# Watershed Plan and Environmental Assessment

NRCS Natural Resources Conservation Service

## *Chattooga River Watershed*

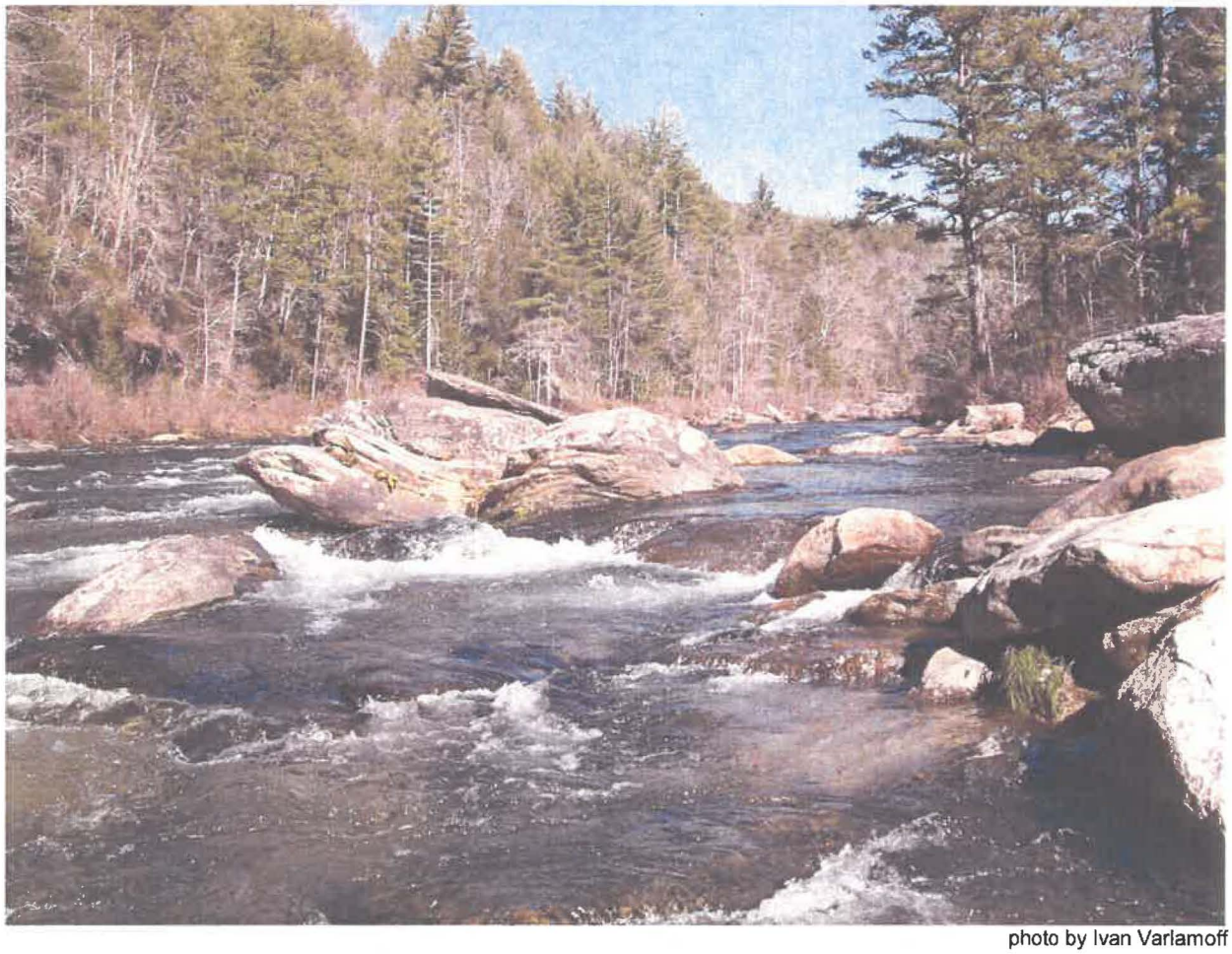


photo by Ivan Varlamoff

***Macon, North Carolina***
***Oconee, South Carolina***
***Rabun, Georgia***

***July 2006***

# Watershed Plan - Environmental Assessment

## Chattooga River, Georgia, North Carolina, and South Carolina

**Prepared for:**
Blue Ridge Mountain Soil and Water Conservation District
Macon County Soil and Water Conservation District
Oconee County Soil and Water Conservation District

**Prepared by:**
United States Department of Agriculture
Natural Resources Conservation Service
University of Georgia College of Agriculture and Environmental Sciences

**In Cooperation With:**
Blue Ridge Mountain Soil and Water Conservation District
City of Clayton
City of Mountain City
Chattooga River Coalition
Chattoga River Watershed Group
Georgia Environmental Protection Division, Water Protection Branch
Georgia Forestry Commission
Georgia Soil and Water Conservation Commission
South Carolina Forestry Commission
Stekoa Creek Steering Committee
U.S. Environmental Protection Agency Region 4
USDA-Farm Services Agency
USDA-Natural Resources Conservation Service

**Project Location:**
Macon, North Carolina, Oconee County, South Carolina and Rabun County, Georgia

**For more information:**
Mr. James E. Tillman, Sr.
State Conservationist
USDA-Natural Resources Conservation Service
355 East Hancock Avenue
Athens, Georgia
706/546-2073

# Watershed Plan - Environmental Assessment
# for
# Chattooga River Watershed, Georgia

## Contents:

# Watershed Plan - Environmental Assessment
# Chattooga River Watershed, Georgia

## SUMMARY OF WATERSHED PLAN

**Project Name:** Chattooga River Watershed

**Counties:** Macon, Oconee, Rabun,

**States:** North Carolina, South Carolina, Georgia

**Sponsors:** Blue Ridge Mountain, Macon County and Oconee Soil and Water Conservation Districts

**Description of Recommended Plan:**
The Recommended Plan Alternative consists of implementing the existing EQIP, CRP, and other Farm Bill Programs on agricultural lands within the watershed. Under this alternative, it is estimated that land treatment will occur on 849 acres of cropland and 5,623 acres of pasture over the next 25 years of the evaluation period. Animal waste management practices would be installed on 42 beef operations and12 poultry operations. Funds from ongoing NRCS Conservation Programs will be sufficient to install adequate Resource Management Systems on any land based or animal operation.

**Table 1: Chattooga River Watershed – Land Cover**

| Land Cover | Acres | Percent |
|---|---|---|
| Cropland | 849 | 0.34 |
| Pasture | 5,623 | 2.27 |
| Orchard | 650 | 0.26 |
| Forest - Private | 78,061 | 31.45 |
| Forest - Public | 153,053 | 61.26 |
| Forest – Harvest | 7,096 | 2.86 |
| Wetlands | 88 | 0.04 |
| Open Water | 871 | 0.35 |
| Urban | 1,781 | 0.72 |
| Other Lands (Development) | 1,156 | 0.47 |
| **TOTAL** | **248,228** | **100.00** |

**Project Beneficiaries:**
The watershed is oriented primarily to agriculture, forestry, and recreation. Broiler production and vegetable farms are by far the largest agricultural operations in the drainage basin. In addition, there are vineyards sprouting up for a growing wine making industry. The Chattooga River was designated a National Wild and Scenic River by Congress in 1974. As a result, no motorized vehicles are allowed within ¼ mile of its banks. Man-made facilities are minimal within the riparian zone and consist primarily of hiking trails. The Chattooga River was made popular in a 1972 movie Deliverance. It has Class 4 and 5 rapids and was chosen as the venue for white water rafting in the 1996 Olympics. As a result, it is a very popular tourist attraction and provides many recreational opportunities in the form of white water rafting, hiking, camping, boating and fishing. Clayton is the largest city in the watershed with a population (2000 census) of 2,019. Per capita income (2003) in the Rabun County area that includes most of the watershed average is $23,281 compared to $29,000 for the state and $31,472 for the nation.

**Threatened and Endangered Species:**
There are 2 species of animals and 4 plants in Georgia that occur on the Federal List of Threatened and Endangered (T&E) Species and known to be present in the watershed.

**Cultural Resources:**
There are 4 listings on the Historic Register in the watershed. These include the Kilby, James Henry and Rachel House located in Clayton, Bleckley House in Clayton, Tallulah Falls Depot in Tallulah Falls Depot, and the York House located in Mountain City. Historic and prehistoric artifacts have been found throughout the watershed project area.

**Problem Identification:**
Erosion and sedimentation has degraded water quality in eight streams of the Chattooga River Watershed to the point where they no longer meeting their designated use. Four of these streams – Stekoa Creek, Cherchero Creek, Saddle Gar Creek, Warwoman Creek – are also impaired from fecal coliform bacteria. As a result, the US Environmental Protection Agency [EPA] has developed two Total Maximum Daily Loads [TMDL] on these stream segments; one for fecal coliform and one for sediment. Additionally, new TMDLs were proposed and finalized on the State of Georgia's 2004 303d list [Table 1].

**Table 2. Stream segments not meeting their designated use in the Chattooga River Watershed and cause of impairment and date of TMDL.**

| Stream Segment | Cause of Impairment | Date of TMDL |
|---|---|---|
| Chechero Creek | Sediment, Fecal Coliform | 2004 |
| Law Ground Creek | Sediment | 2004 |
| Pool Creek | Sediment | 2004 |
| Roach Mill Creek | Sediment | 2004 |
| Saddle Gap Creek | Sediment, Fecal Coliform | 2004 |
| Scott Creek | Sediment | 2004 |
| Stekoa Creek | Fecal Coliform | July 1997 |
| Stekoa Creek | Sediment | February 2000 |
| Stekoa Creek | Sediment | 2004 [Additional Segment] |
| Warwoman Creek | Sediment | 2004 |

Source: EPD – 2004 303[d] list of impaired streams.

Suspected fecal sources, from modeling activities, in the watershed include the Clayton's waste treatment facility, and it's associated drainage network, agriculture livestock and poultry operations, marginal septic systems, and wildlife. Modeling activities by EPA have identified sediment sources to include rural unpaved roads, road banks [paved roads and unpaved roads], development [particularly in Clayton, and along US Highway 441], streambanks, streambeds, agricultural operations, and silvicultural operations. Table 2 shows land-use of the Chattooga River Watershed and the estimated sediment contributions of by each land-use.

**Table 3. Land Use Acres and Estimated Sediment Contributions from Upland Sources by Land Use in the Chattooga River Watershed.**

| Land Use | Acres | Sediment Contribution [%] |
|---|---|---|
| Cropland | 849 | 1.00 |
| Pasture | 5,623 | 0.00 |
| Orchard | 650 | 0.00 |
| Forest - Private | 78,061 | 12.00 |
| Forest - Public | 153,053 | 23.00 |
| Forest – Harvest | 7,096 | 42.00 |
| Wetlands | 88 | 0.00 |
| Open Water | 871 | 0.00 |
| Urban | 1,781 | 0.00 |
| Other Lands (Development) | 1,156 | 20.00 |
| **TOTAL** | **248,228** | **100.00** |

Source: NRCS-Georgia, Agricultural Water Quality Watershed Assessment Model. March 2004

This project proposal brought together Federal and state government officials along with locally elected officials, major land-users, and other residents to identify, and agree upon, pollutant sources and appropriate implementation strategies to address the pollutants of concern.

In addition to having two current, and eight proposed, TMDLs at the time of writing the 319(h) grant proposal, The Chattooga River Watershed was selected as one of seventeen Category I watersheds under the Unified Watershed Assessment [UWA]. The Stekoa Creek sub-watershed, which has five of the eight impaired stream segments, was also identified as a priority sub-watershed in Georgia's statewide Watershed Restoration Action Strategy [WRAS]. EPD, the USDA-Natural Resources Conservation Service [NRCS], and the Georgia Soil and Water Conservation Commission [GSWCC] prepared Georgia's UWA and statewide WRAS.

The Georgia TMDL Implementation Steering Committee [TMDL-ISC] also identified Stekoa Creek as one of the six highest priority sub-watersheds for TMDL related implementation activities. The TMDL-ISC is an interagency alliance working together to address TMDLs that have been developed across Georgia. The TMDL-ISC is coordinated, and chaired, by the Georgia Environmental Protection Division [EPD].

Despite significant resources and attention given to the Chattooga River Watershed, uncertainty remains. Some of this can be attributed to the fact that resources used to date have focused on determining the extent of water quality impairments, and developing tools to link potential sources with actual impairments. While improvements were made each day, much of the

uncertainty that remained was attributed to the fact that a locally led planning effort had not taken place. By using an established planning process, as outlined by the NRCS National Planning Procedures Handbook [NPPH] and National Watershed Manual Handbook, this project resulted in an enhanced WRAS as outlined in guidance provided by EPA.

