations on this creek. Aquatic life uses are fully supported at the two upstream stations, but only partially supported at the downstream station due to dissolved oxygen excursions. Recreational uses are not supported at the upstream and downstream stations, and only partially supported at the midstream station, due to fecal coliform bacteria excursions under Class FW standards. The downstream station showed a significantly declining trend in bacterial concentrations, suggesting improving conditions. This creek was Class B* until April, 1992 and bacterial conditions are expected to improve as new NPDES permit limits are instituted in the watershed. The Town of Hampton exhibited fecal problems in 1992, and steps are currently being taken to resolve these problems.

Coosawhatchie River - This station exhibited a high frequency of pH values below Class FW standards (less than 6 SU), which is typical of natural conditions in swamp or black water drainages such as this. Since this appears to represent natural conditions, these are not considered standards excursions. Aquatic life uses are not supported due to dissolved oxygen excursions, but a significantly increasing trend in dissolved oxygen suggests improving conditions. Aquatic life uses might also be threatened by a wide variety of base-neutral and acid extractable organic compounds, and the pesticide aldrin, which have been detected at this station over the past five years.

Recreational uses are fully supported. Turbidity exhibited a significantly increasing trend, possibly due to adjacent agricultural practices.

Point Source Contributions

The Town of Hampton is under a Consent Order to upgrade the wastewater treatment facility. The quality of the effluent should be significantly improved over current conditions.

RECEIVING STREAM FACILITY NAME PERMITTED FLOW @ PIPE (MGD)	NPDES # TYPE COMMENT
COOSAWHATCHIE RIVER GA PACIFIC/VARNVILLE PIPE #: 001 FLOW: MR	SC0038041 MINOR INDUSTRIAL
SANDERS BRANCH TOWN OF HAMPTON PIPE #: 001 FLOW: 2.0	SC0021318 MAJOR MUNINCAL
SANDERS BRANCH CHAMBERS MEDICAL TECH OF SC IN PIPE #: 001 FLOW: MR	SC0042242 MINOR INDUSTRIAL STORMWATER
SANDERS BRANCH CHAMBERS MEDICAL TECH OF SC IN PIPE #: 002 FLOW: STORM	SC0042242 MINOR INDUSTRIAL
SANDERS BRANCH WESTINGHOUSE ELEC/HAMPTON PLT PIPE #: 001 FLOW: 1.9	SC0001830 MAJOR INDUSTRIAL

Nonpoint Source Contributions

The Coosawhatchie River is listed in the NPS Management Program as a high priority for implementation action due to nonpoint sources related to agricultural activities. No action is currently underway or in the planning stages. Numerous elevated nutrient and toxic material levels have been recorded by the Department on this segment of the stream, along with scattered elevated ammonia levels and pH, DO and fecal coliform excursions. Computer modelling by the SCLRCC indicated a high potential for NPS problems from agricultural activities for this stream. Silvicultural practices (clear-cut harvesting of hardwood forests) in the watershed have increased turbidity levels in the river and surrounding wetlands. The Coosawhatchie River is included on the §304(l) long list for waterbodies impacted by nonpoint source nontoxic pollution.

Ground Water Contamination

The ground water in the vicinity of the surface impoundment owned by Westinghouse-Micarta Division is contaminated with phenols. The facility is in the remediation phase. A contaminated groundwater discharge to the ditch flowing into Sanders Branch, which flows into the Coosawhatchie River, may be occurring.

Growth Potential

No growth is projected for this watershed.

03050208-080

General Description

Watershed 03050208-080 is located in Hampton and Jasper Counties and consists primarily of Cypress Creek and its tributaries. The watershed occupies 72,395 acres of the Lower Coastal Plain region of South Carolina. The predominant soil types consist of an association of the Albany-Pelham-Ocilla-Chipley series. The erodibility of the soil (K-factor) averages 0.13; the slope of the terrain averages 1.3%, with a range of 0-2%. Land use/land cover in the watershed includes: 1.44% urban land, 21.05% agricultural land, 8.85% scrub/shrub land, 0.17% barren land, 44.27% forested land, 20.81% forested wetland, 3.58% nonforested wetland and 0.13% water.

The Cypress Creek watershed flows into the lower reach of the Coosawhatchie River, incorporating the drainage from John Pen Branch, Ziglag Creek, Elbo Creek and Beaverdam Creek. There are a total of 22.08 stream miles in this watershed, all classified as FW.

Water Quality

No water quality data is available for this watershed. Water quality sampling is planned prior to the assessment update.

Point Source Contributions

RECEIVING STREAM
FACILITY NAME
PERMITTED FLOW @ PIPE (MGD)

JOHN PEN BRANCH
DELOACH CATFISH FARM
PIPE #: 001 FLOW: 0.1

NPDES #
TYPE
COMMENT

SC0043222
MINOR INDUSTRIAL

Growth Potential

No growth is projected for this watershed.

03050208-090

General Description

Watershed 03050208-090 is located in Hampton, Jasper and Beaufort Counties and consists of the lower Coosawhatchie River, the Pocotaligo River and the **Broad River** and their tributaries. The watershed occupies 265,585 acres of the Coastal Zone region of South Carolina. The predominant soil types consist of an association of the Bohicket-Argent-Okeetee-Coosaw-Albany series. The erodibility of the soil (K-factor) averages 0.13; the slope of the terrain averages 1.2%, with a range of 0-2%. Land use/land cover in the watershed includes: 2.40% urban land, 5.77% agricultural land, 6.02% scrub/shrub land, 0.19% barren land, 40.06% forested land, 11.11% forested wetland, 15.48% nonforested wetland and 18.97% water.

The Broad River (SFH) is formed from the confluence of the lower Coosawhatchie River (FW-SFH) and the Pocotaligo River (SFH), and flows through the Broad River Estuary (SFH) into Port Royal Sound (SFH) and the Atlantic Ocean. This watershed accepts the drainage from the Coosawhatchie River watersheds (03050208-050,060,070, and 080) and interacts with the adjacent Beaufort River watershed (03050208-100) through tidal creeks. Prior to the confluence, the Tulifinny River (SFH), Bees Creek (SB) and Little Bees Creek (SB) flow into the lower Coosawhatchie River; and Haulover Creek (SFH) flows into the headwaters of the Pocotaligo River.

Boys Creek, together with East Branch Creek, West Branch Creek, South Haulover Creek and Whale Branch (Middle Creek) all drain into the headwaters of the Broad River, all classified as SFH. Euhaw Creek (SFH) enters the Broad River farther downstream together with Hazzards Creek (SFH). Okatie River (ORW), Callawassie Creek (ORW), Chechessee Creek (ORW) and Sawmill Creek (ORW) all flow into the Colleton River (ORW), which flows into the Chechessee River (SFH). The Chechessee River combines with the Broad River in Port Royal Sound, but they are also connected to Daws Creek between Daws and Lemon Islands. Also entering the sound are Edding Creek (SFH), Ballast Creek (SFH) and Archer Creek. Archer Creek changes water quality classifications from SA to SFH at the Parris Island Bridge. There are a total of 92.7 estuarine stream miles in this watershed.

Water Quality

Coosawhatchie River - The monitoring station is located at the break point between Class FW and Class SFH waters. The river exhibited a high frequency of pH values below both Class FW and Class SFH standards, which is typical in swamp or black water drainages such as this. Since this appears to represent natural conditions, these are not considered standards excursions. Aquatic life uses are fully supported. Recreational uses are only partially supported due to fecal coliform bacteria excursions. There are no shellfish beds in the vicinity of this station. Four copper values were

measured in excess of both the freshwater and saltwater aquatic life criteria. Turbidity exhibited a significantly increasing trend, possibly due to adjacent agricultural and resource extraction activities.

Bees Creek - This creek exhibited a high frequency of pH values below Class SB standards (less than 6.5 SU), which is typical in swamp or black water drainages such as this. Since this appears to represent natural conditions, these are not considered standards excursions. Aquatic life uses are fully supported. Recreational uses are not supported based on the current Class SB standards. In April, 1992 the bacterial criteria for Class SB waters were tightened to match Class FW criteria. Bacterial conditions are expected to improve as new NPDES permit limits are instituted in the watershed. Turbidity exhibited a significantly increasing trend, most probably originating from adjacent land use practices.

Pocotaligo River - The Pocotaligo River is not specifically classified; therefore, it takes on the classification of the waterbody it is tributary to, which is the Broad River and Class SFH. The classification may need to be re-examined since there are no shellfish beds in this vicinity. The monitoring station exhibited a high frequency of pH values below Class SFH standards (less than 6.5 SU), which is typical in swamp or black water drainages such as this. Since this appears to represent natural conditions, these are not considered standards excursions. Aquatic life uses are not supported due to dissolved oxygen excursions. Recreational uses are not supported due to fecal coliform bacteria excursions, compounded by a significantly increasing trend in bacterial numbers. Three copper values were measured in excess of the aquatic life criterion at this station, and one mercury value was measured in excess of human health criteria in 1991. The pesticide chlordane, an insecticide used for termite control, was detected in sediment once in 1991. Turbidity exhibited a significantly increasing trend, probably originating from adjacent agricultural and resource extraction activities.

Broad River - There are two monitoring stations on this river and aquatic life uses are fully supported on both, but could be threatened at the downstream station by a significantly increasing trend in BOD₅. Recreational uses are fully supported under Class SA fecal coliform bacteria standards. Shellfish consumption uses are fully supported over most of this drainage, but are not supported in limited areas because of shellfish harvesting closure due to fecal coliform bacteria excursions (see Shellfish Harvesting Status below).

