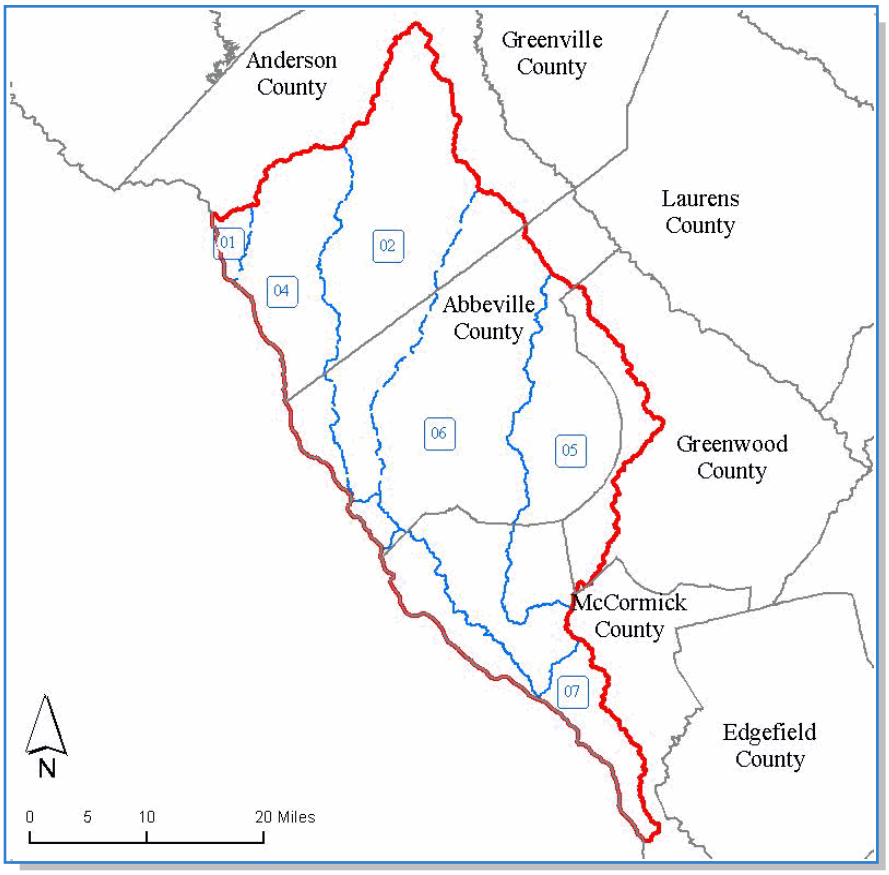
UPPER SAVANNAH Subbasin

August 31, 2007

An Assessment of the Upper Savannah Subbasin

Hydrologic Unit Code (8 Digit): 03060103



WATERSHED (10-digit HUC)
(E.g., 01 = 0306010301)

- 01 Hartwell Lake-Savannah River
- 02 Rocky River
- 04 Big Generostee Creek-Savannah River
- 05 Long Cane Creek
- 06 Little River-Savannah River
- 07 Lake Thurmond-Savannah River

NRCS Natural Resources Conservation Service

EXECUTIVE SUMMARY

Watershed Description

The Upper Savannah Subbasin's northern reach extends into Lake Hartwell which lies on the SC/GA border. The Savannah River is formed as the Tugaloo (from the north) and Seneca (from the west) rivers meet in Lake Hartwell (56,000 acres). The lake is created by Hartwell Dam located on the Savannah River seven miles below the point at which the Tugaloo and Seneca rivers join to form the Savannah.

The subbasin lies entirely in the Piedmont (65) ecoregion (Figure 1). A brief description of the Piedmont ecoregion (Level III) is available in this document's appendix. A more detailed description of the Level III and Level IV Common Resource Areas (Ecological Regions) is available online (See Griffith *et al.* 2002 in References section.).

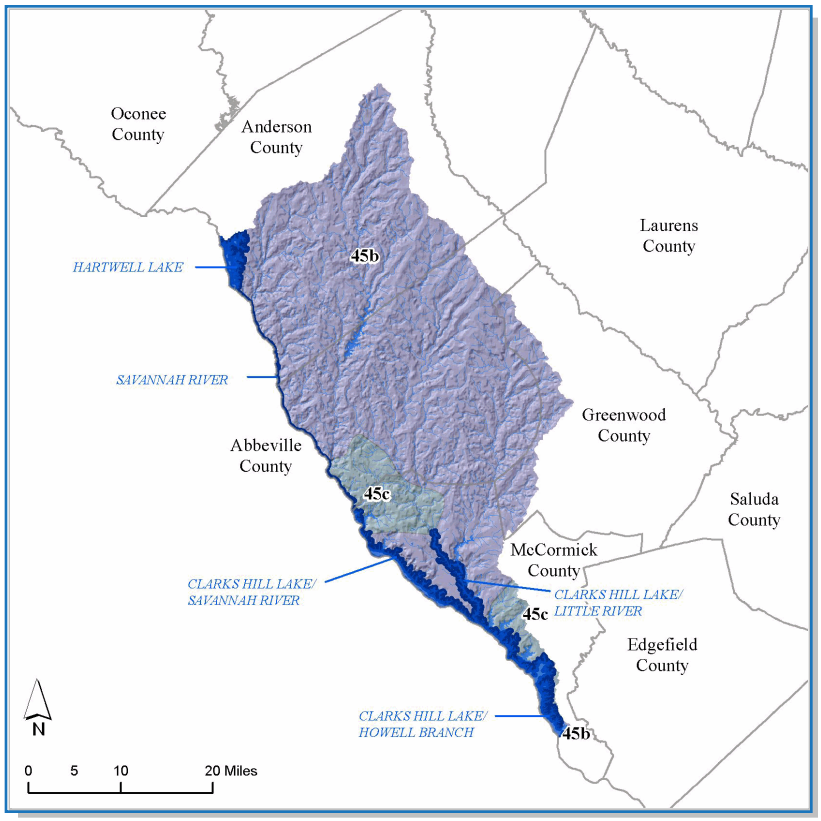


FIGURE 1:
LEVEL IV ECOLOGICAL REGIONS

45b Southern Outer Piedmont
45c Carolina Slate Belt

EXECUTIVE SUMMARY

Land Use/Land Cover

Urban clusters in the subbasin include Anderson, Williamston, Honea Path, Greenwood and Abbeville, however, the subbasin is still fairly rural. The lower quarter of the subbasin is covered primarily by Sumter National Forest (Figure 2). Farmland in the subbasin is found mainly in Anderson and Abbeville counties (Figure 2), mostly committed to pasture and hayland (Table 2), typical of any Piedmont landscape.