**Alternative Plans Considered:**
In the formulation process, four alternative watershed plans were considered. A No Action Plan, which is defined as no additional action from NRCS was quantified. Under this alternative, continued use of the Environmental Quality Incentives Program [EQIP] and Conservation Reserve Program [CRP] activities directed toward improving water quality and enhancing environmental resources would be maintained. Another alternative considered was a Minimum Action Plan. The Minimum Action Plan consists of installing additional BMP on harvested forestland and on developing land.

**Project Purpose:** Watershed Protection and Improvement of Water Quality.

**Principal Project Measures:**
The Recommended plan includes land treatment measures on approximately 6,472 acres of agricultural lands including eroding pastures and cropland; and proper utilization of animal waste using the following practices:

- conservation cover and cropping rotations
- critical area planting
- diversions/curbing
- fencing and cross fencing
- field borders
- filter strips
- grassed waterways
- heavy use area protection
- livestock water supply
- manure transfer nutrient management
- pest management
- residue management
- riparian forest buffers
- streambank protection
- compost facility
- stream crossings
- waste management system
- waste storage structure
- waste treatment lagoon or pond
- waste utilization system
- pasture and hayland planting

| **Project Costs (Dollars):** | PL-566 Funds | Other Funds | Total |
|---|---|---|---|
| Land Treatment | 0 | 78,998 | 78,998 |
| Animal Waste Mgt. | 0 | 636,105 | 636,105 |
| Technical Assistance | 0 | 143,021 | 143,021 |
| Project Administration | 0 | 35,755 | 35.755 |
| TOTAL | 0 | 893,879 | 893,879 |

**Monetary Benefits (Average Annual):**

Agricultural Related: $ 0
Non-Agricultural Related: $221,945
Total Monetary Benefits: $221,945

Project Benefits: (Price Base 2004)

**Non-Monetary Benefits:**
The project will enhance the aesthetic and environmental quality of the Chattooga River watershed and drainage area. Benefits to the area resources will be realized by improving water quality by reducing excessive sediments and nutrients. Wildlife habitats will be improved and odor from animal waste will be reduced. The potential for health and safety problems from impaired water quality will be reduced and the overall well-being in the communities will improve.

| Resource | Impact |
|---|---|
| Land Use Changes | **No Impact** |
| Wooded Flood Plains | **Positive Impact: Flood plain areas void of vegetation caused by roaming cattle will be managed and allowed to grow back in native riparian vegetation.** |
| Fisheries | **Positive Impact: Impaired fish habitats will decrease, allowing fish yields to increase.** |
| Wildlife Habitat | **Positive Impact – Impaired riparian wildlife habitats will be restored.** |
| Wetlands | **Positive Impact – Riparian buffers and decreased sedimentation will allow natural hydrologic process to begin a natural restoration process.** |
| Cultural Resources (No. & Type) | **No Impact** |
| Prime Farmland (Ac) | **No Impact** |
| Compensatory Mitigation: | **None** |

# INTRODUCTION

The initial phases, or pre-planning activities, of the NRCS planning process began in the Chattooga River Watershed prior to the grant. EPA and the USFS conducted a number of preliminary investigations to identify water quality problems, and potential sources of those problems. Cooperating agencies met on December 18, 2000 and February 9, 2001 in Clayton, Georgia to discuss the TMDLs and assess available opportunities. Participants of this process are currently identified as the Chattooga River Watershed Group. During their first meeting, the Group developed a Steering Committee and Technical Advisory Committee. Both of these committees include representation from urban, development, municipal, environmental, forestry, and agricultural interests. Both committees agreed, during their second meeting, that pursuing Section 319[h] funds to assist with facilitating a detailed NRCS-Planning Process will better define TMDL sources and increase the likelihood of acquiring BMP implementation funds.

The plan also serves as a basis and justification for requesting funds to implement the watershed project. As such, this plan was developed following the NRCS Planning Process outlined in the NRCS-National Planning Procedures Handbook. It also conforms to the criteria established in the NRCS-National Watershed Manual, Economic and Environmental Principles and Guidelines, and other NRCS watershed planning policy. Among all alternatives considered, the Recommended Plan is the most environmentally acceptable alternative. The NRCS planning process contains provisions for public participation, technical analysis [i.e. water quality analysis], economic analysis, and a formal interagency review process. This plan serves as documentation of these provisions for the Chattooga River Watershed.

The Chattooga River is a subwatershed located in the Tugaloo River Watershed (03060102) that is 248,228 acres. This project is the key to long-term recovery of this important regional resource. All information and data, except as otherwise noted, were collected during watershed planning investigations or were previously collected by USDA and other natural resource agencies.

This watershed protection plan addresses the regions soil, water, air, plant, and animal resources by protecting water quality, reducing offsite sedimentation damage, reducing nutrient and bacterial offsite transport, sustaining productivity of the soil resource base, and improving the social and economic resources in the area.

# PROJECT SETTING

This section of the watershed plan and environmental assessment describes pertinent physical, social, and economic features of the Chattooga River Watershed. Some conditions within the watershed will be constant throughout the evaluated life of the project [i.e. physical features], while others will be subject to change because of social, economic, and political influences.

## PHYSICAL FEATURES

1. Current Project Location:

The project is located in the Chattooga River Watershed, which is part of the Tugaloo River Basin (MLRA 165). Headwaters of the Chattooga are in the Nantahala National Forest and private lands in North Carolina. Flowing southward out of North Carolina, they form approximately 40 river miles of boundary between Georgia and South Carolina. The river drops 3,000 feet elevation at its headwaters to 950 feet at its termination into Lake Tugalo. It is under the control and protection of the Chattahoochee National Forest in Georgia, Sumter National Forest in South Cardina, and the Nantahala National Forest in North Carolina. The project area includes sub-watersheds 306010201, 306010206, and 306010207. The total project area is 248,228 acres of which 40,877 is located in Macon County, North Carolina, 103,852 is found in Oconee County, South Carolina, and 103,499 is situated in Rabun County, Georgia. A location map of the watershed is displayed on page 11.

2. Streams, Lakes, and Wetlands

**Streams** – There are 679 miles of streams in the watershed. The Chattooga River is the main stem water, and other creeks include: Stekoa Creek, Warwoman Creek, West Fork of the Chattooga River, Chauga River, Taylor Creek, and Whetstone Creek.

**Lakes** – There are 680 acres of constructed lakes and ponds within the watershed. The most prominent lakes include Tugaloo Lake, Chattooga Lake, and Mountain Rest Lake. The watershed contains a few natural ponds, bays, or beaver ponds and associated forested wetlands.

**Wetlands** - The wetlands along with streams and ponds are estimated at 2,825 acres. Most wetland acres are associated as forested wetlands. Approximately 9,277 acres are considered flood plains.

3. Topography

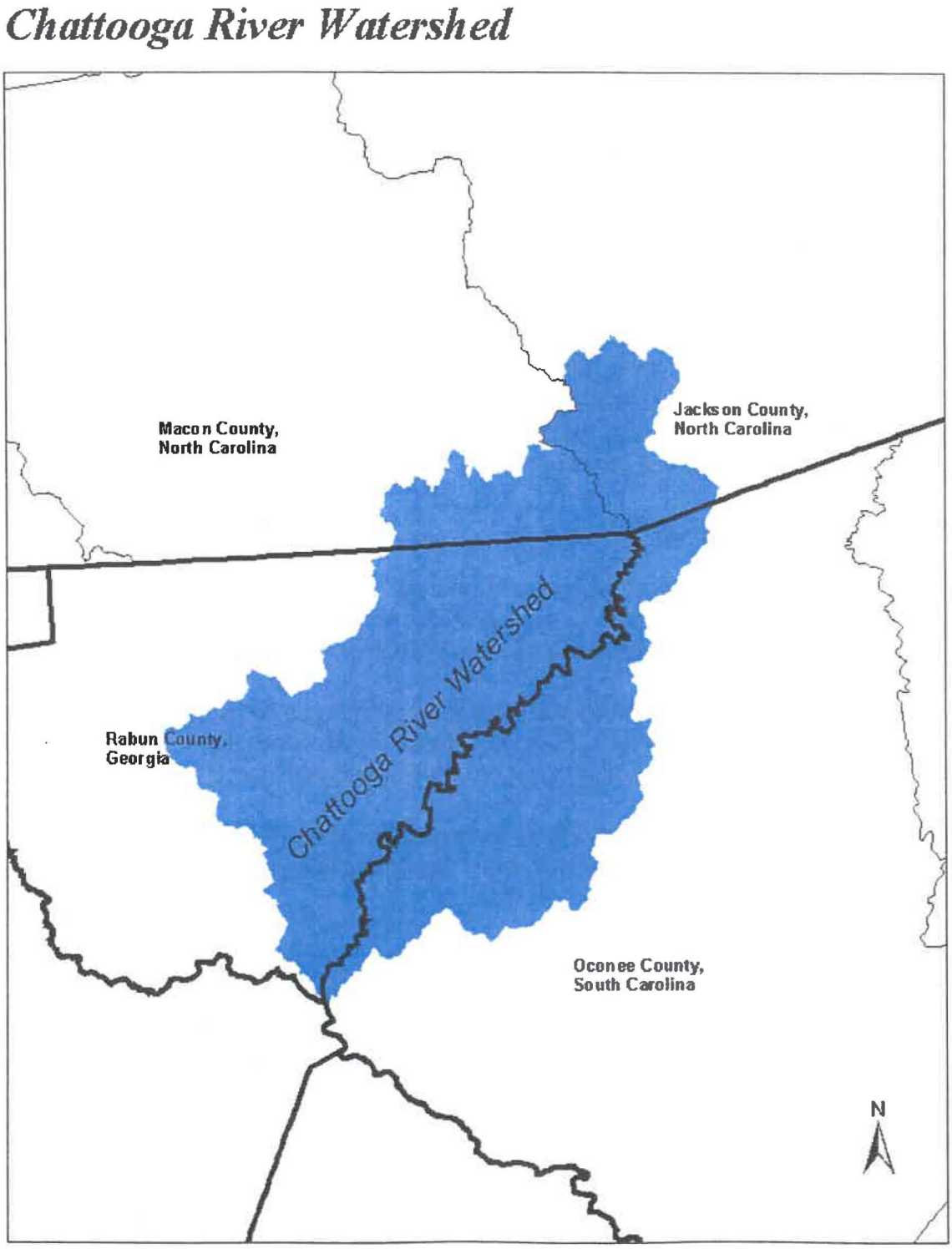
The Chattooga River Watershed is approximately 45 miles in length with elevations ranging from 227 feet mean sea level (MSL) near the watershed terminus to 1250 feet MSL in the headwaters.

4. Climate

The climate of the watershed is humid with hot summers and cool winters. Summer temperatures average 85 degrees F. and winter temperatures are rarely lower than 20 degrees F. The average annual temperature is 57 degrees F. Precipitation is heavy throughout the year averaging 71 inches. The median number of growing days per year is 233. Last frost in the

spring is generally between April 21 and May 9. First frost in the fall usually occurs between October 7 and October 22. It is normal to have more than 0.10 inch of rain per day 104 days out of the year.

## Figure 1 – Project location Map



5. Soils

An estimated 6,083 acres (2.5 percent) of the watershed soils are listed as prime farmland. An estimated 1,159 acres is in Macon County, North Carolina, 2,068 in Oconee County, South Carolina, and 2,856 in Rabun County, Georgia. The predominate upland soils are Ashe, Bradson, Dillard, Hayesville, and Saluda while Toxaway, Toccoa, and Transylvania-Toxaway are predominate lowland soils.

6. Geology

The watershed lies in the Blue Ridge Physiographic Province of northeast Georgia underlain mostly by Precambrian and older Paleozoic crystalline rocks that include metagraywacke, mica schist, and aluminous schist. Within this portion of the Blue Ridge rock units are generally aligned to the northeast parallel to regional structures, while surface water flows are generally southerly. Important regional structures include the Warwoman Shear in the middle of the watershed and the Brevard Zone Cataclasis located below the outlet.

7. Fish Habitat

There are 680 acres of water contained in streams, small lakes, farm ponds, and natural ponds. Fish populations in these water bodies depend on the degree of management and water quality. Fish species identified in the watershed include three species of trout, redeye bass, largemouth bass, bluegill, northern hogsucker, river chub, saffron shiner, yellow shiner, and darters.

8. Wildlife Habitat

There are six different natural environments identified within the watershed. The riverbank zone has soils that are rocky and sandy and support trees like the sycamore, sweetgum and persimmon. The floodplain forest found between the riverbank and slope forests have common hardwoods like the red maple, tulip-poplar, dogwood, sourwood and sassafras and conifers such as the shortleaf pine, white pine and Virginia pine. The cove forest is rare and has common trees include red oak, basswood, hemlock, sweetshrub, and pawpaw. The slope forest contains hardwoods like hickories, tulip-poplar, black oak, beech, and sour wood. Ridge tops and upland oak forest have several species of oak and hickory, sourwood and dogwood while the pitch-pine communities have pitch-pine and a variety of oaks. Cliff and gorge walls have little vegetation - some moss and from time to time hemlock.