Chechessee River - Aquatic life uses are not supported for this stream due to dissolved oxygen excursions, compounded by a significantly declining trend in dissolved oxygen and a significantly increasing trend in BOD₅. Recreational uses are fully supported under Class SA fecal coliform bacteria standards, but are threatened by a significantly increasing trend in fecal coliform. All

shellfish harvesting areas in this drainage are open; therefore, shellfish consumption uses are fully supported.

Colleton River - Aquatic life uses are fully supported for this stream. Recreational uses are fully supported under Class SA fecal coliform bacteria standards. All shellfish harvesting areas in this drainage are open; therefore, shellfish consumption uses are fully supported.

Port Royal Sound - Aquatic life and recreational uses are fully supported for this waterbody. All shellfish harvesting areas in this drainage are open; therefore, shellfish consumption uses are fully supported.

Point Source Contributions

RECEIVING STREAM FACILITY NAME PERMITTED FLOW @ PIPE (MGD)	NPDES # TYPE COMMENT
LITTLE BEES CREEK TR STUCKEY'S PECAN SHOPPE #083 PIPE #: 001 FLOW: 0.005	SC0034550 MINOR COMMUNITY
COOSAWHATCHIE RIVER DIXIE BOY TRUCK STOP PIPE #: 001 FLOW: 0.01	SC0035394 MINOR COMMUNITY
POCOTALIGO RIVER SUGARLOAF ISLAND SD PIPE #: 001 FLOW: 0.028	SC0037940 MINOR COMMUNITY
HAZZARD CREEK HICKORY HILL LANDFILL & RECYCL PIPE #: 001 FLOW: 0.0	SC0044768 MINOR INDUSTRIAL
NO DISCHARGE SYSTEM FACILITY NAME	ND# TYPE
LAND DISPOSAL CALLAWASSIE DEVELOPMENT	ND0062235 MINOR COMMUNITY
LAND DISPOSAL BJW&SA/ROSE HILL PLANTATION	ND0061000 MINOR MUNICIPAL
LAND DISPOSAL BJW&SA/PALM ISLAND	ND0064513 MINOR MUNICIPAL
LAND DISPOSAL TOWN OF RIDGELAND WWTP	ND0067971 MINOR MUNICIPAL
LAND DISPOSAL POINT SOUTH WWTP	ND0068781 MINOR COMMUNITY

Nonpoint Source Contributions

The Coosawhatchie River is listed as an impacted waterbody from nonpoint sources that include agricultural activities and resource extraction. Numerous elevated ammonia levels have been recorded by the Department on this stream, along with scattered elevated nutrient and toxic material levels and pH excursions. Computer modelling by the SCLRCC indicated a high potential for NPS problems from agricultural and surface mining activities for this stream. The Coosawhatchie River is included on the §304(l) long list for waterbodies impacted by nonpoint source nontoxic pollution.

The Broad River is also listed as an impacted waterbody as a result of nonpoint source pollutants. The nonpoint source pollution status was derived from data contained in the National Estuarine Inventory and from computer modelling by the SCLRCC that indicted a high potential for NPS problems from agricultural activities for this stream. The parameter of concern is the nutrient level, which increases with nonirrigated and specialty crop production. The Broad River is also included on the §304(l) long list for waterbodies impacted by nonpoint source nontoxic pollution.

The Okatie and Colleton Rivers are both listed as nonpoint source impacted waterbodies evaluated from outside agency data, due to agricultural activities (crop production). Computer modelling by the SCLRCC indicated a high potential for NPS problems from agricultural activities for the Colleton River.

The Pocotaligo River is listed as an impacted waterbody from nonpoint sources that include agricultural activities and resource extraction. Numerous elevated nutrient and ammonia levels have been recorded by the Department on this stream, along with scattered DO excursions and elevated levels of toxic materials. Computer modelling by the SCLRCC indicated a high potential for NPS problems from agricultural and surface mining activities for this stream. The Pocotaligo River is included on the §304(l) long list for water bodies impacted by nonpoint source nontoxic pollution.

Port Royal Sound and its associated tributaries are also listed as nonpoint source impacted waterbodies. The Sound was evaluated from data collected by outside agencies and found to have DO and fecal coliform excursions and elevated levels of toxic materials and suspended solids that resulted from agricultural and silvicultural activities, together with urban surface runoff.

Shellfish Harvesting Status

Segments of Archer Creek (from Port Royal to Parris Island Bridge and to 1,000 feet above the Parris Island Bridge), encompassing 683 and 102 acres, respectively, classified as SFH, have prohibited access to shellfish harvesting due to the outfall of the Laurel Bay Wastewater Treatment Plant (WWTP). The Archer Creek segment from 1,000 feet below the Parris Island Bridge to Port Royal Sound (1,927 acres) is classified as SFH and is approved for harvesting. The upper reaches of Hazzard Creek, covering 938 acres classified as SFH, has prohibited access to shellfish harvesting

from the headwaters to the Chelsea Plantation Clubhouse. Domestic animals at Chelsea Plantation may be a potential source of pollution to Hazzard Creek.

Whale Branch connects this watershed to the Beaufort River watershed (03050208-100). Middle Creek, which drains into Whale Branch, covers 510 acres classified as SFH. Shellfish harvesting is restricted due to fecal coliform bacteria from nonpoint sources. The most likely source of pollutants is the Clarendon Plantation cattle farm, which maintains over a thousand head of cattle and drains to Whale Branch and Middle Creek. The remainder of Whale Branch extends over 6,928 acres and is approved for shellfish harvesting. Contamination from Lobeco Products, Inc. (see watershed 03050208-100) could potentially affect this watershed as well. The Brays Island Hog Facility maintains several thousand hogs. The animal wastes are pumped to farmland in the Scotts Neck area, and pose a potential pollution impact. The Shalimar Stables, farther downstream on the Broad River, maintain 25 horses and pose a similar potential impact.

The Broad River and Port Royal Sound shellfish area encompasses 57,736 acres classified as SFH; the area includes the Chechessee River and Euhaw Creek. Chechessee Creek covers 1,897 acres that are classified as outstanding resource waters (ORW), but are restricted to harvesting from the headwaters to the unnamed tributary draining Spring Island Shrimp Pond. The waters of the Broad River extending a half mile north and south of the Laurel Bay WWTP are prohibited to harvesting. The waters of Archer Creek 1000 feet west of the Parris Island Bridge are also prohibited. Waters restricted to harvesting include Middle Creek from its headwaters to the confluence with Whale Branch and Ballast Creek from its headwaters to the confluence with the Broad River. Port Royal Sound receives a considerable amount of urban stormwater runoff from the northern end of Hilton Head Island, which has the potential to adversely impact the shellfish waters.

The Colleton River shellfish area includes the Okatie River and encompasses 10,323 acres classified as outstanding resource waters that are approved for shellfish harvesting. The upper reaches of the Okatie River have a great potential for impact from stormwater runoff, due to the series of canals originating near U.S. Highway 278 that drain to the river. The Callawassie WTP and the Waddell Mariculture Center are potential pollution sources to the Colleton River and the Rose Hill WTP poses a potential impact to Sawmill Creek and the Colleton River area.

The two sources having the greatest potential to impact the waters in this watershed include the stormwater runoff mentioned above, and leakage from individual sewage treatment and disposal systems (ISTD), which are numerous and frequently adjacent to the water.

Growth Potential

The area along Hwy 278 en route to Hilton Head Island has several golf and/or residential developments such as Rose Hill Plantation and Colleton River Plantation, and there are plans to develop nearby areas in a similar fashion. Calawassie Island on the Colleton River is currently being

developed and plans to build a bridge over to Spring Island have been discussed, which would increase the islands residential development potential.

The Town of Yemassee has a proposed expansion to their wastewater treatment plant. There are plans for a multi-county industrial park just outside the Town of Yemassee. At this time, water/sewer lines exist, but no construction has occurred. If the park is built, there would be increased growth in the area and a need to expand the Yemassee treatment facility.

03050208-100

General Description

Watershed 03050208-100 is located in Beaufort County and consists of the **Beaufort River** and the Coosaw and Morgan Rivers and their tributaries. The watershed occupies 170,093 acres of the Coastal Zone region of South Carolina. The predominant soil types consist of an association of the Bohicket-Capers-Lynnhaven-Lakeland series. The erodibility of the soil (K-factor) averages 0.08; the slope of the terrain averages 1.6%, with a range of 0-6%. Land use/land cover in the watershed includes: 6.14% urban land, 5.21% agricultural land, 7.24% scrub/shrub land, 0.14% barren land, 23.13% forested land, 0.09% forested wetland, 33.68% nonforested wetland and 24.37% water.

The Beaufort River watershed, which includes the Beaufort River Estuary, consists primarily of sea islands and the tidally influenced creeks that separate them; stream classifications in the watershed range from tidal saltwaters (SA) to shellfish harvesting waters (SFH). The Coosaw River (SFH) and Morgan River (SFH) flow into St. Helena Sound (SFH) and into the Atlantic Ocean. The Beaufort River (SA) connects to the Coosaw River and experiences tidal flux; the Beaufort River drains primarily into the ocean through Port Royal Sound. There are a total of 40.8 estuarine stream miles in this watershed.

Some of the more prominent streams include: Albergotti Creek (SFH) near the City of Beaufort, Chowan Creek (SFH) near Lady's Island, Morse Island Creek, Station Creek and Harbor Creek (SFH) near St. Helena Island, and Pritchard's Inlet, Trenchards Inlet, Story River and Fripp Inlet (SFH) feeding the Atlantic Ocean. Archer Creek and Ballast Creek connect the Beaufort River to the Broad River in watershed 03050208-090.

Albergotti Creek, Factory Creek (SFH) and Battery Creek all flow into the Beaufort River, as does Brickyard Creek (SFH), which also connects to the Coosaw River. The headwaters of Battery Creek are classified as SA and change to SFH before entering the river.