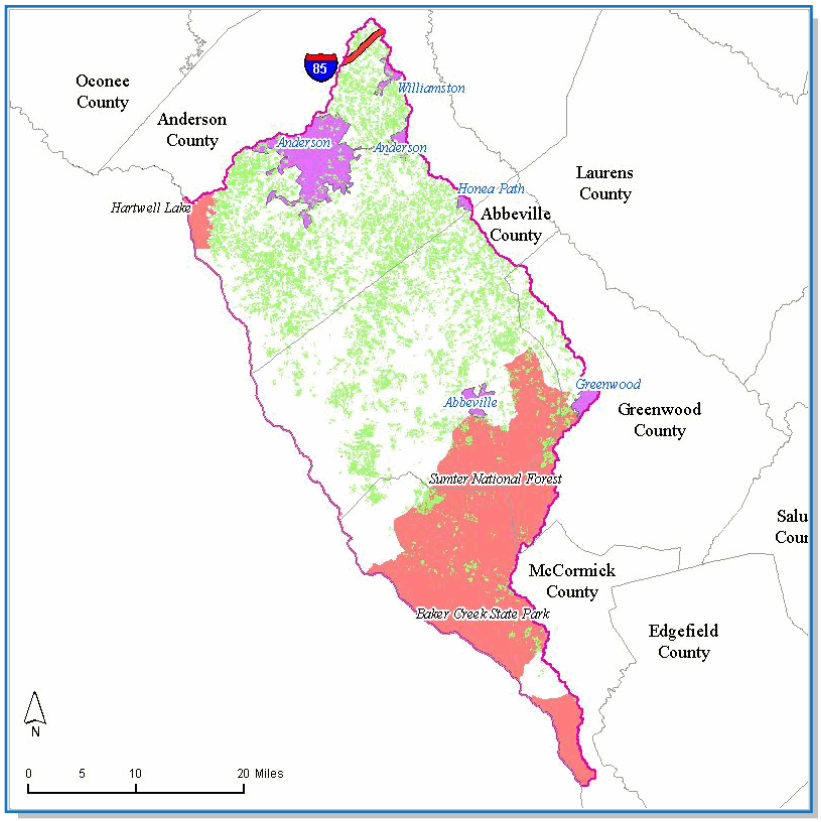


FIGURE 2:
MAJOR LAND USE/LAND COVER CATEGORIES

- FSA Farm Fields
- Urban Areas
- Parks & Land Under Easement
- Other Land

Table 1:
MAJOR LAND USE/LAND COVER CATEGORIES

	Acres	% of Watershed
Watershed (Total)	745,049	-
Urban Area	38,758	5%
Parks/Land Under Easement (not NRCS)	189,677	25%
Farm Service Agency Designated Farm Fields	144,519	19%

Table 2:
AGRICULTURAL LAND USE: FSA ACREAGE AND ESTIMATED FARM FIELD USE FROM THE 2002 AG CENSUS
(NASS Whole County Data Used. Cropland includes: Field Crops, Orchards, and Specialty Crops.)

County	FSA Fields (Acres)	% Pasture (Estimated)	% Cropland (Estimated)	% Hayland (Estimated)
Abbeville	53,970	51%	15%	35%
Anderson	77,487	44%	23%	34%
Greenwood	5,828	49%	15%	36%
McCormick	7,233	56%	10%	33%

EXECUTIVE SUMMARY

Summary of Resource Concerns

The following is a summary of resource concerns for the watershed. Each resource concern has a more detailed analysis provided in its corresponding section.

Soils
Land capability limitations are dominated by erosion in this subbasin that is typical of an area within the Piedmont. Highly erodible and potentially highly erodible soils comprise 88% of the subbasin and are the key resource concerns.

Water Quantity
Awaiting SCDNR's 2007 state water assessment.

Water Quality
The fecal coliform and biological (benthic invertebrate) impairments.

Plant Condition
The most prominent crops in the subbasin include forage, oats, sorghum for silage and nursery stock.

Fish, Wildlife, and Native Plants
According to SC DNR's "Comprehensive Wildlife Conservation Strategy: 2005 - 2010" (see SCDNR 2005 in References section), the following applies to this subbasin: Biologists have identified habitat protection as one of the most important actions to ensure the protection of South Carolina priority species. Loss and fragmentation of habitat have been identified as a major threat to many of the species listed as threatened and endangered in South Carolina.

Domestic Animals
Grazing livestock populations are high; note also that Anderson County ranks top in the state for horse and pony population. Some confined livestock, mainly poultry, is located mainly in the northern half of the subbasin.