Wild game in the Chattooga area includes black bear, white tailed deer, and wild turkey. Small game are prevalent, and include squirrels and cottontail rabbits. Other harvestable game species occurring within the watershed are raccoon, crow, bobcat, opossum, foxes, and a variety of waterfowl. Wood ducks occur throughout the watershed and other waterfowl species are concentrated around larger lakes.

Nongame species of wildlife are abundant throughout the watershed. Upland and wetland habitats play host to a variety of migratory and resident songbirds. Common resident and seasonal species include pileated woodpecker, southern bald eagle, great horned owl, great blue heron, broad-winged hawk, ruffed grouse, wood thrush, titmouse, scarlet tanager, and barred owl. In addition, these habitats support a variety of reptiles and amphibians found throughout the watershed such as the copperhead snake, snapping turtle, and timber rattlesnake. In

particular, riparian areas are very important during reproduction and serve to help these species regulate body temperature by providing shore and wetlands.

10. Threatened and Endangered Species

There are 2 species of animals (Bald eagle and Bog turtle) and 4 plants (Oconee-bells, Rock Gnome Lichen, Small whorled pogonia, and Swamp pink) in Georgia that occur on the Federal List of Threatened and Endangered (T&E) Species and are known to be present in the watershed area.

11. Cultural Resources, Natural and Scenic Areas, and Visual Resources

There are 4 listings on the Historic Register in the watershed. These include the Kilby, James Henry and Rachel, House located in Clayton, Bleckley House in Clayton, Tallulah Falls Depot in Tallulah Falls Depot, and the York House located in Mountain City. Historic and prehistoric artifacts have been found throughout the watershed project area. Historic and prehistoric artifacts are thought to be common in, and geographically distributed throughout, the project area.

Because participating in the NRCS Watershed Program is voluntary, and it is unknown which specific landowners will participate. Potential adverse impacts on cultural resources will be assessed on a field by field basis with participating landowners.

Visual appearance of the watershed is less than desirable due to erosion of the landscape.

## SOCIAL AND ECONOMIC CONDITIONS

1. Social Conditions

The University of Georgia reports there are 146 farms in Rabun County with revenues sufficient to warrant consideration as a full-time operation. Average size per farm is 68 acres. There are 17 minority landowners living in the watershed, exclusive of the urban areas. Most of the land in the watershed is under private ownership.

Farmland ownership includes full time and part time agricultural producers. Conservation stewardship exists with the desire for farms to remain productive for future generations. However, the agricultural producers have requested additional technical and financial assistance in order to accelerate the implementation of conservation measures.

2. Economic Conditions

The economy of the watershed is oriented primarily to the production of non-agricultural products even though agriculture and forestry are important economically. Clayton is the largest city in the watershed with a population (2000 census) of 2,019. Per capita income (2003) in the Rabun County area that includes most of the watershed average is $23,281 compared to $29,000 for the state and $31,472 for the nation.

3. Agricultural Economy:

Agricultural related operations provide an important economic stimulus to the area contributing over $28,424,000 (2003) annually to the local economy. However, to maintain this condition, actions need to be taken to reduce onsite and offsite effects of erosion and sedimentation. Current and potential animal waste problems have also been recognized in the watershed as needing to be addressed.

a. Crops - The major crops inventoried were corn, and hay, and miscellaneous crops such as vineyards and vegetables. Collectively, these commodities were valued at $8,441,928 million in the year 2003.

b. Livestock - A total of 3,130 beef cattle exist in the watershed contribute $1.0 million annually to the watershed's economy. The average number of beef cattle per operation is 74 head. Most of the beef cattle are located on or have access to the 5,623 acres of pasture in the watershed. However, continuous grazing without pasture management practices and waste treatment systems is the common practice. Beef cattle with direct access to rivers and streams, as a source of water supply, within the watershed is also common.

c. Poultry – Poultry production is by far the highest agricultural revenue generating enterprise within the watershed. In 2003, the farm-gate value for poultry operations in Rabun County was over $10,545,304 million for 32 poultry houses. All poultry operations within the watershed are broiler operations. Most operations do not have facilities to handle and dispose of the waste being produced.

4. Non-Agricultural Economy:

a. Recreation/Tourism – The Chattooga River provides recreational opportunities such as white water rafting, boating, camping, hiking and fishing. The U.S. Forest Service estimates that in 2001, there were 42,998 boating visits to the river and the value of white water rafting was nearly $2.6 million for 2005. It is estimated that 70,000 individuals enjoy all types of recreational opportunities on the Chattooga River each year.

Recreation related businesses on the Chattooga River include outfitters, white water raft and boat rentals, service stations, restaurants, motels, and camp grounds.

b. Real Estate – Due to the increased interest of many to live in north Georgia for retirement or to have a second home, the population has increased 18.6 percent from 1990 to 2000. As a result land values have also risen. Current land values in the watershed range from approximately $10,000 per acre to as high as $600,000 per acre.

**Table 4. Chattooga River Watershed project area – Land Use.**

| Land Cover | Acres | Percent |
|---|---|---|
| Cropland | 849 | 0.34 |
| Pasture | 5,623 | 2.27 |
| Grazed Woodland | 650 | 0.26 |
| Forest - private | 78,061 | 31.45 |
| Forest – Public | 152,053 | 61.26 |
| Forest – Harvest | 7,096 | 2.86 |
| Wetlands | 88 | 0.04 |
| Open Water | 871 | 0.35 |
| Urban | 1,781 | 0.72 |
| Other Lands | 1,156 | 0.47 |
| TOTAL | 248,228 | 100 |

Source: USDA-Natural Resources Conservation Service.

a. Agricultural Lands

Agricultural lands, especially cropland account for 0.34 percent of the watershed's area. Poultry operations are the primary commodity. Currently, no acres have been signed up for conversion from cropland to permanent cover under the Conservation Reserve Program (CRP).

b. Forests

Forested land comprises nearly 96 percent of the watershed area. The Chattooga River and forested riparian buffer is protected by the Federal government as a result of the river's designation as a National Wild and Scenic River in 1974. Much of the woodland in the watershed is mixed hardwoods like oaks, maples, and pine. Oak-Hickory eastern

deciduous forests are located in the lower elevations while white pine-upland hardwoods dominate the ridge and mountain areas.

c. Future Land Use Trends

The number of farms has dropped dramatically since 1945 when there were 944 farms. Today there are only 146. Poultry farms, livestock operations and vegetable production remain steady sources of agricultural income in the area.

Interest in recreational opportunities increases and the population is growing with retirees and people seeking second homes in the area. Service sectors of the economy [i.e. shopping, dining, etc.] are also expanding in the watershed to support the increased population. Future land use projections acknowledge the potential for continued population growth, and associated development in the Chattooga Watershed.

2. Population

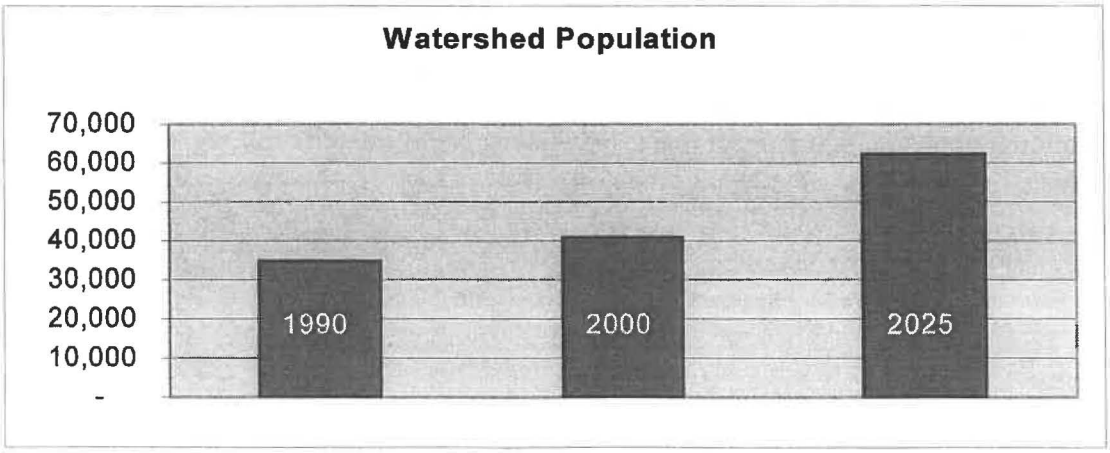
Population has increased significantly in the watershed since 1990 while land has been converted to residential and commercial uses. Population in the watershed (2000 census) is estimated at 40,892 people. The population increased approximately 17 percent between 1990 and 2000. In rural areas, the primary occupation is agriculture with manufacturing and service related industry dominating the urban areas. Population growth, to an anticipated 61,500 residents, is expected in the watershed over the next 25 years.

**Table 5. Chattooga River Watershed - Population Changes**

| 1990 | 2000 | % Change |
|---|---|---|
| 34,790 | 40,892 | + 17 |

Source: U.S. Census Bureau

**Table 6. Chattooga River Watershed - Actual and Projected Population**




Source: U.S. Census Bureau

# WATERSHED PROBLEMS AND OPPORTUNITIES

Natural resource problems and opportunities associated with the watershed, which are based on scientific investigations, resource inventories, and public concerns are identified and described in this section.

1. Watershed Problems Identified by Governmental Agencies

Water quality in eleven tributaries of the Chattooga River Watershed is not meeting their designated use. Water quality impairments were identified by the Georgia Environmental Protection Division [EPA], through their water quality monitoring program; and by the US Environmental Protection Agency, Region IV [EPA], through their biological monitoring program. The latter monitoring effort was conducted by EPA pursuant to Judge Shoob's ruling of litigation filed by several environmental law firms seeking Total Maximum Daily Load development for 303[d] listed streams in Georgia.

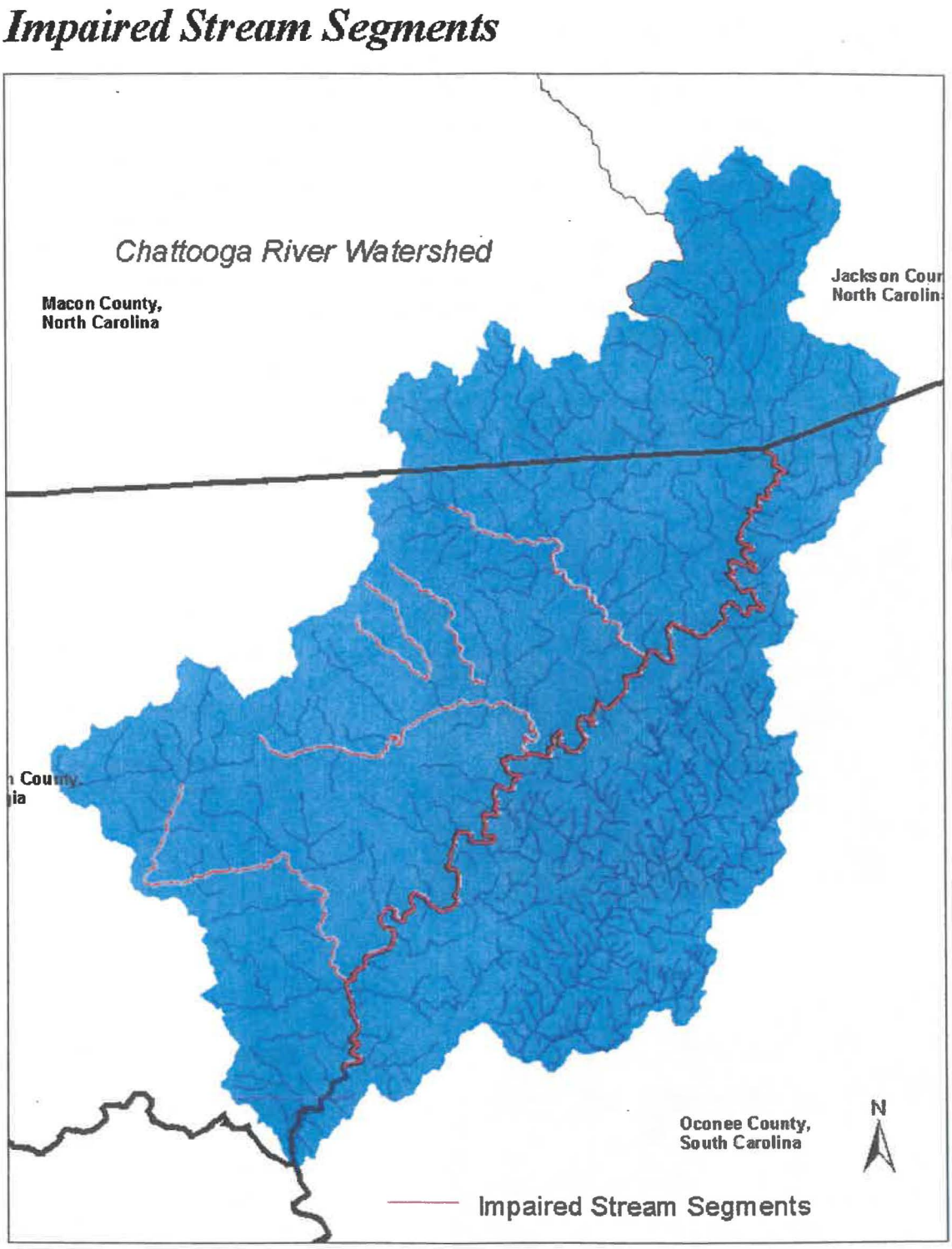
**Table 7. Impaired Stream Segments – Chattooga River Watershed.**

| CREEK | SUPPORTING | REASON | EXTENT |
|---|---|---|---|
| Cherchero Creek | Partially Support | Sediment | 1.5 Miles |
| Cherchero Creek | Partially Support | Fecal Coliform | 1.5 Miles |
| Law Ground Creed | Partially Support | Sediment | 2.3 Miles |
| Pool Creek | Partially Support | Sediment | 1.6 Miles |
| Roach Mill Creek | Partially Support | Sediment | 1.5 Miles |
| Saddle Gap Creek | Partially Support | Sediment | 4.0 Miles |
| Saddle Gap Creek | Partially Support | Fecal Coliform | 4.0 Miles |
| Scott Creek | Partially Support | Sediment | 3.5 Miles |
| Stekoa Creek | Partially Support | Fecal Coliform | 14 Miles |
| Stekoa Creek | Partially Support | Sediment | 13 Miles |
| Warwoman Creek | Partially Support | Sediment | 4 Miles |

Source: Georgia Environmental Protection Division, 303[d] list for year 2002.