Parrot Creek (SFH) connects the Coosaw River to the Morgan River, and Lucy Point Creek, Jenkins Creek, Pine Island Creek, Coffin Creek and Village Creek (SFH) all empty into the Morgan River which flows into St. Helena Sound. Hunting Island State Park is encircled by Harbor Creek, Fripp Inlet, St. Helena Sound and the Atlantic Ocean.

Water Quality

Beaufort River - There are five ambient water quality monitoring stations on this river. At the farthest downstream station, aquatic life and recreational uses are fully supported. Aquatic life uses are not supported at any of the other stations due to dissolved oxygen excursions. At two of these locations, aquatic life conditions are further threatened by either a significantly declining trend in

dissolved oxygen or a significantly increasing trend in five-day biochemical oxygen demand. A third location exhibits both undesirable trends.

Recreational uses are fully supported at all five stations. Two copper values were measured at one location in excess of the aquatic life criterion and one mercury value in excess of the human health criterion. Shellfish consumption uses are not supported over a large portion of this drainage because of shellfish harvesting closure due to fecal coliform bacteria excursions, but are fully supported in limited areas (see Shellfish Harvesting Status below). The US Marines Corps/Parris Island Depot wastewater discharge experienced fecal coliform bacteria and toxicity problems relative to their permit limits in 1992.

Whale Branch - Two ambient water quality monitoring stations are located on this creek and aquatic life uses are not supported at either location due to dissolved oxygen excursions. This is compounded by significantly declining trends in dissolved oxygen at both stations and additionally, by a significantly increasing trend in five-day biochemical oxygen demand at the downstream location. Recreational uses are fully supported under Class SA fecal coliform bacteria standards, but are threatened by significantly increasing trends in bacterial concentrations. Shellfish consumption uses are not supported in this drainage because of shellfish harvesting closure due to fecal coliform bacteria excursions.

Atlantic Ocean - The S.C. Dept. of Parks, Recreation, and Tourism/Hunting Island State Park facility is under a consent order for permit violations for ammonia, BOD and TSS. The current wastewater treatment plant is inadequate and a construction permit has been approved to expand the plant prior to the onset of the next tourist season. The treatment plant discharges into a wetland which drains into the Atlantic Ocean.

Point Source Contributions

RECEIVING STREAM FACILITY NAME PERMITTED FLOW @ PIPE (MGD)	NPDES # TYPE COMMENT
ALBERGOTTI CREEK US MARINES CORPS PIPE #: 001 FLOW: 0.75	SC0000825 MINOR INDUSTRIAL
ALBERGOTTI CREEK US MARINES CORPS PIPE #: 002 FLOW: MR	SC0000825 MINOR INDUSTRIAL
SALT CREEK-ALBERGOTTI CREEK HOWARD JOHNSONS LODGE PIPE #: 001 FLOW: 0.025	SC0032310 MINOR COMMUNITY

FACTORY CREEK MARSH HARBOR UTL PIPE #: 001 FLOW: 0.035	SC0032352 MINOR COMMUNITY
BATTERY CREEK O C WELCH FORD LINCOLN MERCURY PIPE #: 001 FLOW: NO LIMIT	SC0041726 MINOR INDUSTRIAL
WHALE BRANCH TR LOBECO PRODUCTS INC PIPE #: 001 FLOW: 0.353	SC0000914 MAJOR INDUSTRIAL
DOE POINT CREEK TANSII VILLAGE PIPE #: 001 FLOW: TO BE ELIMINATED	SC0033871 MINOR COMMUNITY
JENKINS CREEK COASTAL SEAFOOD CO INC PIPE #: 001 FLOW: PERMIT EXPIRED 2-80	SC0004227 MINOR INDUSTRIAL
JENKINS CREEK LP MAGGIONI & COMPANY PIPE #: 001 FLOW: TO BE CANCELLED	SC0040673 MINOR INDUSTRIAL
JENKINS CREEK L P MAGGIONI & COMPANY PIPE #: 01A FLOW: TO BE CANCELLED	SC0040673 MINOR INDUSTRIAL
HALFMOON CREEK JAMES J DAVIS ELM SCHOOL PIPE #: 001 FLOW: 0.008	SC0027481 MINOR COMMUNITY
BEAUFORT RIVER BJW&SA/FROGMORE WTP PIPE #: 001 FLOW: 0.6	SC0039811 MINOR MUNICIPAL
BEAUFORT RIVER BJW&SA/SHELL POINT WTP PIPE #: 001 FLOW: 0.8	SC0042609 MINOR MUNICIPAL
BEAUFORT RIVER CITY OF BEAUFORT PIPE #: 001 FLOW: 4.0	SC0021016 MAJOR MUNICIPAL
BEAUFORT RIVER US MARINES CORPS/PARRIS ISLAND PIPE #: 001 FLOW: 3.0	SC0002577 MINOR INDUSTRIAL
BEAUFORT RIVER US MARINES CORPS/PARRIS ISLAND PIPE #: 002 FLOW: 0.015	SC0002577 MINOR INDUSTRIAL
BEAUFORT RIVER US MARINES CORPS/PARRIS ISLAND PIPE #: 003 FLOW: 7.2	SC0002577 MINOR INDUSTRIAL

ATLANTIC OCEAN
SC DEPT PRT/HUNTING ISL ST PK
PIPE #: 001 FLOW: 0.10

SC0025054
MINOR COMMUNITY

**NO DISCHARGE SYSTEM
FACILITY NAME**

**ND#
TYPE**

LAND DISPOSAL
FRIPP ISLAND/HARBOR ISLAND

ND0065919
MINOR COMMUNITY

LAND DISPOSAL
BEACHWOOD MHP

ND0067091
MINOR COMMUNITY

LAND DISPOSAL
LADYS ISLAND MIDDLE SCHOOL

NDOO63118
MINOR COMMUNITY

LAND DISPOSAL
PLEASANT POINT PLANTATION

ND0067393
MINOR COMMUNITY

LAND DISPOSAL
PATRIOTS GATE APTS

ND0063126
MINOR COMMUNITY

Nonpoint Source Contributions

The Beaufort River is listed as an impacted waterbody from nonpoint sources that include agricultural activities and urban storm sewer and surface runoff. Numerous excursions have been recorded by the Department on this stream for dissolved oxygen, and scattered elevated nutrient levels were recorded. Computer modelling by the SCLRCC indicated a high potential for NPS problems from agricultural and urban runoff activities for this stream. The Beaufort River is included on the §304(l) long list for waterbodies impacted by nonpoint source nontoxic pollution.

Data collected from other agencies and citizen groups indicate that Lucy Point Creek, Jenkins Creek and Battery Creek are impacted from nonpoint sources. Lucy Point Creek was impacted by fecal coliform from agricultural practices and Jenkins and Battery Creeks were impacted by urban storm sewer and surface runoff. Battery Creek was additionally impacted by landfill runoff from a land disposal site.

Old House Creek was also impacted by land disposal, according to data received from other agencies. The parameter of concern was fecal coliform. A shellfish harvesting prohibition related to fecal coliform levels is in effect for Fripp Inlet (see Shellfish Harvesting Status below), which connects to Old House Creek. Trenchards Inlet was also listed as a nonpoint source impacted waterbody due to agricultural activities (nonirrigated crop production).

St. Helena Sound is listed as an impacted waterbody as a result of nonpoint source pollutants. The nonpoint source pollution status was derived from data contained in the National Estuarine Inventory and from computer modelling by the SCLRCC that indicted a high potential for NPS problems from agricultural activities for this stream. Of concern were nutrient levels, which increase with nonirrigated and specialty crop production.

Shellfish Harvesting Status

Whale Branch (from Campbell Creek to Halfmoon Creek) encompasses 692 acres classified as SFH. The shellfish beds in this segment of Whale Branch (from a half mile east of its confluence with Halfmoon Creek to a half mile west of its confluence with Campbell Creek) are restricted from harvesting. Campbell Creek and Halfmoon Creek are classified as SFH waters and cover 217 and 393 acres, respectively. Shellfish harvesting in both creeks (from headwaters to confluence with Whale Branch) is prohibited due to adjacent point source pollutants, namely the James J. Davis Elementary School WWTP discharging to Halfmoon Creek, and Lobeco Products, Inc. (formerly Venture Chemical Company and American Color and Chemical Company) discharging to Campbell Creek. The Lobeco Products, Inc. facility has contaminated the shallow groundwater with PCBs; but monitoring efforts do not show migration of the contaminant into the surrounding environment as yet. Huspa Creek incorporates 1,609 acres and is classified as shellfish harvesting waters. The waters from the headwaters to the confluence with Whale Branch are restricted to harvesting. A potential nonpoint source impact to these waters is the large herd of cattle located in the upper reaches of Huspa Creek.

Shellfish harvesting is prohibited due to adjacent point source pollutants in the waters of the Beaufort River (encompassing 8,150 acres classified as SA) from the confluence with the Coosaw River to its confluence with Ballast Creek. Access to shellfish harvesting on this segment of the Beaufort River is prohibited due to adjacent point source pollutants. During ebb tide, effluents from Parris Island, the City of Beaufort and Shell Point WWTPs flow out the mouth of the Beaufort River. During the following flood tide, these effluents flow back into the Beaufort River and Battery Creek. Also prohibited are the waters of Ballast Creek from its mouth at the Beaufort River to the Page Field Road causeway. Farther downstream, the Beaufort River (from Ballast Creek to Chowan Creek to Port Royal Sound) is classified SFH with the 8,690 acres approved for shellfish harvesting. Chowan Creek has 4,835 acres classified as SFH and is approved for shellfish harvesting.