Economic and Social Factors
-

EXECUTIVE SUMMARY

Progress on Conservation

Table 3:
A SUMMARY OF NRCS APPLIED CONSERVATION TREATMENTS (ACRES)
(See Appendix for NRCS Conservation Practices used for Conservation Treatment Categories.)
(Applied practice data is reported on a fiscal year basis commencing on October 1st)

Conservation Treatments	2004	2005	2006	Total
Buffers and Filter Strips	4	-	-	4
Conservation Tillage	41	-	663	704
Erosion Control	22	7	1,322	1,351
Irrigation Water Management	-	-	-	-
Nutrient Management	775	831	228	1,834
Pest Management	116	831	517	1,464
Prescribed Grazing	687	638	-	1,325
Trees and Shrubs	4,095	196	3	4,294
Wetlands	32	-	-	32
Wildlife Habitat	864	264	391	1,519

Table 4:
LANDS REMOVED FROM PRODUCTION BY FARM BILL PROGRAMS (WHOLE COUNTY DATA SHOWN)

County	Conservation Reserve Program (ac) 2005	Conservation Reserve Program (ac) 1986 - 2005	Grassland Reserve Program (ac) 2005	Farmland & Ranch Protection Program (ac) 2005	Wetland Reserve Program (ac) 2005
Abbeville	1,202	28,629	297	-	-
Anderson	6,382	170,526	-	-	183
Greenwood	466	9,802	-	-	10
McCormick	255	3,559	72	-	-

Table 5:
APPROVED TOTAL MAXIMUM DAILY LOAD (TMDL)
(See SCDHEC 2007 (a) in Reference Section.) - SCDHEC Contact: Matt Carswell - (803) 898-3609

TMDL Document	Numberof Stations	Parameter of Concern	Status	WQMS ID Standard Attained
Big Generostee Creek	1	Fecal	Approved & Implementing	-
Rocky River & Wilson Creek	7	Fecal Coliform	Completed & Approved	SV-141
Upper Savannah	8	Fecal Coliform	Completed & Approved	SV-052
Upper Savannah	1	Turbidity	Completed & Approved	SV-053B

Table 6:
OTHER PLANS, ASSESSMENTS, AND PROJECTS IN THE WATERSHED

Organization	Description	Contact	Telephone
SCDHEC	Watershed Water Quality Assessment: Savannah River Basin (2003)	Richelle Tolton	803-898-4213

EXECUTIVE SUMMARY

Other Watershed Considerations

RESOURCE CONCERNS

Soils

The Upper Savannah subbasin lies entirely within the Piedmont and contains Carolina Slate Belt and Southern Outer Piedmont subregions. Most of the land (88%) in this Piedmont subbasin has limitations due to erosion (Table 7). Most of the erosion is associated with sloping areas on uplands in the subbasin (Figure 4, Table 9). Low soil organic matter in the highly erodible soils is a soil health concern. Hydric soils and wetness are not major resource concerns in this subbasin with 92% of the land classified as not hydric (Figure 5, Tables 7 and 10). Almost 60% of the land in the Upper Savannah subbasin is either prime farmland (27%) or statewide important farmland (28%) and occurs throughout the subbasin (Figure 3, Table 8).

Table 7:
LAND CAPABILITY CLASSES (See NRCS 2007 [a] and [b] in References section.)

Percentages are based on the whole watershed (745,049 ac).

Land Capability Class 1	Acres	Percent
1 - Slight limitations	-	-

	% Land by Subclass Limitation					
	Erosion (e)		Wetness(w)		Droughtiness (s)	
Land Capability Classes 2-8	Acres	Percent	Acres	Percent	Acres	Percent
2 - Moderate limitations	209,595	28%	18,642	3%	-	-
3 - Severe limitations	193,778	26%	27,830	4%	373	0%
4 - Very severe limitations	117,365	16%	447	0%	826	0%
6 - Severe limitations; unsuitable for cultivation; limited to pasture, range, forest	41,123	6%	-	-	-	-
7 - Very severe limitations; unsuitable for cultivation; limited to grazing; forest, wildlife habitat	91,280	12%	-	-	639	0%
8 - Miscellaneous areas; limited to recreation, wildlife habitat, water supply	-	-	-	-	6,353	1%

RESOURCE CONCERNS

Prime Farmland

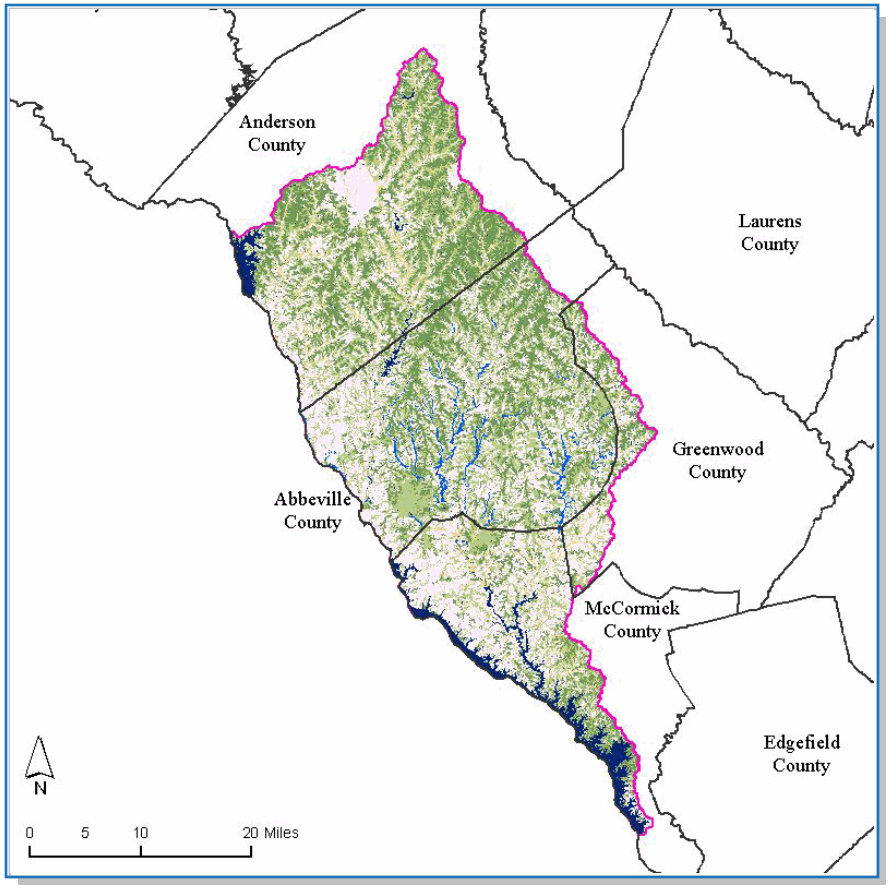


FIGURE 3:
PRIME FARMLAND
(See NRCS 2007 [a] and [b] in References section.)