The Georgia EPD established TMDLs on 32.4 stream miles for eight stream segments that are partially impaired. While developing a Total Maximum Daily Load [pollutant load limitation] for streams within the watershed, the Georgia Environmental Protection Division estimated that over 85 percent of the water quality impairments stem from agricultural related activities. Left unchecked, continued excessive erosion and sedimentation in the watershed will continue to accelerate water quality degradation, and will have the potential to diminish land productivity, reduce recreational opportunities, impact real estate values, and threaten drinking water capacity for urban areas.

**Figure 2. Impaired Streams Segments – Chattooga River Watershed.**



2. Watershed Problems Identified by Local Stakeholders

EPA and the USFS have conducted a number of preliminary investigations to identify water quality problems, and potential sources of those problems during 2000. Cooperating agencies met on December 18, 2000 and February 9, 2001 in Clayton, Georgia to discuss the TMDLs and assess available opportunities. Participants of this process are currently identified as the Chattooga River Watershed Group. During their first meeting, the Group developed a Steering Committee and Technical Advisory Committee. Both of these committees include representation from urban, development, municipal, environmental, forestry, and agricultural interests. Both committees agreed, during their second meeting, that pursuing Section 319[h] funds to assist with facilitating a detailed planning process will help resolve these TMDLs by increasing the likelihood of directing resources for BMP implementation funds to those contributing sources needing attention.

Landowners and other individuals in the watershed participated in identifying additional natural resource concerns in the watershed. The following were identified as examples of potential sources of pollutants.

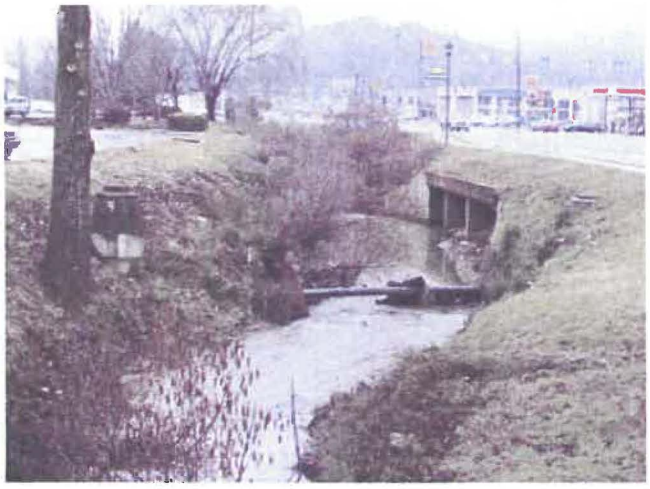


**Figure 3. Fecal Colifrom – Urban**

Aging infrastructure, specifically Clayton's sewer drainage network has been identified as a suspect source of fecal coliform bacteria.

**Figure 4. Fecal Coliform - Agriculture**

Land application of animal waste and livestock access to streams has been identified as suspected sources of fecal coliform bacteria. Also notice the unprotected streambanks, which can be a significant source of sediment.

**Figure 5. Sediment – Roads**

Many roads in the watershed run adjacent to streams, which can be a direct source of sediment deposition. The road pictured here is an example.

**Figure 6. Sediment - Development**

Recent development in, and around, Clayton has resulted in significant sediment yielding rain events. This picture shows sediment deposition in two of the three culverts at the Stekoa Creek crossing with Highway 76. Also, notice the sewer drainage network in the foreground.

3. Magnitude of Current Watershed Problems

The local public also indicated the need to maintain or improve additional natural resources, including mitigation of the potential for flooding in the floodplain, and improve social and economic opportunities. Social and economic concerns include the need to protect prime farmland, provide for human health and safety, improve local economy, provide recreational opportunities, and improve the community's transportation network. Table E shows results of a public meeting held June 21, 2004; the purpose of which was to scope resource concerns within the watershed.

The table below identifies the degree of impact for each area of concern. The degree of impact was determined through public meeting assessments and consensus of interdisciplinary team investigations.

**Table 8. Significance of Publicly Identified Concerns**

| **Economic, Environmental, Cultural, and Social Concerns** | **Degree of Significance to Decision making 1/** |
|---|---|
| Water supply | high |
| Water quality | high |
| Local economy | high |
| Human health | high |
| Property values | high |
| Flooding in floodplain | medium |
| Forest land | medium |
| Transportation | medium |
| Fish and wildlife habitats | medium |
| Sedimentation | medium |
| Animal health | medium |
| Social well being | medium |
| Recreational opportunities | medium |
| Historical and cultural properties | medium |
| Wild and scenic river | medium |
| Maintain Quality of Forest Land | low |
| Endangered species | low |
| Wetlands | low |
| Air Quality (odor and smell) | low |

1/ High - must be considered in the analysis of alternatives; medium - may be affected by some alternative solutions; low - consider, but not very significant.

4. Inventory and Forecasted Conditions

Surface water quantity and quality were identified as the highest resource concerns of local watershed residents. Much of this concern can be attributed to the Georgia Environmental Protection Division's identification of 32 stream miles within the watershed not meeting their designated use. The resulting TMDL's identified agriculture and forestry as major contributors of stream impairment and provided the impetus for resource concerns for the watershed.

Excessively eroding forest and cropland pasture increase the potential for deposition of sediment offsite and into the watershed streams. Because biological impairments were the water quality criterion violated, which subsequently caused 30 miles of watershed streams be classified as impaired, watershed residents felt that fish and wildlife habitats should be identified as a major resource concern to be considered throughout this planning effort. Biological impairments within the watershed are closely correlated with sediment deposition from upland sources. Many livestock producers recognized the need to exclude livestock from streams and other waterbodies. Therefore, water quantity was a major resource concern for local stakeholders. Realizing that TMDL's, increased regulations associated with Combined Animal Feeding Operations, and future regulatory pressures on agriculture, producers indicated a desire to ensure an adequate supply of good quality water for their animals.

Suspected fecal sources, from modeling activities, in the watershed include Clayton's waste treatment facility, and its associated drainage network, agriculture livestock and poultry operations, marginal septic systems, and wildlife. Modeling activities by EPA have identified sediment sources to include rural unpaved roads, road banks [paved roads and unpaved roads], development [particularly in Clayton, and along US Highway 441], streambanks, streambeds, agricultural operations, and silvicultural operations. Table 2 shows the estimated sediment contributions of by each land-use. Preliminary estimates are identified in EPA's TMDL documents.

**Table 9. Land Use Acres and Estimated Sediment Contributions from Upland Sources by Land Use in the Chattooga River Watershed.**

| Land Use | Acres | Sediment Contribution [%] |
|---|---|---|
| Cropland | 849 | 1.00 |
| Pasture | 5,623 | 0.00 |
| Orchard | 650 | 0.00 |
| Forest - Private | 78,061 | 12.00 |
| Forest - Public | 153,053 | 23.00 |
| Forest – Harvest | 7,096 | 42.00 |
| Wetlands | 88 | 0.00 |
| Open Water | 871 | 0.00 |
| Urban | 1,781 | 0.00 |
| Other Lands (Development) | 1,156 | 20.00 |
| **TOTAL** | **248,228** | **100.00** |

Source: NRCS-Georgia, Agricultural Water Quality Watershed Assessment Model. March 2004

Historic trends indicate that livestock and poultry numbers, land use and management of agricultural operations in the watershed will have the potential to increase over the projected 25 year evaluation period without strong external incentives and accelerated program opportunities. However, with the likelihood of increased urban influences from Atlanta, the expected agricultural growth is forecasted as a constant with regard to animal numbers.

The following table identifies current problems and future conditions that are likely in the Chattooga River Drainage area **without** project treatment for the next 25 years. These projections are based on projected land use, water quality modeling, and consensus of Technical Advisory Team Members.

| Current Conditions | Future Conditions |
|---|---|
| 32 Miles of Streams Not Supporting Designated Use | 40 Miles of Streams Not Supporting Designated Use |
| Excessive Sedimentation in Riparian Areas | Change of Bottomland Habitat to Drier Land Species |
| Marginally Adequate Water Supply for Livestock | Few Options for Safe and Plentiful Livestock Water |
| Limited Potential for Human Health Risk | Increased Potential for Human Health Risk |
| Game and Fish Habitats Threatened | Loss of Game and Fish Habitats |
| Recreation Activities Contribute Significantly to Local Economy | Recreation Activities and Revenues Increases don't reach full potential |
| Real Estate Values are Increasing in the Chattooga River Watershed. | Real Estate Value in the Chattooga River Watershed don't reach full potential |

5. Watershed Problem Sources

It is recognized that industrial, municipal, residential, and other land uses are major source contributors to the concerns identified. Total Maximum Daily Loads [TMDLs] have been developed for eight of the watershed's rivers and streams. The U.S. Environmental Protection Agency, Region IV and the Georgia EPD identified agriculture as a source of water quality impairments. Local, state, and federal natural resources experts also expressed concern that agriculture could be a contributing factor.

From scientific assessment of agricultural operations in the watershed, it was determined that approximately 215 tons of waste from beef operations, and 12 tons of waste from poultry operations are delivered to streams in the Chattooga River Watershed annually. This amount of waste contains 17 tons of N and 3 tons of P.

**Figure 7. Unfenced pasture**

Manure produced by beef cattle is deposited on poorly maintained pastures. Runoff of animal waste from some beef operations is common after rainfall events. Beef cattle congregate in streams and graze on poor quality pastureland, while poultry operations are without adequate systems to store, handle, and use their waste properly. Manure is land applied at a rate 258 tons of nitrogen and 114 tons of phosphorus annually. Commercial fertilizer is currently applied at a rate of 411 tons of N and 45 tons of P to cropland and pastures in the watershed, which also contributes nutrients to the watershed streams. After accounting for natural losses of N and P, a combined 669 tons of N from animal waste and commercial fertilizer is applied to cropland and pasture within the watershed each year, which is well in excess of the 400 tons of N needed. With respect to P, an estimated 159 tons are applied to cropland and pasture each year when the P needed is 45 tons per year. Excess nutrients are transported to rivers, streams, and lakes within the watershed during storm runoff. Some of the N and P is lost to the atmosphere, leaches into groundwater, or is attached to soil particles, which may also runoff during storm events into the watershed's water bodies.

Poor pasture quality, animal access areas and trails, and severe stream bank degradation are also primary contributors of water quality problems. Erosion from cropland and pasture totals 9,897 tons per year. Of this total, 1,753 tons are delivered offsite annually into the watershed streams and wetlands.