Battery Creek is divided into two segments, one having 2,458 acres classified as SFH, and the other having 1,081 acres classified as SA. Both segments have prohibited harvesting access due to adjacent point source pollutants. The headwaters of Battery Creek also receive the stormwater runoff from heavily traveled U.S. Highway 21, S.C. Highway 170 and Ribaut Road, Beaufort. A closed landfill at the intersection of Highway 21 and Ribaut Road is another potential impairment to water quality.

All waters of McCalley Creek, Factory Creek, Cat Island Creek, Brickyard Creek, Mulligan Creek, Broomfield Creek, and Albergotti Creek are prohibited to shellfish harvesting due to adjacent point source pollutants. McCalley Creek covers 2,193 acres that are classified SFH and Albergotti Creek covers 1,142 acres that are classified as tidal salt waters (SA) as is Factory Creek. Brickyard Creek covers 1,612 acres classified as SFH, and along with the point sources mentioned above, is

also impacted directly from the effluent of the U.S. Marine Corps Air Station and Marsh Harbor WWTPs.

The St. Helena Sound shellfish harvesting area incorporates 53,578 acres and includes the Coosaw River. The Coosaw River is classified as shellfish harvesting waters (SFH) and is approved for harvesting. The upper reaches of Edding Creek, encompassing 384 acres classified as SFH, has restricted access to shellfish harvesting due to elevated levels of fecal coliform bacteria from nonpoint sources. The City of Beaufort has a sludge farm near Edding Creek which poses a potential pollution impact. The Tansi Village Wastewater Treatment Plant, near Jenkins Creek, is closing due to problems associated with the low elevation of the spray field and is being connected to the Frogmore WTP on St. Helena Island. The Charles Henry Dairy Farm is no longer functioning as a dairy; and the herd has been reduced from 85 to 35 cows, though it remains a potential nonpoint source of pollution.

The Morgan River Estuary shellfish harvesting area incorporates 59,630 acres and includes the Morgan River, Harbor River, Trenchards Inlet Estuary and Station Creek; all were classified as shellfish harvesting waters and, with the exception of the Morgan River, are approved for shellfish harvesting. The Morgan River has prohibited harvesting access due to an adjacent marina. An additional potential impact to the Morgan River is the colony of Rhesus monkeys living on Morgan Island; however, the proximity of St. Helena Sound and the associated flushing activity may prevent a problem. The Burton sludge disposal site is no longer in operation due to the groundwater contamination at the site; Station Creek may be adversely impacted as a result.

Lucy Point Creek covers 566 acres classified as SFH. A 1500 foot area around the discharge point of the drainage ditch from Lucy Creek Farms is prohibited to shellfish harvesting. The lagoon at Lucy Creek Farms has ceased operation and is in the closure process. Lucy Creek Farms will remain a potential pollution source to Lucy Point Creek until the wastewater lagoon is completely phased out, particularly during storm events. The Holly Hill Animal Hospital is another potential source of pollution to Lucy Point Creek.

The waters of Eddings Creek from its headwaters to its confluence with two small tributaries northeast of Rose Island Shrimp dock are restricted to shellfish harvesting. The waters of Jenkins Creek the elbow in the creek to the marsh between Warsaw and Polawana Islands are also restricted to harvesting. A 60 foot area around the Dataw Marina is prohibited to shellfish harvesting.

Rock Spring Creek and Fripp Island Canal encompass 332 and 255 acres, respectively, that are classified as SFH. Fripp Island Canal and an unnamed creek extending from Fripp Canal to Old House Creek including adjacent marshes together with all the waters of Rock Springs Creek are restricted to shellfish harvesting. Several WTPs are in the area including Hunting Island WTP, and Fripp Island/Harbor Island WTP. A 1000 foot area around Fripp Island Marina is prohibited to shellfish harvesting. Fripp Island Canal is included on the §303(d) list (low priority) for TMDL

development due to the elevated fecal coliform levels. All waters of Old House Creek and Village Creek are also prohibited to harvesting.

Sources of potential impact to the waters surrounding Lady's Island include two land disposal sites for pumper truck septage, and the spoils from servicing individual sewage treatment and disposal systems (ISTD). The sites are not directly adjacent to approved shellfish waters. Additional potential pollution sources to the island include the Lady's Island WTP and the Lady's Island Elementary School WTP. Leakage from ISTDs are a potential threat to harvesting waters throughout the watershed.

Growth Potential

The Towns of Lady's Island, Burton and Shell Point and the City of Beaufort are located in this watershed and are projected to continue experiencing residential and commercial growth. The City of Beaufort has adequate sewer service, but the unincorporated areas experiencing growth do not. Less than 25% of the total land area of Lady's Island, Burton and Shell Point are suitable for septic system installation and another 25% or less are classified as marginally suitable. These marginally suitable areas pose the greatest threat to ground water quality; the shallow septic system design required for the marginal areas is most likely to be inadequate and result in the pollution of the ground water. Also, growth in the area tends to be spread out over a large area not served by a sewer system; not only is the potential for impaired ground water widespread, but also there is less chance that a sewer system will be built to replace the failing septic systems.

03050208-110

General Description

Watershed 03050208-110 is located in Beaufort County and consists primarily of the **May River**, the Cooper River and their tributaries. The watershed occupies 86,228 acres of the Coastal Zone region of South Carolina. The predominant soil types consist of an association of the Bohicket-Lynnhaven-Lakeland-Chipley series. The erodibility of the soil (**K-factor**) averages 0.08; the slope of the terrain averages 1.8%, with a range of 0-6%. Land use/land cover in the watershed includes: 18.20% urban land, 0.73% agricultural land, 3.43% scrub/shrub land, 0.46% barren land, 31.23% forested land, 1.05% forested wetland, 14.37% nonforested wetland and 30.53% water.

The May River watershed, which includes the May River Estuary, consists of sea islands and tidally-influenced streams. The May River (ORW) combines with MacKays Creek, Skull Creek and Broad Creek (SFH) in Calibogue Sound (SFH) before flowing into the Atlantic Ocean near Hilton Head Island. The May River accepts drainage from Bass Creek (ORW) and Bull Creek (ORW), which also drains to the Cooper River. The Cooper River is classified as ORW from the New River (03050208-130) to Ramshorn Creek and then changes to SFH through the confluence with the May River and into the sound. There are a total of 49.6 estuarine stream miles in this watershed.

Water Quality

May River - Aquatic life uses are fully supported for this stream. Recreational uses are fully supported. Shellfish consumption uses are fully supported over the majority of this drainage, but are not supported in limited areas because of shellfish harvesting closure due to fecal coliform bacteria excursions (see Shellfish Harvesting Status below).

Skull Creek - Aquatic life uses are only partially supported for this stream due to dissolved oxygen excursions. Recreational uses are fully supported. Shellfish consumption uses are fully supported in this drainage.

Calibogue Sound - Aquatic life and recreational uses are fully supported for this stream; however, aquatic life uses may be threatened by a significantly declining trend in dissolved oxygen. Shellfish consumption uses are fully supported over the majority of this drainage, but are not supported in limited areas because of shellfish harvesting closure due to fecal coliform bacteria excursions (see Shellfish Harvesting Status below).

Point Source Contributions

RECEIVING STREAM FACILITY NAME PERMITTED FLOW @ PIPE (MGD)	NPDES # TYPE COMMENT
PORT ROYAL SOUND BROAD CK PUB SERV DIST PIPE #: 001 FLOW: Spray	SC0040053 MINOR MUNICIPAL SPRAY IRRIGATION
WHOOPING CRANE CONSERVANCY HILTON HEAD PLANT UTIL PIPE #: 001 FLOW: 0.5	SC0043605 MINOR COMMUNITY
CYPRESS CONSERVANCY HILTON HEAD PLANT UTIL PIPE #: 002 FLOW: 0.15	SC0043605 MINOR COMMUNITY
PALMETTO BAY SCDHEC TRUST/CIRCLE MOBIL STA PIPE #: 001 FLOW: NO LIMIT	SC0044831 MINOR INDUSTRIAL
WHITE IBIS & BOGGY GUT MARSHES SEA PINES PSD PIPE #: 001 FLOW: 5.0	SC0042501 MAJOR MUNICIPAL
NO DISCHARGE SYSTEM FACILITY NAME	ND# TYPE
LAND DISPOSAL BJW&SA/THE GATHERINGS	ND0061026 MINOR MUNICIPAL
LAND DISPOSAL BROAD CREEK PSD	ND0063100 MINOR MUNICIPAL
LAND DISPOSAL HILTON HEAD NO.1 PSD	ND0068462 MINOR MUNICIPAL
LAND DISPOSAL HILTON HEAD PLANT UTIL	ND0065854 MINOR COMMUNITY
LAND DISPOSAL COASTAL UTIL/WINDMILL HARBOR	ND0019631 MINOR COMMUNITY
LAND DISPOSAL WEXFORD/PLANTATION UTIL	ND0017141 MINOR COMMUNITY
LAND DISPOSAL LONG COVE CLUB	ND0013528 MINOR COMMUNITY
LAND DISPOSAL MOSS CREEK PLANTATION	ND0014567 MINOR COMMUNITY
LAND DISPOSAL BRIGHTON BEACH MHP	ND0000566 MINOR COMMUNITY

LAND DISPOSAL SEA PINES PSD	ND0064033 MINOR COMMUNITY
LAND DISPOSAL HAIG POINT/MELROSE WWTP	ND0062286 MINOR COMMUNITY
LAND DISPOSAL DAUFUSKIE ISLAND CLUB	ND0068179 MINOR COMMUNITY
LAND DISPOSAL BJW&SA/BLUFFTON REGIONAL	ND0069191 MINOR MUNICIPAL

Nonpoint Source Contributions

Data collected from other agencies and citizen groups indicate that Broad Creek and Calibogue Sound, with associated tributaries, are impacted from nonpoint sources. Broad Creek was found to be impacted by fecal coliform from urban runoff. Calibogue Sound and tributaries were impacted by fecal coliform, toxic materials and suspended solids resulting from agricultural and silvicultural activities and from urban surface runoff. Calibogue Sound is included on the §304(l) long list for waterbodies impacted by nonpoint source non-toxic pollution.