Table 8:
PRIME FARMLAND

Prime Farmland Categories	Acres	Percent of Land
All areas are prime farmland	197,074	26%
Farmland of statewide importance	207,746	28%
Not prime farmland	304,603	41%
Prime farmland if drained	0	0%
Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season	25,360	3%
Prime farmland if irrigated	0	0%
Prime farmland if irrigated and drained	0	0%
Prime farmland if protected from flooding or not frequently flooded during the growing season	10,138	1%

RESOURCE CONCERNS

Highly Erodible Land

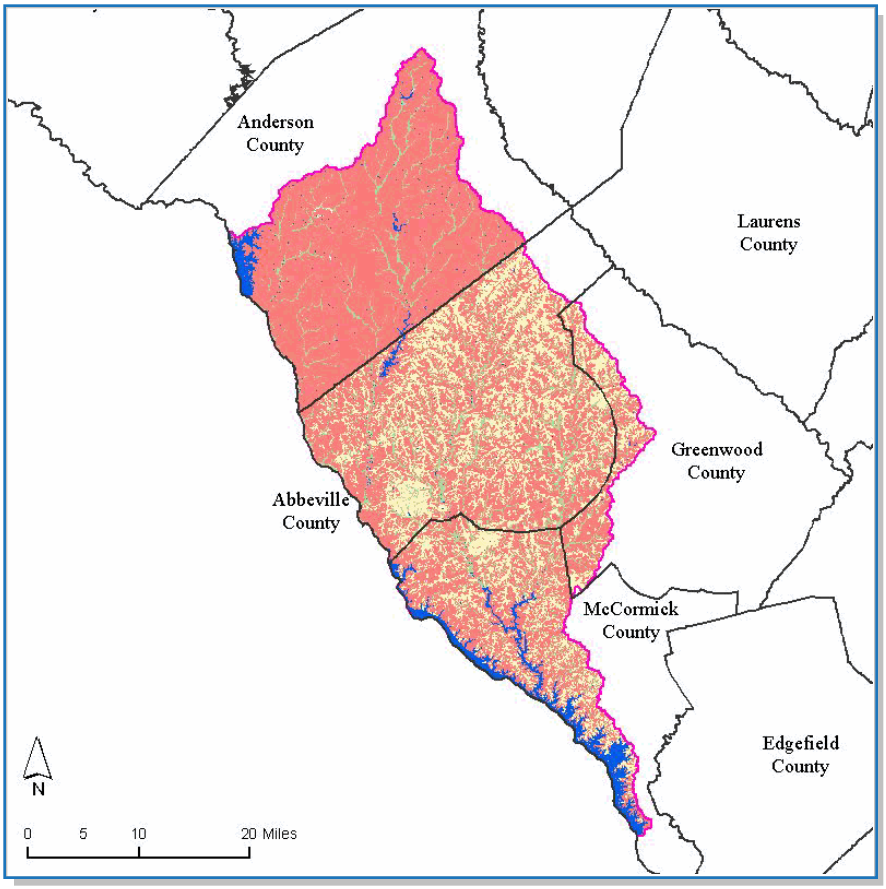


FIGURE 4:
HIGHLY ERODIBLE LAND
(See NRCS 2007 [a] and [b] in References section.)

Table 9:
HIGHLY ERODIBLE LAND

Highly Erodible Land Categories	Acres	Percent of Watershed
Highly erodible land	500,589	67%
Not highly erodible land	54,236	7%
Potentially highly erodible land	158,014	21%

RESOURCE CONCERNS

Hydric Soils

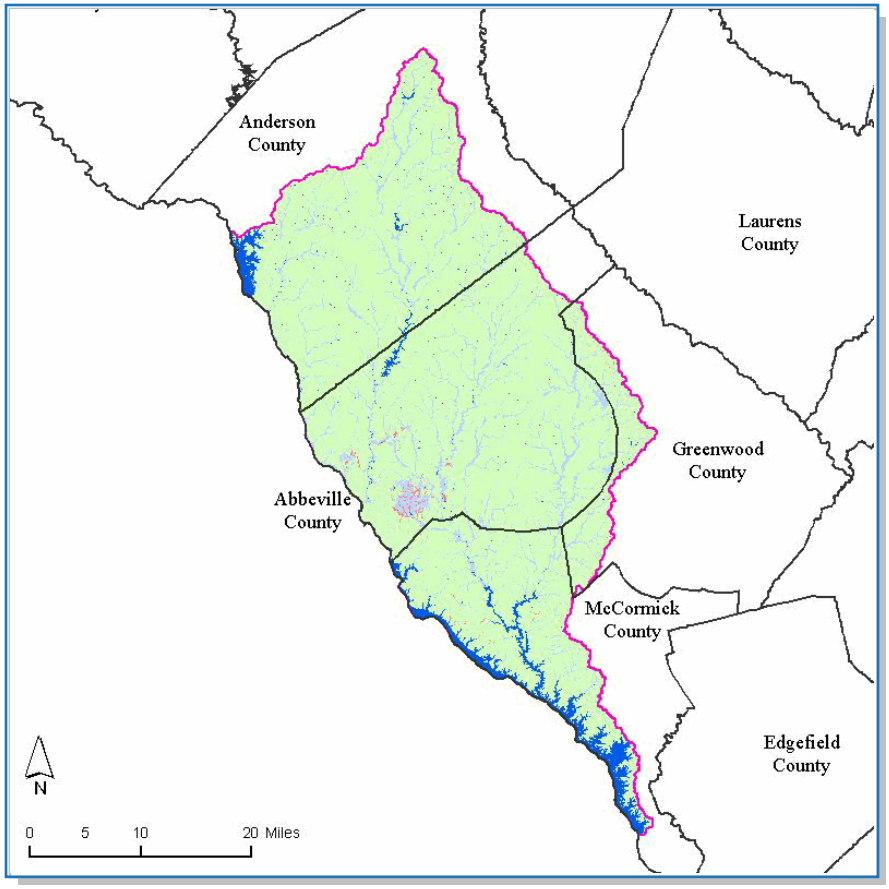


FIGURE 5:
HYDRIC SOILS
(See NRCS 2007 [a] and [b] in References section.)