**Figure 8. Pasture Erosion**

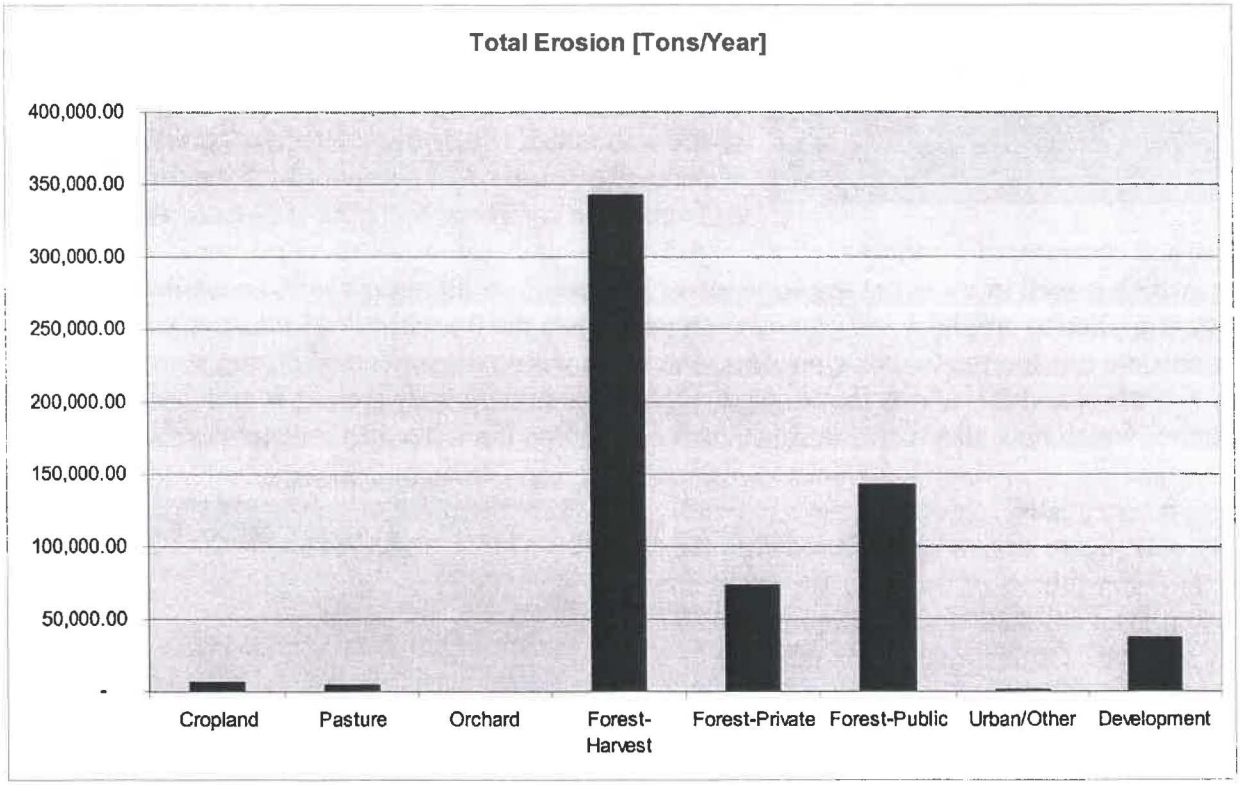
Agricultural related problems in the watershed can be grouped into several source areas. These include:

- Eroding pasture and cropland
- Inadequate management and disposal of animal waste onsite.
- Animal access to streams and streambanks.
- Streambank riparian degradation and sedimentation from animal walkways.

In addition to contamination to the watershed by agriculture, a UGA study by Agricultural and Applied Economics [Marselli 2002] identified leaks in the sewage distribution system as a major contributor to water quality impairments. The City of Clayton, recognizing a need to update their aging infrastructure, applied for and received a GEFA grant to address these issues.

Sediment contamination is primarily caused by public forest and forest used for harvesting as shown by the NRCS- Georgia Agricultural Water Quality Watershed Assessment Model results in Table 2 on page 24. Because sediment is a major pollutant of concern, analyses of resource inventory data for the watershed shows erosion rates of various land-uses in the watershed in Table 3.

**Table 10. Estimated Erosion - Chattooga River Watershed.**



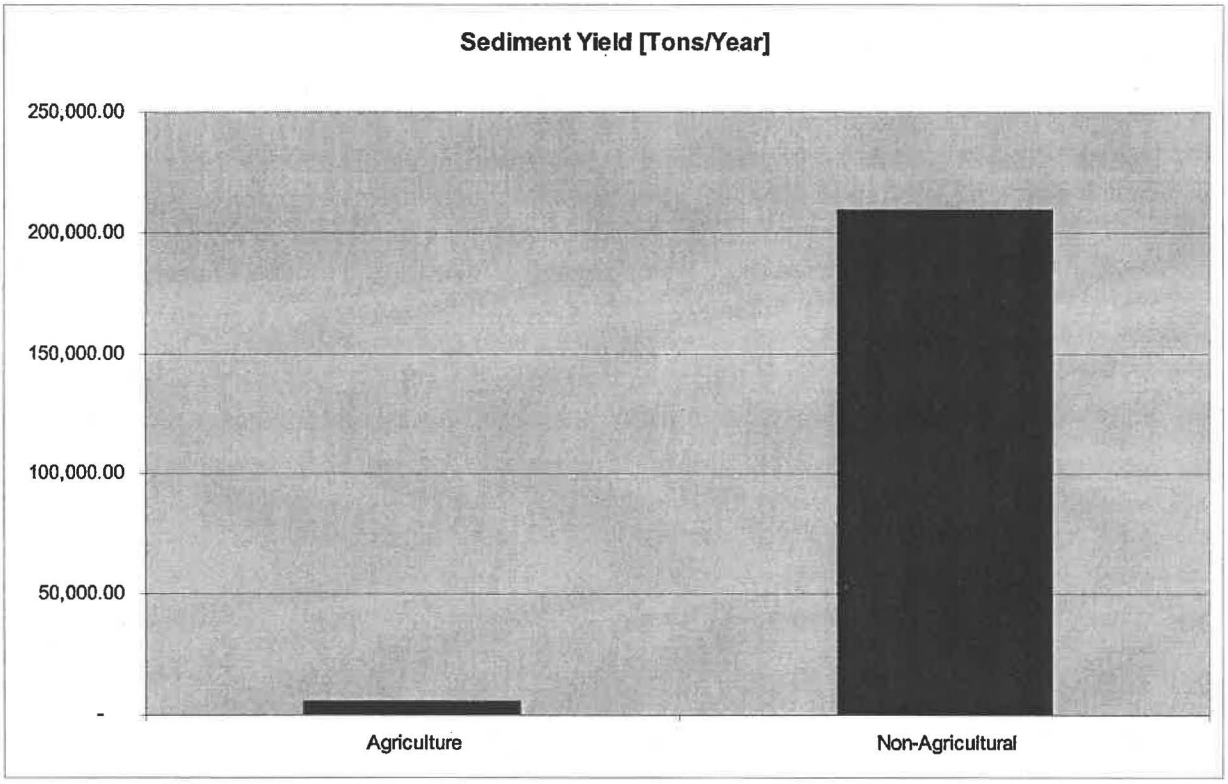

Source: NRCS-Georgia, Agricultural Water Quality Watershed Assessment Model. March 2004.

It is estimated that cropland is eroding at a rate of 5,997 tons/year, or 7.06 tons/acre. Pasture erosion occurs at a rate of 3,900 tons/year with orchards eroding at 475 tons/year. Collectively, erosion from agricultural land uses amounts to 10,372 tons/year, which accounts for 2 percent of all erosion that takes place within the watershed.

Harvested forestland and development have the highest erosion rates at 48 tons/acre and 32 tons/acre respectively. Total erosion from these two land-uses amounts to 379,284 tons/year, accounting for 63 percent of all erosion in the watershed.

When looking at the amount of erosion that actually reaches the streams and waterbodies within the watershed, a similar picture unfolds. Agricultural landuses deliver approximately 5,970 tons of sediment to the watershed streams and rivers, or 3 percent of the 215,243 tons of sediment deposited in streams annually.

**Table 11. Estimated Sediment Yield - Chattooga River Watershed.**




Source: NRCS-Georgia, Agricultural Water Quality Watershed Assessment Model. March 2004.

There are 0 municipal/industrial facility (TRIS facility), 0 air facilities, 0 hazardous waste facility, and 0 superfund sites located in the watershed that have Point Source discharge permits as identified by EPA.

6. Watershed Opportunities

Agriculture's role in contributing to water quality impairments within the watershed provides a basis for application of the NRCS Watershed Program. The NRCS Watershed Program was established to assist Federal, State, local agencies, local government sponsors, tribal governments, and program participants to protect and restore watersheds from damage caused by erosion, floodwater, and sediment, to conserve and develop water and land resources, and solve natural resource and related economic problems on a watershed basis. The program provides technical and financial assistance to local people or project sponsors, builds partnerships, and requires local and state funding contribution. It is intended to accelerate BMP installation where ongoing programs are determined to be deficient in addressing resource concerns. Resource concerns addressed by the program include watershed protection, flood prevention, erosion and

sediment control, water supply, water quality, opportunities for water conservation, wetland and water storage capacity, agricultural drought problems, rural development, municipal and industrial water needs, upstream flood damages, water needs for fish, wildlife, and forest-based industries, fish and wildlife habitat enhancement, wetland creation and restoration, and public recreation in watersheds of 250,000 or fewer acres.

Other sources of pollution within the watershed such as industrial, commercial, forestry, and residential are beyond the scope of the NRCS Watershed Program. Other land uses, however, were evaluated in this plan to determine the overall impact of agriculture to water quality problems within the watershed. Agriculture's contribution to water quality impairments have been shown to be minimal in this watershed negating justifiable application for financial assistance under the NRCS Watershed Program.

The Chattooga River Watershed Project is part of a comprehensive effort to improve water quality by controlling non-point source pollution and sediment in the Chattooga River drainage area. Total Maximum Daily Load [TMDL] Implementation activities administered by the Georgia EPD and the Georgia Mountain Regional Development Center will address issues dealing with non-agricultural contributors. The Project has identified a variety of pollution sources and provides an opportunity to pursue funding that can be targeted to address watershed pollutant contributors identified above [i.e. private forest land and development]. The Sponsors, along with individual landowners, have shown an interest in developing and carrying out water quality and watershed protection measures in a timely manner. No opposition has surfaced to date.

# SCOPE OF ENVIRONMENTAL ASSESSMENT

1. Introduction

A scoping process was used to identify issues of economic, environmental, cultural, and social concerns in the watershed. Watershed concerns of local citizen were expressed at public meetings and through questionnaires. Factors that would effect soil, water, air, plant, and animal resources were identified by multidisciplinary teams composed of agronomists, biologists, economists, resource conservationists, soil scientists, water quality specialists, and others. The concerns and their degree of significance to the decision making process were identified. A multidisciplinary team composed of various State and Federal agency personnel, conducted an environmental evaluation in June 21, 2004 and provided input into the development of the Environmental Assessment (EA). Water quality, erosion, and aquatic habitat were the major issues identified. Opportunities to reduce water quality degradation and erosion related flooding were targeted for analysis. The following table shows the degree of significance of the concerns identified.

**Table 12. Significance of Interdisciplinary Identified Concerns**

| Economic, Environmental, Cultural, and Social Concerns | Degree of Significance to Decision making 1/ |
|---|---|
| Water supply | high |
| Water quality | high |
| Local economy | high |
| Human health | high |
| Property values | high |
| Flooding in floodplain | medium |
| Forest land | medium |
| Transportation | medium |
| Fish and wildlife habitats | medium |
| Sedimentation | medium |
| Animal health | medium |
| Social well being | medium |
| Recreational opportunities | medium |
| Historical and cultural properties | medium |
| Wild and scenic river | medium |
| Maintain Quality of Forest Land | low |
| Endangered species | low |
| Wetlands | low |
| Air Quality (odor and smell) | low |

1/ High - must be considered in the analysis of alternatives; medium - may be affected by some alternative solutions; low - consider, but not very significant.

2. Wetlands

There are 2,825 acres of wetlands in the watershed. Additionally, there are 680 acres of lakes, and 679 of streams, and creeks; and 6,083 acres of hydric soils in the project area.

3. Wildlife Habitat

There are six different natural environments identified within the watershed. The riverbank zone supports trees like the sycamore, sweetgum and persimmon. The floodplain forest found between the riverbank and slope forests have common hardwoods like the red maple, tulip-poplar, dogwood, sourwood and sassafras and conifers such as the shortleaf pine, white pine and Virginia pine. Although rare, the cove forest has common trees which include red oak, basswood, hemlock, sweetshrub, and pawpaw. The slope forest contains hardwoods like hickories, tulip-poplar, black oak, beech, and sour wood. Ridge tops and upland oak forest have several species of oak and hickory, sourwood and dogwood while the pitch-pine communities have pitch-pine and a variety of oaks. Cliff and gorge walls have little vegetation - some moss and from time to time hemlock.

Wild game in the Chattooga area include black bear, white tailed deer, and wild turkey. Small game are prevalent and include squirrels and cottontail rabbits. Other harvestable game species occurring within the watershed are raccoon, crow, bobcat, opossum, foxes, and a variety of waterfowl. Wood ducks occur throughout the watershed and other waterfowl species are concentrated around larger lakes.