Shellfish Harvesting Status

The May River system encompasses 15,366 acres and includes Bull Creek and a portion of the Cooper River, all of which are approved for harvesting. The May River and Bull Creek are classified as outstanding resource waters (ORW); and the Cooper River segment is classified as ORW/SFH. Another segment of the Cooper River covers 65 acres classified as SFH, and is prohibited to harvesting within 1000 feet of the Cooper River Landing Marina. The northern shore of the May River has the highest regional potential for impact by individual sewage treatment and disposal systems (ISTD) leakage. Additional impacts to the May River Area may originate from the Brighton Beach mobile home park, The Gatherings WTP or the Wading Bird Management Area.

Calibogue Sound encompasses 19,990 acres that are classified as SFH. The Sound Area includes Mackays Creek, Skull Creek, Jarvis Creek and a portion of Broad Creek at Palmetto Bay. Areas prohibited to shellfish harvesting include: those waters adjacent to Harbour Town, Moss Creek, Skull Creek, Outdoor Resorts, Windmill Harbour, Palmetto Bay, Shelter Cove, Wexford Harbour, South Beach and Broad Creek Marinas. In addition, waters adjacent to the boat docking facilities at Villages on Skull Creek, Hilton Head Plantation, Long Cove, Baynard Cove, Gull Point Community and Shillings Boat House are also prohibited to harvesting. Areas that are restricted from harvesting include the waters of the unnamed creek from Mariners Cove near the confluence of Skull Creek and MacKay Creek, and the waters of Broad Creek between the Broad Creek Marina and Wexford Harbor.

Wastewater treatment plants in the watershed include Sea Pines WWTP, Wexford Plant, Long Cove Plant, Broad Creek PSD and Hilton Head PSD. The majority of the WTPs use spray irrigation rather than surface water discharge. Skull Creek near Mariner's Cove and Calibogue Sound at Braddock Creek are both impacted by residential nonpoint sources. Hilton Head and Windmill Harbor WTPs are located near Skull Creek, and Moss Creek and The Gatherings WTPs are located near MacKays Creek.

The Baynard Cove area includes Lawton Creek and Braddock Creek and covers 834 acres classified as SFH. The entire area is prohibited for harvesting: Baynard Cove and Braddock Creek are adjacent to marinas and Lawton Creek is adjacent to the Sea Pines PSD. Fish Haul Creek is prohibited to shellfish harvesting from its mouth to its headwaters.

Stormwater runoff from nearby highways and urban centers, such as Hilton Head Island, and leakage from individual sewage treatment and disposal systems (ISTD) pose the greatest potential impact to shellfish waters in this watershed.

The continued development of Daufuskie Island may potentially impact the waters surrounding the island. Recently constructed golf courses (63 holes) would pose a potential stormwater impact. Individual sewage treatment and disposal systems along with the Melrose/Haig Point WTP are potential sources of impacts as well.

Growth Potential

The City of Hilton Head Island and the Town of Bluffton are projected for residential and commercial growth. The City of Hilton Head Island has adequate sewer service, but is trying to control growth due to size limitations of the highly developed island. However, this area of southern Beaufort County is still projected as the main growth area within the watershed due to the following plans: (1) Beaufort and Jasper Counties are cooperating to construct a regional wastewater treatment plant in the Cherry Point area; (2) the regional water and sewer authority has proposed a regional water supply project to serve southern Beaufort and Jasper Counties with the Savannah River as the source; (3) a four lane, limited access highway connecting Hilton Head Island with I-95 will be built in the next few years; and (4) Union Camp has plans to develop at least a portion of its holdings in southern Beaufort County.

The Town of Bluffton is an unincorporated area experiencing growth without the benefit of adequate sewer service. Between 25 and 50% of the total land area is suitable for septic system installation; and another 25% or less is classified as marginally suitable. These marginally suitable areas pose the greatest threat to ground water quality; the shallow septic system design required for the marginal areas is most likely to be inadequate and result in the pollution of the ground water. Also, growth in the area tends to be spread out over a large area not served by a sewer system; not only is the potential for impaired ground water widespread, but also there is less chance that a sewer system will be built to replace the failing septic systems.

03050208-120

General Description

Watershed 03050208-120 is located in Jasper County and consists primarily of the **Great Swamp** drainage. The watershed occupies 56,959 acres of the Lower Coastal Plain region of South Carolina. The predominant soil types consist of an association of the Rains-Paxville-Albany-Lynchburg series. The erodibility of the soil (K-factor) averages 0.17; the slope of the terrain averages 1.2%, with a range of 0-2%. Land use/land cover in the watershed includes: 2.10% urban land, 16.94% agricultural land, 1.63% scrub/shrub land, 0.58% barren land, 47.27% forested land, 23.27% forested wetland, 8.15% nonforested wetland and 0.05% water.

The Great Swamp (SA) originates in Calfpen Bay and is joined by Broadwater Creek (Waggon Branch) farther downstream near the Town of Ridgeland, all classified as SA.

Water Quality

No water quality data is available for this watershed. Water quality sampling is planned prior to the assessment update.

Point Source Contributions

RECEIVING STREAM FACILITY NAME PERMITTED FLOW @ PIPE (MGD)	NPDES # TYPE COMMENT
GREAT SWAMP CYPRESS WOODS FISH PONDS PIPE #: 001 FLOW: 4.0	SC0042943 MINOR INDUSTRIAL

Growth Potential

No growth is projected for this watershed.

03050208-130

General Description

Watershed 03050208-130 is located in Jasper and Beaufort Counties and consists of the lower portion of the Great Swamp and the **New River** and their tributaries. The watershed occupies 96,023 acres of the Coastal Zone region of South Carolina. The predominant soil types consist of an association of the Argent-Okeetee-Santee series. The erodibility of the soil (K-factor) averages 0.19; the slope of the terrain averages 1.1%, with a range of 0-6%. Land use/land cover in the watershed includes: 1.61% urban land, 6.59% agricultural land, 1.65% scrub/shrub land, 0.08% barren land, 55.85% forested land, 12.40% forested wetland, 18.25% nonforested wetland and 3.57% water.

The New River watershed, which includes the New River Estuary, drains to the Atlantic Ocean. Great Swamp and Bagshaw Swamp join to form the New River. Causeway Swamp (SFH) enters the New River, as does Bob Dam Swamp and Brickyard Swamp downstream (SFH). There are a total of 11.0 estuarine stream miles in this watershed. The New River forms a section of the Atlantic Intracoastal Waterway before entering the Atlantic Ocean near Daufauskie Island. This watershed accepts the drainage of the upper Great Swamp (03050208-120) and interacts with the Wright River watershed (03050208-140) through tidal creeks.

Water Quality

New River - The monitoring station exhibited a high frequency of pH values below Class SA standards (less than 6.5 SU), which is typical of natural conditions in swamp or black water drainages such as this. Since the majority of the drainage upstream of this sampling location is swamp, this appears to represent natural conditions, and these are not considered standards excursions. Aquatic life uses for this stream are not supported due to dissolved oxygen excursions; however, low dissolved oxygen is typical of swamp and black water drainages and may represent natural conditions. Recreational uses are not supported due to fecal coliform bacteria excursions, compounded by a significantly increasing trend in bacterial numbers. Turbidity exhibited a significantly increasing trend, most probably originating from agricultural and urban runoff.

Point Source Contributions

There are currently no point source dischargers in this watershed.

Nonpoint Source Contributions

The New River is listed as an impacted waterbody from nonpoint sources that include agricultural activities (nonirrigated and specialty crop production) and urban surface runoff. Numerous elevated ammonia levels have been recorded by the Department on this stream, along with

scattered DO and pH excursions. Computer modelling by the SCLRCC indicated a high potential for NPS problems from agricultural and urban runoff activities for this stream. The New River is included on the §304(l) long list for waterbodies impacted by nonpoint source nontoxic pollution.

Shellfish Harvesting Status

The New River encompasses 13,444 acres classified as SFH that have restricted access to shellfish harvesting due to nonpoint source fecal coliform levels. Possible sources of fecal coliform to the New River include a cattle herd located in the headwaters region, and the freshwater influence to the river. The New River also has the potential for degradation from stormwater runoff.

The continued development of Daufuskie Island may potentially impact the waters surrounding the island. Recently constructed golf courses (63 holes) would pose a potential stormwater impact. Increased boat traffic to Daufuskie and Hilton Head Islands also has the potential for adverse impact. The southern portion of Daufuskie Island has the greatest regional potential for impact from individual sewage treatment and disposal systems (ISTD) leakage. The Melrose/Haig Point WTP is another potential impact to the island.

Growth Potential

No growth is projected for this watershed.

03050208-140

General Description

Watershed 03050208-140 is located in Jasper County and consists of the **Wright River** and its tributaries. The watershed occupies 30,631 acres of the Coastal Zone region of South Carolina. The predominant soil types consist of an association of the Bohicket-Capers-Coosaw series. The erodibility of the soil (K-factor) averages 0.12; the slope of the terrain averages 1.1%, with a range of 0-2%. Land use/land cover in the watershed includes: 3.09% urban land, 11.01% agricultural land, 0.97% scrub/shrub land, 1.47% barren land, 34.81% forested land, 6.00% forested wetland, 36.94% nonforested and 5.71% water.

The Wright River (SA) flows through the Tybee Migratory Bird Refuge and drains into the Atlantic Ocean. The Wright River is connected to the Savannah River (03060109-060) through the channel-like Mud River (Fields Cut) and Saltwater Creek (SA). The Wright River also connects to the New River watershed (03050208-130) near Turtle Island.