Table 10:
HYDRIC SOILS

Hydric Soils Categories	Acres	Percent of Watershed
All Hydric	2,036	0%
Not Hydric	685,905	92%
Partially Hydric	56,979	8%

RESOURCE CONCERNS

Water Quantity

Several major lakes are located along the river, all of which are man-made reservoirs. These include Strom Thurmond Lake, Russell Lake, Lake Hartwell, and Lake Keowee. None of these lakes exists below the fall line, however.

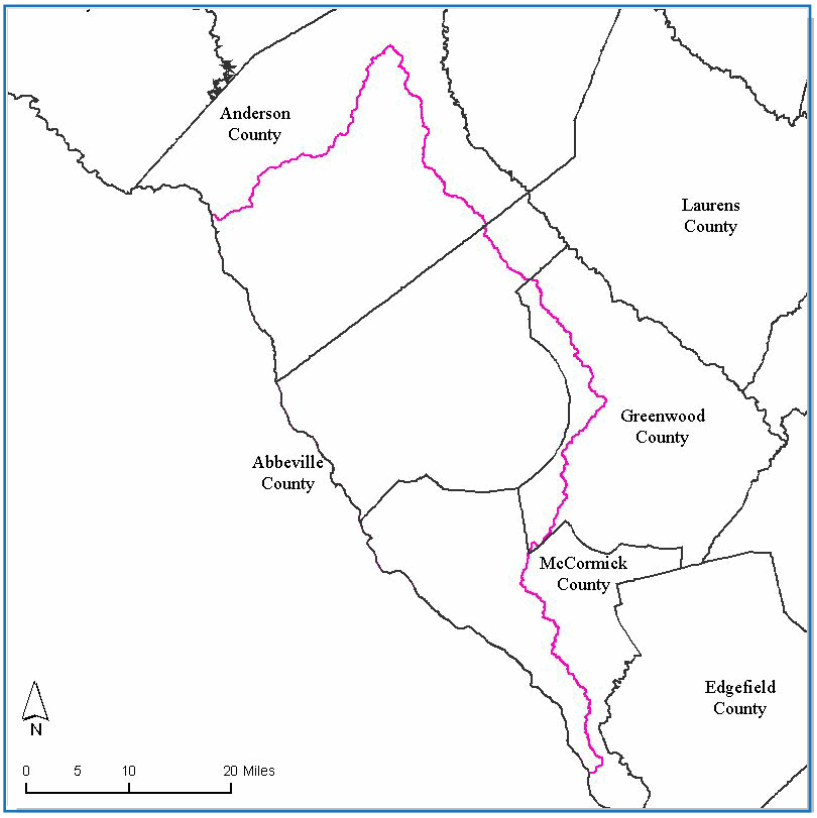


FIGURE 6:
WATERSHED RELATIVE TO CAPACITY USE AREAS, NOTICE OF INTENT AREAS, AND CONES OF DEPRESSION

Table 11:
CAPACITY USE, NOTICE OF INTENT, AND CONES OF DEPRESSION AREA IN WATERSHED
(See SCDHEC 2007 [c] and SCDNR 2004 in Refrerences Section.)

Area	Percent of Watershed
% Watershed in Cone of Depression and Capacity Use (CU) Area	0%
% Watershed in SCDHEC Capacity Use (CU) Area	0%
% Watershed in SCDHEC Notice of Intent (NOI) Area	0%

RESOURCE CONCERNS

Water Quantity Cont.

Table 12:
INDICATORS OF IRRIGATION WATER USAGE (WHOLE COUNTY DATA ARE USED)
(See NASS 2002 and SCDNR 2004 in References Section)

County	Total Irrigated Water Used MGD	Total NASS Cropland (ac)	Cropland Under Irrigation (ac)	Percent Cropland Under Irrigation	Water Use Gal/Ac/Day for Irrigated Land
Abbeville	1.08	35,086	625	1.8	1,728
Anderson	1.61	87,393	996	1.1	1,616
Greenwood	0.09	25,075	179	0.7	503
McCormick	1.34	5,430	15	0.3	89,333

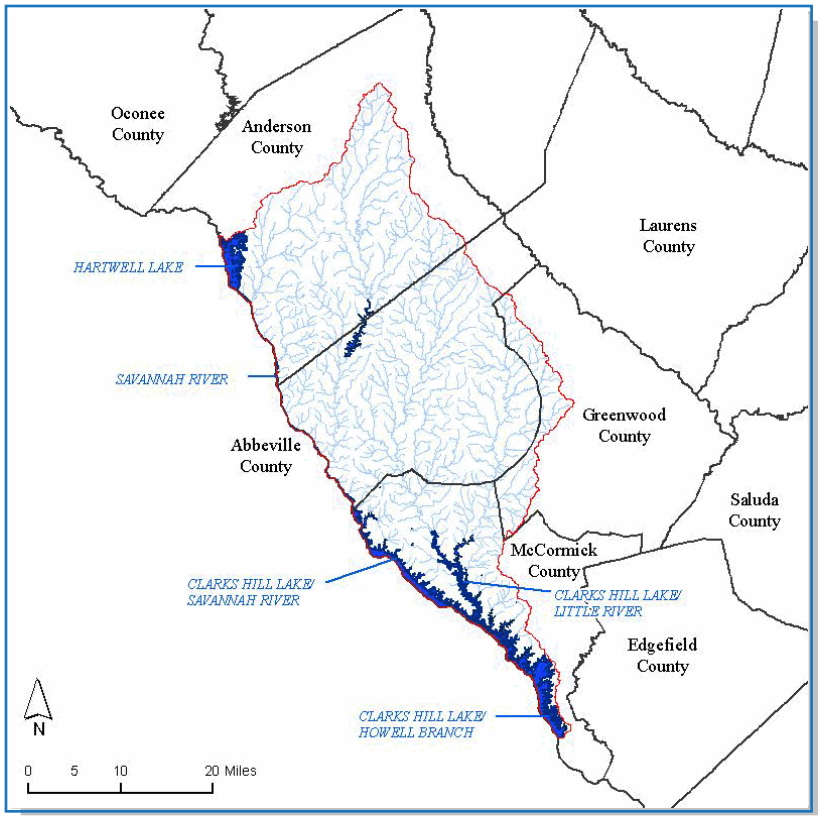


FIGURE 7:
NRCS ASSISTED FLOOD CONTROL STRUCTURES IN WATERSHED

- Flood Control Structure
- Main River
- Hydrography

Table 13:
NRCS IMPLEMENTED FLOOD CONTROL STRUCTURES

Number of Structures (in Watershed)	Maximum Storage (AcFt)	Number of Structures by Hazard Class			
		High	Low	Significant	Unclassified
0	-	0	0	0	0