Nongame species of wildlife are abundant throughout the watershed. Upland and wetland habitats play host to a variety of migratory and resident songbirds. Common resident and seasonal species include pileated woodpecker, southern bald eagle, great horned owl, great blue heron, broad-winged hawk, ruffed grouse, wood thrush, titmouse, scarlet tanager, and barred owl. In addition, these habitats support a variety of reptiles and amphibians found throughout the watershed such as the copperhead snake, snapping turtle, and timber rattlesnake. In particular, riparian areas are very important during reproduction and serve to help these species regulate body temperature by providing shore and wetlands.

Open land habitat consists of cropland, abandoned cropland and pasture. There are 1,079 acres of cropland under use for raising corn and vegetables and are clean tilled with little or no residue remaining on the soil surface. There are estimated 4,515 acres of abandoned cropland fields and pastures.

Wildlife using the cropland habitats are benefited by the "ecotone" created by the cropland that is adjacent to woodland. The diversification of the abandoned cropland and pasture is creating better conditions for escape, nesting, and resting cover for many species of wildlife, including birds, deer, and small mammals.

4. Fish Habitat

Studies by Georgia Game and Fish biologists indicate the Chattooga River can support high populations of game fish with good quality water. The river can also support a very large population of game fish. Fishing in the drainage areas and on the lake has been one of the most popular recreational activities in the area.

There are an additional 680 acres of water contained in streams, small lakes, farm ponds, and natural ponds. Fish populations in these water bodies depend on the degree of management and water quality. The primary native fish species identified in the watershed are bass, brem, shiners, studfish, redhorse, bluegill, and darters.

5. Endangered and Threatened Animals and Plants

The **Federal** list of Endangered and Threatened Species contains the following as occurring in the watershed. These species are listed because of their general ranges of potential occurrence, which includes the Chattooga River Watershed if suitable habitat is present.

Animals:1/

Bald eagle (T) *Haliaeetus leucocephalus*
Bog turtle (T) *Clemmys muhlenbergii*

Plants:1/

Persistent trillium (E) *Trillium persistens*
Rock Gnome Lichen (E) *Gymnoderma lineare*
Small whorled pogonia (T) *Isotria medeoloides*
Swamp pink (T) *Helonias bullata*

1/ (E) Endangered, (T) Threatened, (S) Threatened due to similarity of appearance of another endangered or threatened species.

6. Cultural and Historical Resources

There are 4 listings on the Historic Register in the watershed. These include the Kilby, James Henry and Rachel House located in Clayton, Bleckley House in Clayton, Tallulah Falls Depot in Tallulah Falls Depot, and the York House located in Mountain City. Historic and prehistoric artifacts have been found throughout the watershed project area. Historic and prehistoric artifacts are thought to be common in, and geographically distributed throughout, the project area.

7. Prime Farmland

There are 6,083 acres of prime farmland in the 248,228 acre drainage area.

# FORMULATION OF ALTERNATIVES

The Chattooga River Watershed project was formulated to bring the watershed's waters back to support their designated uses. Meeting goals of the Project Sponsors in the Chattooga River Watershed will reduce sediment, bacteria, and nutrient exports to watershed's rivers and streams. Cumulative efforts to address resource concerns identified and continued emphasis on nutrient and pesticide management; along with a sound conservation program should improve and maintain water quality in the project area as a quality resource over the next 25 plus years.

Preliminary alternatives for solving offsite and onsite problems caused by erosion and animal waste were developed according to the following objectives of the Sponsor:

1. Improve surface water quality to support its designated use by reducing erosion rates to comply with Total Maximum Daily Load [TMDL] recommendations.

2. Decrease the potential for negative offsite impacts from agricultural sources by reducing sediment deposition from agricultural lands and by controlling the amount of nutrients and bacteria from agricultural sources.

1. Formulation Process

Formulation of alternative plans for the Chattooga River Watershed followed procedures outlined in the NRCS-National Planning Procedures Handbook, NRCS-National Watershed Manual, Economic and Environmental Principles and Guidelines for Water and Related Land Resource Problems, and other NRCS watershed planning policy. Formulation also followed specifications in Technical Note 1706 "Project Planning for Water Quality Concerns, and Technical Note 1801 "Guide for Estimating Participation in Conservation Operations and Watershed Protection Projects".

The formulation process began with the application of an informal indicator survey outlined in Technical Note 1801 "Guide for Estimating Participation in Conservation Operations and Watershed Protection Projects" [TN1801]. The survey was provided to, and completed by, the local NRCS Field Office, Cooperative Extension Agent, Farm Service Agency Representatives, and Soil and Water Conservation District Supervisors. TN 1801 guidance reveals that an estimated participation rate of 50 percent represents a minimum threshold for a viable watershed project. Results of this survey indicate an estimated participation rate of 50 percent for the Chattooga River Watershed Project. The adequacy of technical, financial, and educational resources at the NRCS Field Office was also assessed and documented.

Given the information that expected participation in the Chattooga River Watershed warranted a viable project, the next step was to employ a water quality model to assess cause and effect relationships for this project. The water quality model, informally referred to as AWQWA [Agricultural Water Quality Watershed Assessment], is a compilation of NRCS guidance documents [i.e. Technical Note 1706, "Project Planning for Water Quality Concerns, Animal Waste Management Field Handbook, National Engineering Handbook – Section 3, etc.]. Empirical research published by Universities in the southeastern United States also forms the basis of the AWQWA model. The NRCS-Georgia Water Resources Staff developed the

AWQWA model with researchers at The University of Georgia, College of Agricultural and Environmental Sciences for application to rural watersheds in Georgia.

An initial run of the AWQWA model, using resource inventory data collected by the Planning Team for this project, identified existing cause and effect relationships among land use and water quality within the project area. The model output provides a benchmark condition from which to assess alternative implementation scenarios.

The formulation of alternative implementation scenarios began with a review of all conservation practices in the National Conservation Practice Handbook. Those practices deemed applicable to resource conditions and acceptable to local producers were selected for their relevance. Selected practices were combined into distinct alternatives for the purpose of conforming to a specified planning philosophy expressed by the Project Sponsors. As a result, two alternative plans of action were developed based on their ability to address identified and documented resource concerns, and based on benefit-cost information:

- No Action Alternative
- Minimum Protection Alternative

Each alternative, including the No Action Alternative, was designed to follow the complete, effective, efficient, acceptable criteria outlined in the Principles and Guidelines for Water and Related Land Resource Problems.

A No Action Alternative is defined to be no additional Federal action on the part of NRCS. Specifically, no additional funds under the NRCS Watershed Program will be requested to address agricultural contributions to water quality impairments. NRCS's Watershed Program is designed to augment ongoing conservation efforts when they do not adequately address resource concerns at the watershed level. Results of this planning process have documented agriculture has a relatively minor contribution to water quality impairments in the Chattooga River Watershed. As such, ongoing Farm Bill Programs, the Environmental Quality Incentives Program, Conservation Reserve Program, Wetlands Reserve Program, and Wildlife Habitat Incentives Program will be used to address agricultural resource concerns.

A Minimum Alternative was developed with a primary focus of meeting the TMDL Compliance criteria of reducing erosion and sedimentation in the watershed. There are no established water quality standards for erosion and sedimentation. A TMDL Technical Advisory Group - comprised of EPA-Region IV, Georgia EPD, Georgia Conservancy, UGA, and other federal agency representatives - recommended 30 mg/L of Total Suspended Sediment [TSS] as a proxy water quality standard. Estimates of non-agricultural contributions indicate TSS at 49.43 mg/L for forest harvesting and 147.35 mg/L for development activities. This alternative is formulated to bring TSS in line with recommended water quality standards.

2. Description and Effects of Alternative Plans

a. ALTERNATIVE 1 - NO ACTION

Contents: The No Action Alternative consists of implementing the existing EQIP, CRP, and other Farm Bill Programs on agricultural lands within the watershed. Under this alternative, it is estimated that land treatment will occur on 849 acres of cropland and 5,623 acres of pasture over the next 25 years of the evaluation period. Animal waste management practices would be installed on 42 beef operations and12 poultry operations. Funds from ongoing NRCS Conservation Programs will be sufficient to install adequate Resource Management Systems on any land based or animal operation.

Costs: Total installation cost - $ 715,103 Gov't share - $357,551; State/Local - $357,551; Annual cost - $51,373.

Effects: Without the Project, water quality conditions are forecasted to deteriorate in the watershed. However, the influence of agriculture as a contributing source to fecal coliform bacteria and sedimentation is expected to decrease.

With respect to fecal coliform, it is estimated that agricultural runoff contains a concentration of 100.48 col/100mL. This concentration is below current water quality standards. Additionally, ongoing Farm Bill Programs will target conservation practices that will further reduce livestock access to creeks and streams, providing alternative water supply sources, comprehensive nutrient management planning and implementation. Each of these practices will further reduce fecal coliform concentrations in agricultural runoff being delivered to the watershed's streams.

The average erosion rate for cropland, in the watershed, exceeds soil tolerance levels of 5.0 tons/acre/year at a current rate of 7.06 tons/acre/year. Erosion rates that take place below soil tolerance levels allow for the natural soil replenishing process to unfold. Anticipated conservation practices that include crop residue management, conservation tillage, comprehensive nutrient management, etc. will reduce cropland erosion rates within soil tolerance levels. Estimated Total Suspended Sediment [TSS] concentrations in agricultural runoff will continue to improve from the current 7.44 mg/L, which already exceeds The University of Georgia [UGA] recommendation of 20-30 mg/L.

Effects on publicly identified resource concerns will be positive. Water supply will be addressed through alternative livestock watering systems. Water quality, from agricultural sources, will improve as described above. Concerns associated with human health will be addressed via the positive correlation with water quality. The local economy benefits slightly from federal funds being infused into the watershed for the installation of conservation practices, as does property values due to management decision that promote land productivity and sustainability.

b. ALTERNATIVE 2 – MINIMUM PROTECTION PLAN

Contents: The Minimum Protection Alternative consists of accelerated land treatment on 8,250 per year of harvested forestland and developing lands. Potential cost-share provision would be directed primarily at the 7,096 acres of private harvested forestland each year.

Land treatment would include but is not limited to, the installation of conservation measures like: forest harvest and landings, forest harvest management, forest road construction, forest site preparation, forest stand improvement, prescribed burning, riparian forest buffers, stream crossings, and wildlife upland habitat.

Costs: Total installation cost - $6,614,115; PL-566 share - $0; Other - $6,614,115; Annual cost - $475,158.

Effects: Under the Minimum Protection Plan, water quality conditions can be expected to improve. Erosion rates from harvested forestland will decrease from 48.25 tons/acre to 38.64 tons/acre. More importantly, sediment yield will decrease from 49.43 mg/L to 21.80 mg/L, which complies with TMDL recommendations, and was the primary target for this alternative. Forest road management, riparian buffers, and other harvesting best management practices all contribute to improved water quality.

Effects on other resource concerns are also positive under the Minimum Protection Plan. Human health and safety, fish and wildlife habitats, the local economy, wetlands, property values, recreational opportunities, flooding, and transportation networks will all be protected, or enhanced, as a result of this alternative.

The following table identifies the expected effects on resource concerns identified by the local watershed residents for with and without project conditions based on land treatment practices and animal waste systems considered.