Water Quality

No water quality data is available for this watershed. Water quality sampling is planned prior to the assessment update.

Point Source Contributions

There are currently no point source dischargers in this watershed.

Nonpoint Source Contributions

The Wright River was evaluated from data collected from other agencies and citizen groups to be nonpoint source impacted from toxic materials contained in a dredge spoil runoff.

Shellfish Harvesting Status

The Wright River encompasses 11,421 acres classified as SFH. All waters of the Wright River from the headwaters to the confluence with Fields Cut are restricted to shellfish harvesting due to nonpoint source fecal coliform. Fields Cut connects the Wright River to the Savannah River and is the location of a U.S. Army Corps of Engineers dredge spoil disposal site, and is the probable source of the elevated fecal coliform levels. All waters of Fields Cut are prohibited to shellfish harvesting. The Wright River also has the potential to be degraded by stormwater runoff.

Growth Potential

No growth is projected for this watershed.

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APPENDIX A. WMU-0101

Water Quality Trends and Status by Station

Summary of Heavy Metal Data by Station

Mean Seasonal Water Quality Values

SAVANNAH - SALKEHATCHIE WATERSHED MU-0101

	<u>SPRING</u> <u>(MAR - MAY)</u>	<u>SUMMER</u> <u>(JUN - SEP)</u>	<u>FALL</u> <u>(OCT - NOV)</u>	<u>WINTER</u> <u>(DEC - FEB)</u>
Temperature (C°)				
MEAN	17.1	25.5	17.7	11.6
MAX	28.0	32.5	27.0	20.5
MIN	7.0	15.0	7.0	4.0
MED	17.0	26.0	18.0	12.0
95%	25.5	31.0	25.0	17.5
N	134	239	114	136
Dissolved Oxygen (mg/l)				
MEAN	9.03	7.69	8.48	9.88
MAX	11.70	15.00	11.30	13.60
MIN	5.60	0.10	5.30	7.70
MED	9.10	7.60	8.30	9.90
5%	6.70	5.80	6.40	8.20
N	132	239	113	134
pH (SU)				
MEAN	6.9	7.0	6.7	6.7
MAX	8.9	9.3	8.2	7.4
MIN	6.3	6.1	6.1	6.2
MED	6.9	6.9	6.7	6.7
95%	7.3	8.0	7.3	7.0
N	132	237	113	134
BOD-5 day (mg/l)				
MEAN	1.2	1.5	1.2	0.8
MAX	6.8	8.2	8.4	3.3
MIN	0.1	0.1	0.1	0.1
MED	0.9	1.1	0.8	0.6
95%	2.7	5.0	3.1	1.8
N	127	218	104	130
Turbidity (NTU)				
MEAN	8.3	10.7	8.1	6.8
MAX	95.0	88.0	90.0	140.0
MIN	0.7	0.6	0.4	0.6
MED	3.3	3.1	2.0	2.4
95%	29.0	40.0	40.0	24.0
N	127	223	107	130
Ammonia (mg/l)				
MEAN	0.14	0.16	0.10	0.15
MAX	0.76	1.70	0.37	0.64
MIN	0.05	0.05	0.05	0.05
MED	0.07	0.08	0.09	0.09
95%	0.57	0.65	0.17	0.45
N	55	64	43	59
TKN (mg/l)				
MEAN	0.34	0.38	0.36	0.29
MAX	1.42	2.40	3.40	0.82
MIN	0.10	0.10	0.07	0.10
MED	0.28	0.28	0.24	0.22
95%	0.86	0.84	0.86	0.74
N	93	185	84	113

SAVANNAH - SALKEHATCHIE WATERSHED MU-0101

	<u>SPRING</u> <u>(MAR - MAY)</u>	<u>SUMMER</u> <u>(JUN - SEP)</u>	<u>FALL</u> <u>(OCT - NOV)</u>	<u>WINTER</u> <u>(DEC - FEB)</u>
Nitrite-Nitrate (mg/l)				
MEAN	0.18	0.35	0.19	0.14
MAX	0.84	6.90	1.25	0.71
MIN	0.02	0.02	0.02	0.02
MED	0.09	0.17	0.05	0.06
95 %	0.66	0.86	0.88	0.57
N	106	126	79	120
Total Phosphorus (mg/l)				
MEAN	0.07	0.10	0.08	0.06
MAX	0.28	0.62	0.32	0.20
MIN	0.02	0.02	0.02	0.02
MED	0.03	0.06	0.06	0.04
95 %	0.21	0.27	0.22	0.15
N	73	137	53	56
Total Organic Carbon (mg/l)				
MEAN	3.3	4.1	3.4	4.0
MAX	12.1	12.2	9.4	13.7
MIN	0.8	1.2	1.1	1.0
MED	2.5	3.4	2.3	2.9
95 %	7.1	8.4	7.8	12.1
N	35	43	44	35
Fecal Coliform (#/100ml)				
MEAN	22	39	21	12
MAX	2900	6400	2300	2200
MIN	1	1	1	1
MED	20	40	15	6
95 %	960	1500	800	480
N	83	167	81	90

APPENDIX B. WMU-0102

Water Quality Trends and Status by Station

Water Quality Summary MU-0102

STATION NUMBER	TYPE	WATERBODY NAME	CLASS	TP-TOTAL PHOSPHORUS			TN-TOTAL NITROGEN			TURB-TURBIDITY			TSS-TOTAL SUSPENDED SOLIDS		
				TP	N	N	TN	N	TURB	N	TSS	N			
SV-340	P	LAKE HARTWELL	FW												
SV-316	S	BIG GENEROSTEE CK	FW	D 40						*	41				
SV-100	P	LAKE RUSSELL	FW	D 98	*	78				*	98				
SV-098	P	LAKE RUSSELL	FW	D 96	D	61	D	100							
SV-031	P	ROCKY RVR	FW	D 99	D	93	*	98							
SV-041	S	ROCKY RVR	FW	D 51			*	46							
SV-139	S	CUPBOARD CK	FW	*	52		*	47							
SV-140	S	CUPBOARD CK	FW	D 52			I	47							
SV-141	S	BROADWAY CK	FW	*	46		*	46							
SV-037	S	BETSY CK	FW	I	46		*	45							
SV-043	S	CHEROKEE CK	FW	D 47			*	47							
SV-331	P	LAKE SECESSION	FW	*	35										
SV-332	P	LAKE SECESSION	FW	*	34										
SV-052	P	SAWNEY CK	FW	D 47			*	46							
SV-053B	S	BLUE HILL CK	FW	*	46		*	46							
SV-318	P	LONG CANE CK	FW	*	89	*	84	I	97						
SV-291	P	CLARKS HILL RESERVOIR	FW	D 92	*	65	I	96	I	76					
SV-294	P	CLARKS HILL RESERVOIR	FW	D 91	*	77	I	95							
SV-151	P	HARD LABOR CK	FW	D 35			*	39							
SV-330	P	STEVENS CK	FW	D 40			*	41							
SV-068	S	BEAVERDAM CK	FW	*	44		*	45							

Summary of Heavy Metal Data by Station

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Mean Seasonal Water Quality Values

SAVANNAH - SALKEHATCHIE WATERSHED MU-0102

	<u>SPRING</u> <u>(MAR - MAY)</u>	<u>SUMMER</u> <u>(JUN - SEP)</u>	<u>FALL</u> <u>(OCT - NOV)</u>	<u>WINTER</u> <u>(DEC - FEB)</u>
Temperature (C°)				
MEAN	16.5	24.1	16.7	10.1
MAX	27.6	32.5	24.0	15.5
MIN	6.5	12.0	8.0	5.0
MED	16.5	25.0	16.0	10.0
95%	26.0	30.5	23.0	15.0
N	126	213	90	112
Dissolved Oxygen (mg/l)				
MEAN	9.25	7.46	7.99	10.17
MAX	13.30	10.80	12.47	13.40
MIN	4.75	2.80	4.70	6.05
MED	9.45	7.60	8.10	10.20
5%	7.00	4.30	5.55	8.15
N	126	213	90	110
pH (SU)				
MEAN	7.1	7.2	6.9	6.8
MAX	8.6	9.2	8.7	8.1
MIN	6.1	5.4	6.1	5.6
MED	7.0	7.1	6.8	6.7
95%	7.9	8.3	7.4	7.6
N	122	211	88	112
BOD-5 day (mg/l)				
MEAN	1.6	1.7	1.4	1.1
MAX	7.9	13.0	5.8	4.1
MIN	0.1	0.3	0.3	0.1
MED	1.2	1.4	1.1	1.0
95%	4.4	4.1	3.3	2.9
N	116	190	84	107
Turbidity (NTU)				
MEAN	15.6	14.6	8.3	15.1
MAX	100.0	330.0	60.0	150.0
MIN	1.3	1.4	0.8	1.1
MED	9.6	8.5	5.8	7.2
95%	55.0	38.0	18.0	60.0
N	114	189	86	108
Ammonia (mg/l)				
MEAN	0.08	0.12	0.10	0.11
MAX	0.18	0.91	0.66	0.33
MIN	0.04	0.04	0.05	0.05
MED	0.08	0.08	0.08	0.09
95%	0.15	0.31	0.20	0.20
N	72	88	71	67
TKN (mg/l)				
MEAN	0.42	0.49	0.47	0.36
MAX	1.95	1.88	4.60	0.86
MIN	0.08	0.08	0.06	0.14
MED	0.42	0.43	0.35	0.33
95%	0.66	1.06	0.92	0.64
N	100	162	71	104