RESOURCE CONCERNS

Water Quality

The number of surface water quality impairments is shown in Table 15 resulting in a "303(d)" listing of that Water Quality Monitoring Site (WQMS). Table 5 indicates what progress has been made to address surface water quality through the Total Maximum Daily Load (TMDL) process. Once a TMDL plan is approved, the WQMS is removed from the 303(d) list even though the standard may not have been attained. Note that standards for total nitrogen, total phosphorus, and chlorophyll-a only exist for lakes; therefore, no stream in the state can be listed for any of these three parameters.

The fecal coliform concern will be addressed through ongoing TMDLs (Table 5). The other primary water quality concern is related to biological (benthic invertebrate) impairments (Table 15).

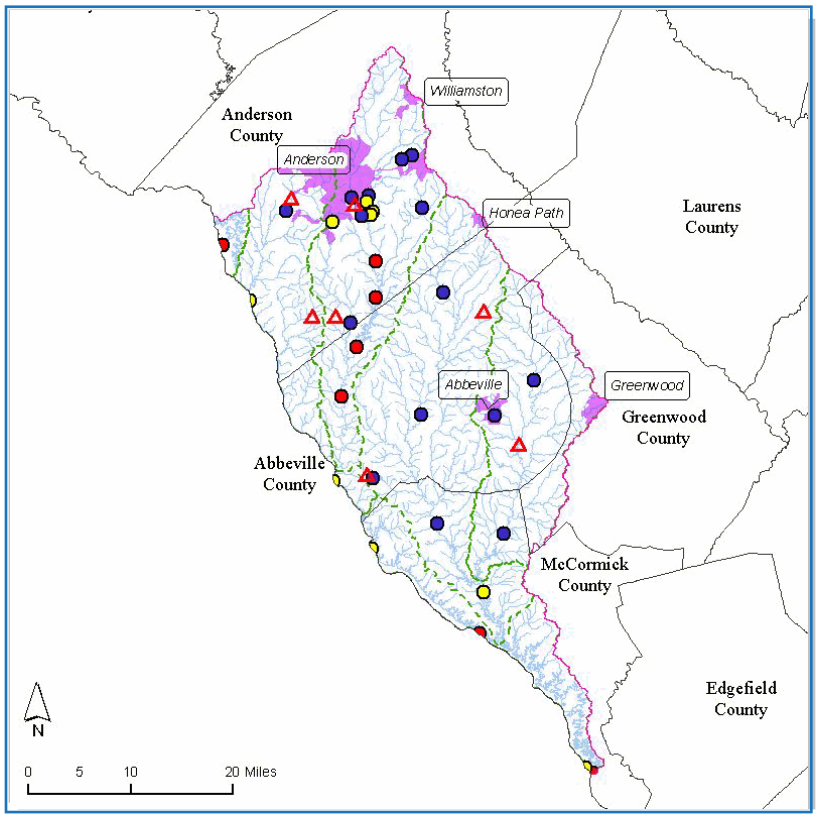


Table 14:
WATER QUALITY MONITORING SITES

Permanent Water Quality Monitoring Sites (WQMS)	31
Random Water Quality Monitoring Sites (WQMS)	29

FIGURE 8:
PERMANENT WATER QUALITY MONITORING SITES

- WQMS (No Impairment)
- WQMS (303d Listed)
- WQMS (Approved TMDL)
- Waste Water Treatment Plant
- Hydrography
- Hydrologic Unit Code 10 Boundary

Table 15:
NUMBER OF MONITORING SITES SHOWING SURFACE WATER QUALITY IMPAIRMENTS
(See SCDHEC 2006 in References for the state 303(d) list.)

Recreational Use Standard

Parameter	Impairments
Fecal Coliform	2

Fish Tissue Standard

Parameter	Impairments
Mercury	0
PCB's	1

Shellfish Harvest Standard

Parameter	Impairments
Fecal Coliform	NA

Aquatic Life Use Standard

Parameter	Impairments	Parameter	Impairments	Parameter	Impairments
Biological	10	Dissolved Oxygen	3	Total Phosphorus	1
Chlorophyll A	0	Ammonia Nitrogen	0	pH	4
Chromium	0	Nickel	0	Turbidity	0
Copper	1	Total Nitrogen	0	Zinc	0

RESOURCE CONCERNS

Plant Condition

Plants of Economic Importance

Plants of economic importance are shown in Table 16. The crops shown in this table are from NASS data where the top five crops, by acres, in each county are displayed. The timber statistics (see Clemson Extension Forest Services 2003 in References) indicate the relative importance of the timber industry within the state and the importance of the timber industry compared to agriculture within the county.

The most prominent crops in the subbasin include forage, oats, sorghum for silage and nursery stock.

Native Plant Species

According to SC DNR's "Comprehensive Wildlife Conservation Strategy: 2005 - 2010" (see SCDNR 2005 in References section), the following applies to this subbasin: the Piedmont ecoregion plant community historically consisted of oak and hickory-dominated forest with associated tree species varying by slope and soil moisture. This was the primary potential vegetation type in the Piedmont. Due to land disturbances however, today the majority of these sites exist mostly in closed canopy pine-dominated forests.