**Table 13. Project Effects on Identified Resource Concerns.**

| Resource | WITH PROJECT<br>Accelerated Land Treatment | WITHOUT PROJECT<br>Accelerated Land Treatment |
|---|---|---|
| a. Water supply | + | - |
| b. Water quality | + | - |
| c. Local economy | + | - |
| d. Human Health | + | - |
| e. Property values | + | - |
| f. Flooding in flood plain | + | - |
| g. Forest land | + | - |
| h. Transportation | + | - |
| i. Fish and wildlife habitats | + | - |
| j. Sedimentation | + | - |
| k. Animal health | + | - |
| l. Social well being | + | - |

(+) favorable impact (-) adverse impact (0) no impact

## Table 14. Summary and Comparison of Candidate Plans of Action.

| Effects (Measures) | ALT 1 No Action | ALT 2 Minimum Protection |
|---|---|---|
| Current = 7,096 acres of eroding harvested forestland; 1,154 eroding acres of development; 5,623 acres of eroding cropland and pasture; 849 acres of eroding cropland, 42 beef, 12 poultry without adequate waste handling facilities | Conservation treatment on 6,472 acres, and installation of 54 animal waste facilities | Land treatment on 7,096 acres of harvested forestland. |
| Project Investment | $893,879 | $7,077,103 |
| Adverse, Avg. Annual | $51,373 | $508,419 |
| Beneficial, Avg. Annual | $159,445 | $900,400 |
| Net Beneficial | $108,072 | $391,981 |
| ***Water Quality*** | ***Water Quality - Agriculture*** | ***Water Quality – Harvested Forestland*** |
| Watershed Erosion<br>Current = 2.44 Tons/Ac./Yr. | 1.60 T/A/Y | 0.93 T/A/Y |
| Total Suspended Sediment<br>Current = 36.43 [mg/L] | 6.51 [mg/L] | 21.80 [mg/L] |
| Offsite Sedimentation.<br>Current = 51,286 Tons/Yr. | 875 Tons/Yr. | 16,759 Tons/Yr. |
| Fecal Coliform<br>Current = 101 [col/100mL] | 101 [col/100mL] | n/a |
| Nitrogen & Phosphorus<br>Current = .67/.12 [mg/L] | .23/.04 [mg/L] | n/a |
| Turbidity<br>Current = High Frequency | Reduced Freq. | Reduced Freq. |
| ***Erosion*** | ***Erosion – Agriculture*** | ***Erosion – Harvested Forestland*** |
| Current - Ag 10,370 Tons/Yr.<br>Current – Harvest Forestland 342,382 Tons/Yr. | 10,370 Tons/Yr. | 231,311 Tons/Yr. |

**Table 14. Summary and Comparison of Candidate Plans of Action [Cont'd].**

| Effects (Measures) | ALT 1 No Action | ALT 2 Minimum Protection |
|---|---|---|
| ***Threatened and Endangered Species*** | | |
| Current = Negative impact on aquatic habitats | Positive impact on aquatic habitats | Positive impact on aquatic habitats |
| ***Prime Farmland*** | | |
| Current = Risk of conversion to other land uses | Protection of agricultural acres in prime farmland. | Protection of limited acres in prime farmlan. |
| ***Air Quality*** | | |
| Current = Some odor problems near beef, dairy, and poultry operations. | Reduced odor problems | Reduced odor problems |
| ***Wetlands*** | | |
| Current = Adverse impact on 2,825 acres of wetlands. | Positive impact on 2,825 acres of wetlands. | Positive impact on 2,825 acres of wetlands. |
| ***Cultural Resources*** | | |
| Current = Potential damage to unidentified cultural resources | Reduced potential adverse impact on cultural resources | Reduced potential adverse impact on cultural resources |
| ***Health*** | | |
| Current = Potential health related problems from sediment, nutrients, bacteria, and chemicals in ground and surface waters | Reduced potential for health related problems | Reduced potential for health related problems |
| ***Visual Quality*** | | |
| Current = Moderate impairment to visual quality | Reduced impairment of visual resource | Reduced impairment of visual resource |

3. Risk and Uncertainty

The occurrence of 2-10 year storm events immediately after installation of land treatment measures and application of animal waste could temporarily impair surface water quality and reduce the effectiveness of the proposed measures in controlling soil erosion and nutrient runoff.

The risk and uncertainty of landowner participation in the installation, operation, and maintenance of such practices and systems is a concern. The benefits and costs of proposed measures are computed at a specific rate of landowner participation and are based on the assumption that practices and systems installed will be properly maintained throughout the life of the project (25 years). However through public participation efforts and criteria in NRCS Technical Note 1801 it was estimated that the rate of landowner participation will be 50 percent for land treatment and animal waste management systems in the Recommended Plan. If the percentages are not obtained or the measures are not operated and maintained properly, the project benefits and costs will be reduced.

Risk and uncertainty are also increased from the relative contributions to water quality impairments from agricultural sources and harvested forestland. The average annual benefits of $1,875,834 are representative of recreational values. Agricultural contributions to water quality impairments, although minimal, include multiple pollutants [fecal coliform, nitrogen, phosphorus, and sediment]. Harvested forestland contributions to water quality impairments are limited to sediment. As a result, recreational benefits were divided between sedimentation and fecal coliform, and then assigned to agricultural proportionally to water quality impairment contributions. Additional benefits could be calculated to ascertain on-farm benefits, and other related benefits within the watershed associated with this project. However, it was determined in the planning process that additional watershed scale benefits are marginal in relation to those attributed to recreation.

AWQWA is a water quality model based on empirical research coefficients. However, landuse data utilized in the model is dated requiring a number of assumptions regarding landuse activities [i.e. percent of forestland being harvested annually]. Additionally, land management activities for individual farms may differ significantly from those assumed at the watershed scale, which can greatly alter the results of such analyses.

Cost development for forestry best management practices can be improved upon greatly. There were efforts in this planning process to include forestry as a viable PL-566 cost-sharing component. This effort failed, and subsequent detailed costs estimates for forestry BMPs from forestry professionals were limited. It is suggested that additional consultation be undertaken with the Georgia Forestry Commission and US Forest Service to improve forestry related costs estimates.

4. Rationale for Plan Selection

This planning process was intitiated to determine the viability of apply PL-566 program funds to the Chattooga River Watershed. One of the program criteria calls for 20 percent agricultural related benefits. It has been determined through the planning process agricultural benefits are less that 20 percent of the overall benefits associated with this project. Therefore, PL-566 program funds will not be eligible for project implementation.

The No Action Alternative was developed to comply with TMDL Implementation criteria and practically accommodate the maximum number of resource concerns identified during the initial scoping process of the first public meeting held June 21, 2004. When compared against the Minimum Protection Alternative, the No Action Alternative was judged to be the more acceptable alternative.

# CONSULTATION AND PUBLIC INVOLVEMENT

Since the 1990's, citizens within the Chattooga River Watershed have recognized increasing water quality issues and potential problems related to agriculture.

- → Litigation related to Georgia's 303d list
- → EPA and EPD have developed TMDLs [8-streams]
- → Stekoa Creek Watershed Group requested assistance from NRCS to address agricultural contributions
- → NRCS works through local Soil and Water Conservation Districts
- → SWCD agreed to sponsor project
- → NRCS partnered with UGA to apply for and secure 319 grant

Landowners utilized assistance through EQIP to address their concerns, but were limited by program policy and budget constraints. Meetings were held to evaluate the problem and determine if the issues warranted application for additional federal assistance through the PL-566, Small Watershed Program. Based on data obtained, and interest within, the watershed; the Districts (Sponsors) and NRCS agreed that this watershed should be targeted for special water quality improvement efforts. The Sponsor(s) submitted an application in October 2002 to the Georgia Soil and Water Conservation Commission for NRCS planning assistance under the PL-566 authority. The Commission approved the application and gave it high priority.

To facilitate consultation and public involvement in the Chattooga River Watershed Project, a project organizational structure was developed. It consisted of the Project Sponsors, who were supported by an Interdisciplinary Planning Team, a Technical Advisory Group, and Stakeholder Involvement.

1. Project Sponsors:

At the initiation of the planning process, meetings were held with key farmers and District representatives from the watershed area to discuss problem identification, conservation systems and PL-566 requirements. Meetings were held during Fall of 2002 with the Blue Ridge Soil and Water Conservation District [Georgia], Oconee County Soil and Water Conservation District [South Carolina], Macon County Soil and Water Conservation District [North Carolina], and the Sekoa Creek Watershed Group. The project was guided by a Planning Team, Technical Advisory Group, and the Public with representation from across the watershed and interested stakeholder groups.

2. Public Participation:

A public meeting was held on June 21, 2004 to scope the problems and concerns and to explain impacts of the program in relation to the identified concerns. An overflow crowd of approximately 50 concerned citizens, landowners, and partners attended the meeting. Support was unanimous for continued development of the PL-566 Land Treatment project to help protect the area's natural resources.

3. Planning Team:

An Interdisciplinary Planning Team provided for the "technical" administration of this project. Technical administration includes tasks pursuant to the NRCS nine step planning process, and planning procedures outlined in the NRCS-National Planning Procedures Handbook. Examples of

tasks completed by the Planning Team include, but are not limited to, Preliminary Investigations, Resource Inventorying, Analysis of Resource Data, Formulating and Evaluating Alternatives, and Writing the Watershed Plan and Environmental Assessment. Data collected from partner agencies, databases, landowners, and others throughout the planning process, were evaluated at formal Planning Team meetings held on December 2, 2002, January 30, 2003, March 13, 2003, December 12, 2003, March 30, 2004, April 13, 2004, February 18, 2005, November 14, 2005. Informal discussions among the planning team, partner agencies, and landowners were conducted throughout the entire planning period.

4. Technical Advisory Group:

A Technical Advisory Group was developed to aid the Planning Team with the planning process. The following organizations were involved in the development of this plan and provided representation:

- Chattooga River Watershed Coalition
- Georgia Department of Natural Resources, Environmental Protection Division (EPD), Water Protection Branch
- Georgia Department of Natural Resources, Wildlife Resources Division (WRD), Game and Fisheries Management Sections
- Georgia Forestry Commission
- Georgia State Historic Preservation Officer (SHPO)
- Georgia Soil and Water Conservation Commission
- South Carolina Forestry Commission
- United States Environmental Protection Agency (EPA)
- University of Georgia, Cooperative Extension Service (UGA)
- USDA, Natural Resources Conservation Service (NRCS)
- USDA, US Forest Service (FS)
- USDI, Fish and Wildlife Service (F&WS)

Meetings were held with members of the Technical Advisory Group as needed to determine the influence of agriculture, and other land-use, activities on natural resource concerns in the watershed. This information was used to calculate current and future conditions in the watershed.

It was determined early in the planning process that agriculture had a relatively small influence on water quality issues in the Chattooga River Watershed. Efforts were made to adjust the watershed boundary to bring in additional agricultural lands in South Carolina. Additional efforts were made to include forestry as a viable PL-566 component of the planning process. Both efforts failed and the planning scope remained as originally initiated.

5. Plan Review and Development:
A Drafted version of the Watershed Plan and Environmental Assessment [EA] was submitted to Planning Team members. Comments from individuals participating with these groups were incorporated into this final plan.

# SELECTED PLAN

1. Purpose and Summary

The Selected Plan (No Action Alternative) provides technical and financial assistance for the installation of best management practices on 5,623 acres of pasture and 849 acres of cropland. Animal waste management practices will be installed on 42 beef operations and 12 poultry operations.

Installation of the Selected Plan will promote rural economic development; increase local sales tax revenues and income; provide employment; and reduce the amount of agricultural pollutants reaching the watershed streams. It will also reduce erosion; maintain the productivity of the soil resource base; and reduce sediment reaching watershed streams, lakes, and wetland areas.

The Minimum Alternative Plan can be implemented through a 319h Grant between the Georgia EPD and the Georgia Forestry Commission. Concerns related to erosion and sedimentation from development should be addressed through Georgia's Erosion and Sedimentation Act. All developers, contractors must be certified under the E&S Act prior to December 2006.

2. Measures to be Installed

Ongoing programs will treat 42 beef operations and 12 poultry operations over the next 25 years, and will install conservation practices on 5,623 acres of pasture and 849 acres of cropland. Specific components will include 140 acres of Prescribed Grazing, 71,816 linear feet of Fencing, 19 acres of Riparian Forest Buffers, 71 Wells for alternative livestock watering facilities, 6,560 linear feed of Fencing for Livestock Exclusion, and Nutrient Management on 6,472 acres of agricultural lands,

The Blue Ridge Soil and Water Conservation District, supported by the NRCS, will provide administrative and technical assistance in the development of conservation plans and application of conservation practices. Landowners will make the final decision on land use and practices to be installed; however, assistance will be provided only when it contributes to the identified resource concerns and does not result in significant adverse impacts. Participation in the program is voluntary. Through public participation efforts and criteria in NRCS Technical Note 1801 it was estimated that the rate of landowner participation will be 50 percent for animal waste management systems and land treatment for the Selected Plan.

Practices, or systems, other than those listed above that provide either equal or greater benefits are permitted. All enduring practices or combination of practices listed in Section IV of the Georgia NRCS Field Office Technical Guide are eligible alternatives as long as they provide equal or greater benefits. Erosion reduction targets are defined in the Georgia NRCS Field Office Technical Guide for resource management systems. Technical and financial assistance will be limited to areas where they contribute to resource concerns and do not result in adverse impacts to identified concerns.

3. Mitigation

Upon outcome of Cultural Resource consideration in the planning process, mitigation may be required.

4. Permits and Compliance

No permits will be required on conservation practices installed on pasture and cropland areas, which are owned or controlled by individual land users.

EPD is responsible for TMDL Implementation. Individual producers are not required, at this point, to follow any specific criteria for TMDL Compliance; however, installing treatment measures outlined in the Selected Plan will mitigate any potential for regulatory action.

With respect to animal operations, the Georgia Environmental Protection Division, Water Protection Branch [EPD], in cooperation with the Georgia Department of Agriculture, promulgates and enforces rules and regulations associated with animal feeding operations and National Pollution Discharge Elimination System [NPDES] Permits. New and expanding animal operations must comply with a variety of rules prior to operating or expanding their facility. Stipulations for animal operations are based on the size of the facility. Requirements can include, but not be limited to, registering the operation with EPD, obtaining a LAS [Land Application System] Permit, and conducting on farm water quality monitoring. EPD and the Georgia Department of Agriculture recognize, and recommend NRCS conservation practices for all animal operations. Treatment measures outlined in the Selected Watershed Plan will assist producers to comply with animal feeding regulations.

5. Costs

The estimated project costs appear in Table 1 on page 47. This includes the cost of land treatment practices and animal waste management systems for which financial assistance, technical assistance and project administration will be provided.