SAVANNAH - SALKEHATCHIE WATERSHED MU-0102

	<u>SPRING</u> <u>(MAR - MAY)</u>	<u>SUMMER</u> <u>(JUN - SEP)</u>	<u>FALL</u> <u>(OCT - NOV)</u>	<u>WINTER</u> <u>(DEC - FEB)</u>
Nitrite-Nitrate (mg/l)				
MEAN	0.26	0.52	0.28	0.20
MAX	2.40	13.20	3.00	2.80
MIN	0.02	0.02	0.02	0.02
MED	0.19	0.22	0.12	0.13
95%	0.62	1.93	0.67	0.42
N	97	138	62	101
Total Phosphorus (mg/l)				
MEAN	0.09	0.25	0.25	0.07
MAX	0.92	4.20	4.50	0.26
MIN	0.02	0.02	0.02	0.02
MED	0.05	0.08	0.05	0.05
95%	0.28	1.10	0.72	0.18
N	92	146	52	72
Total Organic Carbon (mg/l)				
MEAN	5.1	5.6	3.8	4.1
MAX	14.0	20.5	8.0	10.6
MIN	2.0	1.1	1.1	1.1
MED	4.0	4.7	4.0	3.6
95%	12.0	11.6	6.5	8.4
N	40	61	26	39
Fecal Coliform (#/100ml)				
MEAN	25	68	37	30
MAX	6000	22000	20000	4500
MIN	1	1	1	1
MED	30	75	51	30
95%	840	1400	470	600
N	94	162	68	93

APPENDIX C. WMU-0103

Water Quality Trends and Status by Station

Summary of Heavy Metal Data by Station

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The following information was obtained from the records of the
 Department of the Interior, Bureau of Land Management, regarding
 the acquisition of certain lands in the State of California.
 The lands in question are located in the County of [County Name],
 and are described as follows: [Description of Lands]
 The acquisition of these lands was effected by the purchase of
 certain interests therein from [Seller Name] on [Date]. The
 purchase price was \$[Amount]. The lands were acquired for the
 purpose of [Purpose]. The acquisition was completed on [Date].
 The following is a list of the lands acquired: [List of Lands]
 The lands were acquired in accordance with the provisions of
 the Act of Congress, approved [Date], which authorized the
 acquisition of lands for the [Agency Name]. The acquisition
 was effected by the purchase of certain interests therein from
 [Seller Name] on [Date]. The purchase price was \$[Amount].
 The lands were acquired for the purpose of [Purpose]. The
 acquisition was completed on [Date]. The following is a list
 of the lands acquired: [List of Lands]

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Mean Seasonal Water Quality Values

SAVANNAH - SALKEHATCHIE WATERSHED MU-0103

	<u>SPRING</u> <u>(MAR - MAY)</u>	<u>SUMMER</u> <u>(JUN - SEP)</u>	<u>FALL</u> <u>(OCT - NOV)</u>	<u>WINTER</u> <u>(DEC - FEB)</u>
Temperature (C°)				
MEAN	16.2	23.5	17.3	11.5
MAX	26.0	30.0	25.5	19.5
MIN	7.0	9.0	8.0	4.0
MED	16.0	24.0	17.0	11.0
95 %	23.0	28.5	23.5	17.0
N	206	304	144	207
Dissolved Oxygen (mg/l)				
MEAN	8.83	7.27	8.35	9.94
MAX	13.80	10.80	12.80	12.50
MIN	4.55	3.50	4.20	7.60
MED	8.70	7.20	8.40	10.00
5 %	6.40	5.00	6.10	8.1
N	207	304	142	207
pH (SU)				
MEAN	6.5	6.5	6.5	6.5
MAX	8.0	7.5	7.5	7.7
MIN	5.2	2.2	1.8	5.1
MED	6.5	6.5	6.6	6.6
95 %	7.3	7.1	7.2	7.2
N	207	304	144	207
BOD-5day (mg/l)				
MEAN	1.3	1.3	1.1	1.2
MAX	7.9	4.8	3.9	27.0
MIN	0.0	0.1	0.0	0.1
MED	1.1	1.3	1.1	0.9
95 %	2.7	2.7	2.6	2.3
N	200	285	141	206
Turbidity (NTU)				
MEAN	11.4	9.0	7.1	7.8
MAX	180.0	100.0	45.0	50.0
MIN	1.4	1.5	1.1	1.2
MED	6.8	6.8	4.9	6.3
95 %	25.0	21.0	19.0	17.0
N	200	284	138	203
Total Suspended Solids (mg/l)				
MEAN	8.3	6.5	6.5	6.4
MAX	28.0	15.0	21.0	51.0
MIN	0.6	0.8	0.6	0.8
MED	6.8	6.3	5.6	4.0
95 %	17.0	13.0	21.0	18.0
N	25	28	10	26
Ammonia (mg/l)				
MEAN	0.10	0.10	0.12	0.10
MAX	0.26	0.42	0.55	0.46
MIN	0.05	0.04	0.05	0.05
MED	0.08	0.08	0.10	0.09
95 %	0.21	0.25	0.24	0.23
N	139	172	76	134

SAVANNAH - SALKEHATCHIE WATERSHED MU-0103

	<u>SPRING</u> <u>(MAR - MAY)</u>	<u>SUMMER</u> <u>(JUN - SEP)</u>	<u>FALL</u> <u>(OCT - NOV)</u>	<u>WINTER</u> <u>(DEC - FEB)</u>
TKN (mg/l)				
MEAN	0.43	0.47	0.39	0.43
MAX	2.70	2.20	1.70	6.80
MIN	0.10	0.10	0.13	0.14
MED	0.38	0.42	0.36	0.35
95 %	0.74	0.81	0.65	0.75
N	189	264	121	191
Nitrite-Nitrate (mg/l)				
MEAN	0.38	0.31	0.31	0.45
MAX	4.80	6.70	3.00	6.40
MIN	0.02	0.02	0.02	0.02
MED	0.18	0.14	0.15	0.22
95 %	1.84	1.44	1.79	2.20
N	196	272	125	190
Total Phosphorus (mg/l)				
MEAN	0.06	0.08	0.05	0.05
MAX	0.21	1.60	0.22	0.18
MIN	0.02	0.02	0.02	0.02
MED	0.05	0.06	0.05	0.04
95 %	0.12	0.17	0.12	0.10
N	167	227	84	150
Total Organic Carbon (mg/l)				
MEAN	4.4	5.0	4.8	4.1
MAX	13.4	32.0	13.1	14.1
MIN	1.0	1.0	1.3	1.4
MED	3.7	4.2	3.7	3.6
95 %	8.6	10.4	8.8	7.6
N	68	143	20	84
Fecal Coliform (#/1000ml)				
MEAN	90	112	71	58
MAX	840	2000	1600	1290
MIN	2	1	1	3
MED	100	150	75	62
95 %	480	680	600	320
N	193	281	126	191

APPENDIX D. WMU-0104

Water Quality Trends and Status by Station

Water Quality Summary MU-0104

STATION NUMBER	TYPE	WATERBODY NAME	CLASS	DO-DISSOLVED OXYGEN				BACT-FECAL COLIFORM BACTERIA				TRENDS				TRENDS				TRENDS							
				EXC-NUMBER OF EXCURSIONS				EXC-NUMBER OF EXCURSIONS				TRENDS				D-SIGNIFICANT DECLINING TREND				I-SIGNIFICANT INCREASING TREND				-NO SIGNIFICANT TREND			
				DO EXC.	DO N	DO %	DO	DO EXC.	DO N	DO %	DO	TRENDS	PH EXC.	PH N	PH %	PH	TRENDS	BACT EXC.	BACT N	BACT %	BACT	TRENDS	BACT EXC.	BACT N	BACT %	BACT	TRENDS
03050208090																											
CSTL-107	P	COOSAWHATCHIE RVR	FW	4	54	7	*	96	D	96	18	55	33	*	95	7	50	14	*	91							
MD-128	S	BEESCK	SB	1	23	4	*	43	*	44	12	24	50	*	44	12	22	55	*	41							
MD-007	P	POCOTALIGO RVR	SFH	14	53	26	*	93	*	93	15	54	28	D	93	32	48	67	I	88							
MD-116	P	BROAD RVR	SFH	0	22	0	*	42	*	58	0	22	0	D	42	0	22	0	*	34							
MD-172	S	BROAD RVR	SFI	1	22	5	*	42	I	37	0	21	0	D	41	0	21	0	*	32							
MD-117	S	CHECHESSEE RVR	SFH	7	22	32	D	42	I	40	0	22	0	D	42	0	22	0	I	40							
MD-176	I*	COLLETON RVR	ORW	1	23	4	*	44	*	38	0	23	0	D	44	0	23	0	D	34							
MD-006	S	PORT ROYAL SOUND	SFH	0	24	0	*	47	*	42	1	24	4	*	47	0	23	0	*	43							
03050208100																											
MD-001	S	BEAUFORT RVR	SA	11	24	46	*	53	I	42	0	24	0	*	52	0	23	0	*	51							
MD-002	S	BEAUFORT RVR	SA	12	24	50	*	54	*	42	0	24	0	*	53	0	23	0	*	51							
MD-003	P	BEAUFORT RVR	SA	8	23	35	D	53	*	41	0	23	0	*	52	0	21	0	*	50							
MD-004	S	BEAUFORT RVR	SFH	11	25	44	D	54	I	43	0	25	0	*	52	0	25	0	*	47							
MD-005	P	BEAUFORT RVR	SFH	1	23	4	*	56	*	42	1	23	4	*	55	0	23	0	*	46							
MD-010	I*	WHALE BRANCH	SFH	11	23	48	D	41	*	38	0	23	0	D	41	0	22	0	I	39							
MD-194	S	WHALE BRANCH	SFH	11	23	48	D	41	I	40	0	23	0	D	41	0	23	0	I	41							
03050208110																											
MD-016	I*	MAY RVR	ORW/SFH	7	24	29	*	46	*	38	0	24	0	*	46	0	23	0	*	34							
MD-013	S	SKULL CK	SFH	3	23	13	*	46	*	41	0	23	0	*	46	0	23	0	*	42							
MD-175	P	CALIBOGUE SOUND	SFH	2	23	9	D	42	*	37	0	23	0	D	41	0	23	0	*	33							
03050208130																											
MD-118	P	NEW RVR	SA	20	54	37	*	96	*	96	49	55	89	*	95	20	49	41	I	90							