Table 16:
WHOLE COUNTY DATA OF PLANTS OF ECONOMIC IMPORTANCE IN SUBBASIN
(See: USDA NASS 2002 & Clemson University Forest Extension Services 2003 in References section)

Plant	Counties
All Wheat for grain	Abbeville, Greenwood, Anderson
Corn for silage	Anderson
Forage - land used for all hay and haylage, grass silage, and greenchop	Anderson, Abbeville, Greenwood, McCormick
Nursery stock	Abbeville
Oats	Anderson, Greenwood, McCormick, Abbeville
Pecans	Greenwood, McCormick
Short-rotation woody crops	Greenwood
Soybeans	Anderson
Timber Revenues Exceed Ag. Revenues	Abbeville, Greenwood

Table 17:
FEDERALLY LISTED THREATENED AND ENDANGERED PLANT SPECIES IN WATERSHED
(See USFW 2006 in References section.)

Common Name	Latin Name	Status
Georgia aster	*Aster georgianus*	Supported Proposals to List
Miccosukee gooseberry	*Ribes echinellum*	Threatened
Smooth coneflower	*Echinacea laevigata*	Endangered

RESOURCE CONCERNS

Fish and Wildlife

For additional information, the SC Department of Natural Resources has completed a "Comprehensive Wildlife Conservation Strategy: 2005 - 2010" (see SCDNR 2005 in References section).

In 2005, mercury advisories were issued for 57 water bodies in South Carolina. Higher concentrations of mercury in fish tissue tend to occur in the Coastal Plain of South Carolina with relatively lower concentrations (and therefore fewer advisories) in the Piedmont. For more details on fish advisories, please refer to the SCDHEC fish advisory website at: **http://www.scdhec.gov/environment/water/fish/**

Table 18:
FEDERALLY LISTED THREATENED AND ENDANGERED WILDLIFE SPECIES IN WATERSHED
(See USFW 2006 in References section.)

Common Name	Latin Name	Status
Wood stork	*Mycteria americana*	Endangered
Red-cockaded woodpecker	*Picoides borealis*	Endangered

Table 19:
FEDERALLY LISTED THREATENED AND ENDANGERED AQUATIC SPECIES IN WATERSHED
(See USFW 2006 in References section.)

Common Name	Latin Name	Status
Carolina heelsplitter	*Lasmigona decorata*	Endangered
Carolina heelsplitter	*Lasmigona decorata*	Endangered, Critical Habitat

RESOURCE CONCERNS

Domestic Animals

Grazing livestock populations are high in the subbasin (Table 20). Note also that Anderson County ranks top in the state for horse and pony population. Some confined livestock, mainly poultry, are located primarily in the northern half of the subbasin.

Table 20:
WHOLE COUNTY GRAZING ANIMAL POPULATION DATA FROM 2002 AG. CENSUS
(See NASS 2002 in References section. "D" in table = "Cannot be disclosed".)

County	Cows/Calves	Grazing/Forage (ac)	County Rank in State
Abbeville	19,123	17,796	3
Anderson	40,505	38,017	1
Greenwood	13,667	12,343	12
McCormick	3,527	3,062	(D)

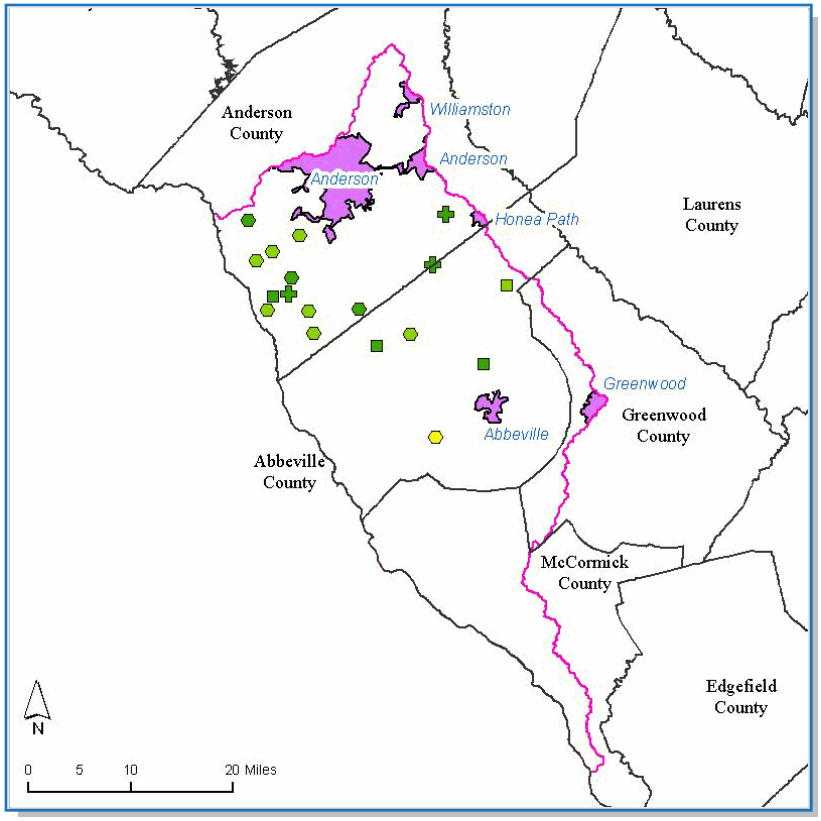
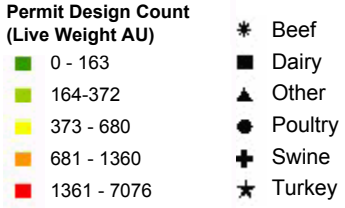


Table 21:
CONFINED ANIMAL POPULATION [As given by SCDHEC] (Au = Animal Unit = 1,000 lbs)

Beef Live Weight (Au)	-
Dariy Live Weight (Au)	652
Horse Live Weight (Au)	-
Poultry Live Weight (Au)	2,610
Swine Live Weight (Au)	122
Turkey Live Weight (Au)	-

FIGURE 9:
TYPE AND SIZE OF CONFINED ANIMAL OPERATION



ECONOMIC & SOCIAL FACTORS

The number of full-time farmers is similar to the state average of 47% and farm sizes are *smaller* than the state average of 197 ac (Table 22), suggesting average or below-average levels of participation in conservation programs in the subbasin. Farm sizes *decreased* by an estimated 8% between 1997 and 2002, whereas on average farm sizes decreased by 13% across the state for the same period. Loss of cropland between 1997 and 2002 is estimated at 3%, lower than the SC average of 8%.