PL 83-566 funds will not be pursued for this watershed effort. The NRCS Watershed Planning Process determined that Ongoing Programs are sufficient to address agricultural related resource concerns. The estimated project cost is $893,879, it is anticipated that NRCS technical and financial assistance will provide $446,940 of these funds. Cost sharing will be based on one of the four methods outlined in Title 120, Part 404, Subpart D of the NRCS General Manual. The average cost method will be used unless actual cost data can be obtained.

The average cost list will be developed by local USDA agency and district personnel and approved by the NRCS State Conservationist prior to installation. These costs will be reviewed annually by the NRCS State Economist and updated if significant increases or decreases are found. Alternative practices may be substituted if the same or greater level of protection is achieved. Payment will be based on the average cost of the substituted practices and will be limited to the amount, which would have been paid in the selected plan. Cost sharing on a long-term contract (LTC) is limited based on specific program funds utilized. The Environmental Quality Incentives Program [EQIP] allows for a total of $100,000 funds for work with an individual, family, corporation or a combination of these where the party has a mutual interest.

The NRCS will provide technical assistance for the design, layout, and installation of appropriate land treatment and animal waste management systems as determined in the individual conservation plans and as identified in the LTC's. All practices will be designed, constructed and maintained according to NRCS standards and specifications. The cost of NRCS technical assistance is estimated at $446,940.

In addition to the installation costs, there will be operation, maintenance and replacement costs (OM&R) that will be incurred by participating landowners and operators. These costs will primarily be for maintaining and replacing components of the water disposal systems and animal waste facilities. Average annual OM&R costs are estimated to be $3,596

The average annual costs of the project are shown in Table 4 on page 48. Project costs and benefits were discounted and amortized at a 5.125 percent interest rate for the 25-year evaluation period to arrive at average annual figures.

**Table 15. Estimated Installation Costs – Chattooga River Watershed.**

| | ESTIMATED COST 1/ | | |
|---|---|---|---|
| **EVALUATION UNIT** | **PL-566 NRCS 2/** | **Other Than PL-566** | **TOTAL** |
| Animal Waste | $ 0 | $636,105 | $636,105 |
| Land Treatment | $ 0 | $ 78,998 | $ 78,998 |
| Subtotal | **$ 0** | **$715,103** | **$715,103** |
| TECHNICAL ASSISTANCE | **$ 0** | **$143,021** | **$143,021** |
| PROJECT ADMINISTRATION | **$ 0** | **$ 35,755** | **$ 35,755** |
| **TOTAL PROJECT COST** | **$ 0** | **$893,879** | **$893,879** |

1/ Price Base 2004
2/ Federal Agency Responsible for Installation of Works of Improvements

**Table 16. Estimated Average Annual Costs – Chattooga River Watershed.**

| **EVALUATION UNIT** | **Installation Costs 1/** | **Operation, Maint. and Replacement 1/** | **TOTAL 1/** |
|---|---|---|---|
| Animal Waste | $45,698 | $3,199 | $48,897 |
| Land Treatment | $ 5,675 | $ 397 | $ 6,075 |
| TOTAL | **$51,373** | **$3,596** | **$54,972** |

1/ Price Base 2004, Amortized over 25 years at a discount rate of 5.125%

**Table 17. Estimated Average Annual Watershed Protection and Damage Reduction Benefits – Chattooga River Watershed.**

| ITEM | Damage Reduction Benefits [Average Annual Dollars] 1/ Agricultural Related | Non-Agricultural |
|---|---|---|
| Offsite/Public | | |
| Recreation | $ 0 | $221,946 |
| Onsite | $ 0 | $ 0 |
| TOTAL | **$0** | **$221,946** |

1/ Price Base, 2004

**Table 18. Comparison of Agricultural Benefits and Costs – Chattooga River Watershed.**

| | DOLLARS 1/ Average Annual Benefits | Average Annual Costs 2/ | Benefit Cost Ratio |
|---|---|---|---|
| **TOTAL** | **$221,946** | **$54,972** | **4.0:1.0** |

1/ Price Base 2004
2/ From Table 4

**Table 19. Effects of the Selected Plan on Resources of Principal National Recognition.**

| Types of Resources | Principal Sources of National Recognition | Measurement of effects Resource Gain or Loss |
|---|---|---|
| Air Quality | Clean Air Act, as amended (42. U.S.C 1857b. et seq.) | **Gain**. Adverse Odors from animal waste near animal operations will decrease |
| Areas of particular concern within the coastal zone. | Coastal Zone management act of 1973, as amended (16 U.S.C. 1451 et seq.). | **No Effect** |
| Endangered and threatened sp. critical habitat | Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.). | **Gain**. Protection of aquatic habitats |
| Fish and Wildlife habitat | Fish and Wildlife Coordination Act (16 U.S.C. Sec. 661 et seq.). | **Gain**. Reduction in associated agricultural nutrients in habitat areas |
| Floodplains | Executive Order 11988, Flood Plain Management | **Gain**. Wooded floodplains and riparian buffers restored with conservation practices |
| Historic and cultural properties | National Historic Preservation Act of 1966 as amended (16 U.S.C. Sec 470 et seq) | **No Expected Effect** |
| Prime and unique farmland | CEQ Memorandum of August 1,1980; Analysis of Impacts on Prime or Unique Agricultural Lands in Implementing the National Environmental Policy Act | **No Effect** |
| Water quality | Clean Water Act of 1977 (33U.S.C. 1251 et seq.) | **Gain**. Water quality in streams and groundwater will improve by reducing sediment and animal waste nutrients from the problem area. |
| Wetlands | Executive Order 11990, Protection of Wetlands Clean Water Act of 1977 (42 U.S.C 1857h-7, et seq.). | **Maintain**. Wetland areas will be maintained and improved by reduction of sediment and protection of wetlands. |
| Wild and scenic rivers | Wild and Scenic Rivers Act, as amended (16 U.S.C. 1271 et seq.). | **No Effect** |

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# TABLES

# FIGURES

# APPENDIX A

Investigation And Analysis

## General

The overall plan development was guided by NRCS's National Watersheds Manual as amended December, 1992, and associated Circulars No. 1, 2, and 4. It is recognized that other sources contributing land uses such as industrial, commercial, and residential are not evaluated in this plan. However, their percent impact on the overall problems identified in the watershed was calculated out from the overall watershed evaluation to determine the impact for agriculture. It is assumed that if substantial offsite impacts are linked to these sources, appropriate actions and solutions will be taken to help protect natural resources in the watershed. Their treatment is beyond the scope of the PL-566 program.

## Land Use

Present land use in the watershed was determined from Natural Resources Conservation Service Field Office records, meetings with local agricultural workers, National Resources Inventory (NRI) 1997, Multi-Resolution Land Cover 1994 (EPA), and regional and local statistical data from state and local commissions and agencies. NRCS also performed a cropland erosion assessment on a site-specific basis for all cropland in the watershed.

Future land use is based on good land management, the intentions of local landowners and trends in land use as recognized by agricultural leaders and workers within the watershed area. Historic trends indicate that crop rotations, livestock, and poultry numbers, land use and management of agricultural operations in the watershed could change significantly over the next 25 years.

## Animal Waste Options

Technical Note 1706,"Project Planning for Water Quality Concerns", was used as a guide together with the NRCS Engineering Handbook-Agricultural Waste Management Field Handbook in developing and evaluating alternative animal waste management systems.

Alternative systems were developed considering the functions of each system component used in the production, storage, treatment, transfer and utilization of animal waste. Multi-systems were derived considering these functions and the associated components that would enable a complete and efficient system to be installed. Consideration for the acceptability and practicality of each system for the local landowners was determined and those systems that did not meet the criteria were deleted from further consideration. The Project Engineer, District Conservationist, and Extension Agents supplied the cost estimates.

## Land Treatment Options

The practices or conservation systems considered under the watershed project were compared, where applicable, to the ongoing programs, or EQIP and CRP programs. For example, critical area treatment and riparian buffers were used in the waterways with pasture and hayland planting on the pasture areas. All practices and systems will be installed according to NRCS standards and specifications applicable at the time of the agreement date.

NRCS, FSA, Soil and Water Conservation Commission, district personnel, together with local farmers, helped develop a list of potential practices and estimated costs. All practices available in NRCS's National Conservation Handbook were reviewed for consideration.

**Forestry**

A systematic field survey by NRCS in consultation with the Georgia Forestry Commission personnel assessed ground cover, forest and hydrologic conditions, excessive erosion, and treatment needs. The recommended measures help reduce flooding, stabilize soil, and reduce offsite sediment problems.

**Fish and Wildlife**

The NRCS Biologist and interdisciplinary team made several watershed reconnaissance visits and visited with local and regional parks, game and fisheries personnel to establish the fisheries, fishing and hunting pressure, wildlife abundance and habitat and problems in those arenas.

**Rare, Threatened, and Endangered Species**

An NRCS biologist and members of the planning team made a literature search and a field reconnaissance of the watershed. They confirmed the potential for presence of some listed species in the event of suitable habitats and recognized likely habitat for many others. Following this finding an interagency planning team scoped problem area sites to determine the impact of project actions on threatened and endangered species and determined that proposed measures would not impair their habitats. A list of the threatened and endangered species is found in the Scope of the EA section of the Plan.

**Wetlands**

The 1997 NRI database and Multi-Resolution Land-Cover geographic information database made a wetland survey possible for the watershed counties. Additional field checks will be made in determining eligibility. The maps and checks will be consulted when developing implementation plans and long- term contracts.

**Geology and Sedimentation**

The geologic investigation consisted of a study of literature and maps pertaining to the area and a field reconnaissance. The watershed area is covered by published soils maps, USGS quad sheets, multiple USGS and Georgia Geological Survey Bulletins and recent aerial photography. Procedures established in the NRCS National Engineering Handbook (NEH-3) were followed. Erosion values and sediment yields were established for all major land uses.

**Economics**

The economic analysis was conducted in accordance with procedures outlined in the NRCS National Watersheds Manual, the NRCS Economics Handbook, and the Water Resource Council's Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies. The formulation and evaluation of this project is consistent with the federal objective of contributing to national economic development while protecting the nation's environment. All alternative project plans were formulated to alleviate environmental problems, while maximizing economic development.

All basic data used in the investigation and analysis of this project was obtained from interviews with local farmers and agricultural workers, publications from the U.S. Department of Agriculture, the University of Georgia's College of Agricultural and Environmental Sciences, and from the interdisciplinary planning team members.

Animal waste treatment measures were selected following an economic evaluation of all viable alternatives. Each recommended option was selected based on cost efficiency, greatest net benefits, and other non-monetary factors. Onsite benefits included utilizing the waste on pasture, hayland, or cropland for fertilizer. Crop and livestock data reported by the Georgia Agricultural Statistics Service and information compiled by the NRCS Special Project's Team Water Quality Specialist were used to estimate the total volume of waste produced. Evaluation units were established using the size of operations and treatment methods as the grouping criteria. Land treatment options considered erosion factors affecting pasture and cropland.

The selection of the recommended project measures was determined by following the Conservation Options Procedures (COP). The COP procedure was used to determine the cost effectiveness of conservation practices and combinations of practices, the quantification of net benefits and the costs of the alternatives identified as being cost effective.

All benefits of the alternative plans were calculated using the difference in the value of goods and services available "with the project" and their values "without the project". The onsite agricultural benefits were determined by subtracting gross returns without treatment from gross returns with treatment and then adding the reduction in variable production costs.

Offsite benefits attributable to offsite sediment reduction and water quality improvements were determined from interdisciplinary meetings and interviews with state, city, and county officials. Damages were based on impacts to area water resources. All benefits and costs are average annual figures for the evaluation period (25 years). The tables on the following pages show the procedures used for calculating the average annual equivalents over the evaluation period.

**Practices and Resource Management Systems for the Selected Plan**

The average cost list for cost-shared practices, units and cost per unit used in formulation.

| **Conservation Treatment Practices** | **Unit** | **Cost($)** |
|---|---|---|
| Prescribed Grazing, Forage Harvest Mgt | Ac | $ 10.00 |
| Fencing – Cross Fencing [4-strand barb] | Ft | $ 1.10 |
| Riparian Forest Harvest Buffer | Ac | $ 190.00 |
| Livestock Use Exclusion | Ft. | $ 1.10 |
| Water Access for Cattle | | |
| Mobilization | No. | $ 200.00 |
| GAB | Ton | $ 20.00 |
| Geo-textile | Sq. Ft. | $ 0.19 |
| Shaping | Sq. Ft. | $ 0.04 |
| Well [Livestock Watering] | No. | $4,800.00 |
| Drinker | No. | $ 500.00 |
| Pump | No. | $1,400.00 |
| Pipe | Ft. | $ 0.65 |
| Concrete | No. | $ 500.00 |
| Waste Utilization – Nutrient Management | Ac | $ 10.00 |


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