Summary of Heavy Metal Data by Station

Water Quality Summary MU-0104

STATION NUMBER	TYPE	WATERBODY NAME	CLASS	CD-AQ		CD-HH		CD		CR-AQ		CR-HH		OR		NI-NICKEL		ZN-ZINC		TRENDS		D-SIGNIFICANT DECLINING TREND		I-SIGNIFICANT INCREASING TREND		-NO SIGNIFICANT TREND		BLANKS-INSUFFICIENT DATA FOR TREND	
				EXC	N	EXC	N	EXC	N	EXC	N	EXC	N	EXC	N	EXC	N	EXC	N	EXC	N	EXC	N	EXC	N	EXC	N	EXC	N
03050207010																													
CSTL-028	P	SALKEHATCHIE RVR	FW	1	0	20				0	0	20					2	20			0	1	20						
03050207020																													
CSTL-001B	S	TURKEY CK	FW																										
03050207030																													
CSTL-003	P	SALKEHATCHIE RVR	FW	0	0	20				0	0	20					5	20			0	0	20						
03050207040																													
CSTL-006	P	SALKEHATCHIE RVR	FW	0	0	18				0	0	18					5	18			0	0	18						
03050208020																													
CSTL-044	S	IRELAND CK	FW																										
CSTL-068	P	ASHEPOO RVR	FW																										
03050208040																													
CSTL-069	S	ASHEPOO RVR	SFH																										
03050208010																													
CSTL-007	I*	COMBAHEE SWAMP	FW																										
CSTL-098	P	COMBAHEE RVR	FW	0	0	18				1	0	18					3	18			0	0	18						
03050208050																													
CSTL-110	P	COOSAWHATCHIE RVR	FW	0	0	4				0	0	5					1	5			0	0	5						
03050208060																													
CSTL-075	S	LAKE WARREN	FW																										
03050208070																													
CSTL-108	S	SANDERS BRANCH	FW*																										
CSTL-010	S	SANDERS BRANCH	FW*	0	0	5				0	0	5					1	5			0	0	4						
CSTL-011	S	SANDERS BRANCH	FW*																										
CSTL-109	P	COOSAWHATCHIE RVR	FW	0	0	18				0	0	18					2	18			0	0	18						

Water Quality Summary MU-0104

STATION NUMBER	TYPE	WATERBODY NAME	CLASS	CD-AQ		CD-HH		CD		CR-AQ		CR-HH		CR		PB-AQ		PB-HH		FB		TRENDS		D-SIGNIFICANT DECLINING TREND		I-SIGNIFICANT INCREASING TREND		*NO SIGNIFICANT TREND		BLANKS-INSUFFICIENT DATA FOR TREND				
				EXC	N	EXC	N	EXC	N	EXC	N	EXC	N	EXC	N	EXC	N	EXC	N	EXC	N	EXC	N	EXC	N	EXC	N	EXC	N	EXC	N	EXC	N	
03050208090																																		
CSTL-107	P	COOSAWHATCHIE RVR	FW	0	19	0	0	0	19	0	0	0	0	19	0	19	0	0	0	19	0	19	0	0	18	0	19	0	19	5	19			
MD-128	S	BEESCK	SB																															
MD-007	P	POCOTALGOR RVR	SFH	0	19	0	0	0	19	0	0	0	0	19	0	19	0	0	0	19	0	19	0	1	18	0	19	4	19					
MD-116	P	BROAD RVR	SFH																															
MD-172	S	BROAD RVR	SFH																															
MD-117	S	CHECHESSEE RVR	SFH																															
MD-176	I*	COLLETON RVR	ORW																															
MD-006	S	PORT ROYAL SOUND	SFH																															
03050208100																																		
MD-001	S	BEAUFORT RVR	SA																															
MD-002	S	BEAUFORT RVR	SA																															
MD-003	P	BEAUFORT RVR	SA																															
MD-004	S	BEAUFORT RVR	SFH	0	5	0	0	0	5	0	0	0	0	5	0	5	0	0	0	5	0	5	0	1	4	0	5	0	5	0	5			
MD-005	P	BEAUFORT RVR	SFH																															
MD-010	I*	WHALE BRANCH	SFH																															
MD-194	S	WHALE BRANCH	SFH																															
03050208110																																		
MD-016	I*	MAY RVR	ORW/SFH																															
MD-013	S	SKULL CK	SFH																															
MD-175	P	CALIBOGUE SOUND	SFH																															
03050208130																																		
MD-118	P	NEW RVR	SA	0	19	0	0	0	19	0	0	0	0	19	0	19	0	0	0	19	0	19	0	1	18	0	19	2	19					

Mean Seasonal Water Quality Values

SAVANNAH - SALKEHATCHIE WATERSHED MU-0104

	<u>SPRING</u> <u>(MAR - MAY)</u>	<u>SUMMER</u> <u>(JUN - SEP)</u>	<u>FALL</u> <u>(OCT - NOV)</u>	<u>WINTER</u> <u>(DEC - FEB)</u>
Temperature (C°)				
MEAN	19.1	26.4	16.7	11.3
MAX	28.0	32.5	23.0	20.0
MIN	6.0	19.5	9.0	3.0
MED	20.0	27.0	17.0	11.0
95%	26.0	30.5	22.0	16.5
N	143	222	90	122
Dissolved Oxygen (mg/l)				
MEAN	6.76	5.26	6.87	8.54
MAX	16.00	9.15	10.30	11.80
MIN	2.35	1.90	3.25	5.45
MED	6.70	5.25	7.00	8.55
5%	4.05	2.90	3.55	6.70
N	143	218	88	122
pH (SU)				
MEAN	6.5	6.8	6.6	6.4
MAX	8.1	8.5	8.4	7.6
MIN	4.5	4.8	3.8	4.3
MED	6.5	6.8	6.6	6.5
95%	7.8	8.0	8.1	7.1
N	143	221	90	122
BOD-5 day (mg/l)				
MEAN	2.1	1.9	1.6	1.6
MAX	22.0	6.8	4.2	3.8
MIN	0.4	0.2	0.4	0.4
MED	1.6	1.6	1.4	1.6
95%	4.4	4.4	2.6	2.8
N	142	218	82	122
Salinity (ppt)				
MEAN	8.1	20.7	10.6	3.4
MAX	32.5	40.0	34.0	17.5
MIN	0.0	0.0	0.0	0.0
MED	2.0	27.0	3.0	1.0
95%	29.5	34.0	31.0	13.0
N	65	113	51	54
Turbidity (NTU)				
MEAN	11.0	8.6	9.6	9.5
MAX	170.0	90.0	85.0	180.0
MIN	1.2	1.5	1.3	1.6
MED	6.0	5.1	5.1	4.4
95%	38.0	30.0	32.0	36.0
N	142	220	86	122
Total Suspended Solids (mg/l)				
MEAN	12.1	11.1	9.4	9.6
MAX	48.0	43.0	20.0	74.0
MIN	1.4	1.8	1.6	0.8
MED	9.0	8.0	9.6	6.4
95%	29.0	31.0	20.0	19.0
N	30	32	11	27

SAVANNAH - SALKEHATCHIE WATERSHED MU-0104

	<u>SPRING</u> <u>(MAR - MAY)</u>	<u>SUMMER</u> <u>(JUN - SEP)</u>	<u>FALL</u> <u>(OCT - NOV)</u>	<u>WINTER</u> <u>(DEC - FEB)</u>
Ammonia (mg/l)				
MEAN	0.12	0.13	0.13	0.11
MAX	0.62	1.30	0.70	0.48
MIN	0.05	0.05	0.05	0.05
MED	0.09	0.09	0.11	0.09
95 %	0.27	0.27	0.23	0.26
N	106	107	41	67
TKN (mg/l)				
MEAN	0.93	1.03	0.74	0.72
MAX	2.80	6.70	1.55	1.94
MIN	0.31	0.12	0.10	0.18
MED	0.89	0.94	0.72	0.68
95 %	1.52	1.82	1.26	1.23
N	121	143	63	120
Nitrite-Nitrate (mg/l)				
MEAN	0.13	0.15	0.10	0.12
MAX	0.73	1.10	0.42	0.91
MIN	0.02	0.02	0.01	0.02
MED	0.07	0.08	0.05	0.06
95 %	0.44	0.56	0.40	0.35
N	108	154	45	78
Total Phosphorus (mg/l)				
MEAN	0.13	0.14	0.15	0.10
MAX	1.24	0.71	2.10	0.47
MIN	0.02	0.02	0.02	0.02
MED	0.09	0.10	0.08	0.07
95 %	0.30	0.39	0.32	0.28
N	138	197	75	107
Total Organic Carbon (mg/l)				
MEAN	16.6	16.6	18.8	16.4
MAX	33.0	47.0	41.0	111.0
MIN	3.7	3.5	4.5	4.1
MED	17.0	13.9	16.1	13.3
95 %	27.0	38.0	41.0	38.0
N	58	73	28	58
Fecal Coliform (#/100ml)				
MEAN	133	113	149	193
MAX	11200	19000	4400	3300
MIN	1	1	2	16
MED	150	126	150	152
95 %	1600	1600	2400	1600
N	126	133	149	111

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