The relative importance of crop and livestock commodity groups in the watershed is shown in Tables 24 and 25; a *qualitative* indication of the relative importance of timber is provided on Table 16.

For more economic and farm information from the 2002 Agricultural Census, more detailed reports for all South Carolina counties can be found at:
http://www.nass.usda.gov/census/census02/profiles/sc/index.htm

Table 22:
2002 FARM CENSUS DATA (WHOLE COUNTY DATA SHOWN) (SC average farm size = 197 ac)

County	Total Number of Farms	% Full Time Farmers	% Farms > 180 (ac)	Average Farm Size (ac)
Abbeville	538	47%	26%	177
Anderson	1,644	46%	15%	108
Greenwood	501	46%	20%	161
McCormick	97	38%	34%	240
Weighted Avg*	**1,112**	**46%**	**20%**	**142**

Table 23:
2002 FARM CENSUS ECONOMIC DATA (WHOLE COUNTY DATA SHOWN) (Results in $1,000)

County	Market Value of Ag Products Sold	Market Value of Crops Sold	Market Value of Livestock, Poultry, and Their Products	Farms with sales < $10,000
Abbeville	11,155	2,849	8,306	433
Anderson	37,046	14,916	22,130	1,352
Greenwood	5,719	1,211	4,508	-
McCormick	1,530	132	1,397	76
Weighted Avg*	**24,437**	**9,164**	**15,274**	**894**

Table 24:
VALUE OF CROP COMMODITY GROUPS - COUNTY RANK IN STATE
(See NASS 2002 in References section. "D" in table = "Cannot be disclosed".)

County	Value of All Crops	Grains & Oilseeds	Tobacco	All Cotton	Vegetables & Melons	Fruits, Nuts, & Berries	Nursery, Etc.	Christmas Trees & Woody Crops	Hay & other Crops
Abbeville	36	37	-	(D)	43	34	(D)	30	(D)
Anderson	17	26	-	30	20	16	6	7	3
Greenwood	43	(D)	-	-	32	13	33	(D)	34
McCormick	46	(D)	-	-	(D)	42	(D)	(D)	46

* Weighted averages are estimated based on agricultural land use area.

ECONOMIC & SOCIAL FACTORS

Table 25:
VALUE OF LIVESTOCK AND POULTRY COMMODITY GROUPS - RANK IN STATE
(See NASS 2002 in References section. "D" in table = "Cannot be disclosed".)

County	Value of Livestock, poultry	Poultry, Eggs	Cattle & Calves	Milk & Dairy	Hogs & Pigs	Sheep & Goats	Horses, etc.
Abbeville	25	(D)	3	(D)	32	9	34
Anderson	15	19	1	5	18	1	3
Greenwood	30	28	12	21	(D)	21	29
McCormick	41	(D)	(D)	(D)	(D)	34	44

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APPENDIX

Level III Common Resource Area (Ecological Region) Descriptions

Piedmont (45)

The Piedmont is an erosional terrain with some hills; the soils are generally finer-textured than those found in coastal plain regions with less sand and more clay. Piedmont soils are moderately to severely eroded; most of this region is now in planted pine or has reverted to successional pine and hardwood woodlands, with some pasture; spreading urban- and suburbanization is apparent. The Piedmont of South Carolina is divided into five level IV ecoregions: Southern Inner Piedmont (45a), Southern Outer Piedmont (45b), Carolina Slate Belt (45c), Triassic Basins (45g) and Kings Mountain (45i).

NRCS Conservation Practices used for Conservation Treatment Categories in Table 3

Report Category	Practice Codes
Buffer and Filter Strips	332, 391, 393, 412
Conservation Tillage	324, 329, 329A, 329B, 344, 484
Erosion Control	327, 328, 330, 340, 342, 561, 585, 586
Irrigation Water Management	441, 449
Nutrient Management	590
Pest Management	595
Prescribed Grazing	528, 528A
Trees and Shrubs	490, 612, 655, 656, 66
Wetlands	657, 658, 659
Wildlife Habitat	644, 645

Hydrologic Unit Numbering System

In 2005, the NRCS in cooperation with the U.S. Geological Survey, the South Carolina Department of Health and Environmental Control, and the U.S. Forest Service updated the South Carolina part of the USGS standard hydrologic unit map series. The report, "Development of a 10- and 12- Digit Hydrologic Unit Code Numbering System for South Carolina, 2005", describes and defines those efforts. The following is from the Abstract contained in that report: "A hydrologic unit map showing the subbasins, watersheds, and subwatersheds of South Carolina was developed to represent 8-, 10-, and 12-digit hydrologic unit codes, respectively. The 10- and 12-digit hydrologic unit codes replace the 11- and 14-digit hydrologic unit codes developed in a previous investigation. Additionally, substantial changes were made to the 8-digit subbasins in the South Carolina Coastal Plain. These modifications include the creation of four new subbasins and the renumbering of existing subbasins." The report may be obtained at **http://www.sc.nrcs.usda.gov/technical/HUC_report.pdf**. See Table 2 in the report for a cross-reference of old to new 8-digit HUC.

This subbasin profile uses the new HUC 8 numbering system with its modified and newly created subbasins. The NRCS reports implemented practices by 8-digit Hydrologic Unit Code. All NRCS reported Conservation Practices were reported using the older numbering system. 2005 and 2006 data were converted to the new HUC 8 numbering system through the Latitude and Longitude data reported with the applied practice. The use of these differing numbering systems has resulted in some NRCS implemented practices being credited in this report to an 8-digit HUC as reported by the NRCS but not correctly credited in the new numbering system. Likewise, the newly created 8-digit HUC will not be credited with the 2004 applied practices.