

STATE OF GEORGIA
TIER 2 TMDL IMPLEMENTATION PLAN REVISION 1
 Settingdown Creek and Bannister Creek Watershed
 Coosa River Basin
 April 28, 2006

Local Watershed Governments:
 Forsyth County
 Dawson County

I. INTRODUCTION

Total Maximum Daily Load (TMDL) Implementation Plans are platforms for evaluating and tracking water quality protection and restoration. These plans have been designed to accommodate continual updates and revisions as new conditions and information warrant. In addition, field verification of watershed characteristics and listing data has been built into the preparation of the plans. The overall goal of the plans is to define a set of actions that will help achieve water quality standards in the state of Georgia.

This implementation plan addresses the general characteristics of the watershed, the sources of pollution, stakeholders and public involvement, and education/outreach activities. In addition, the plan describes regulatory and voluntary practices/control actions (*management measures*) to reduce pollutants, milestone schedules to show the development of the management measures (*measurable milestones*), and a monitoring plan to determine the efficiency of the management measures.

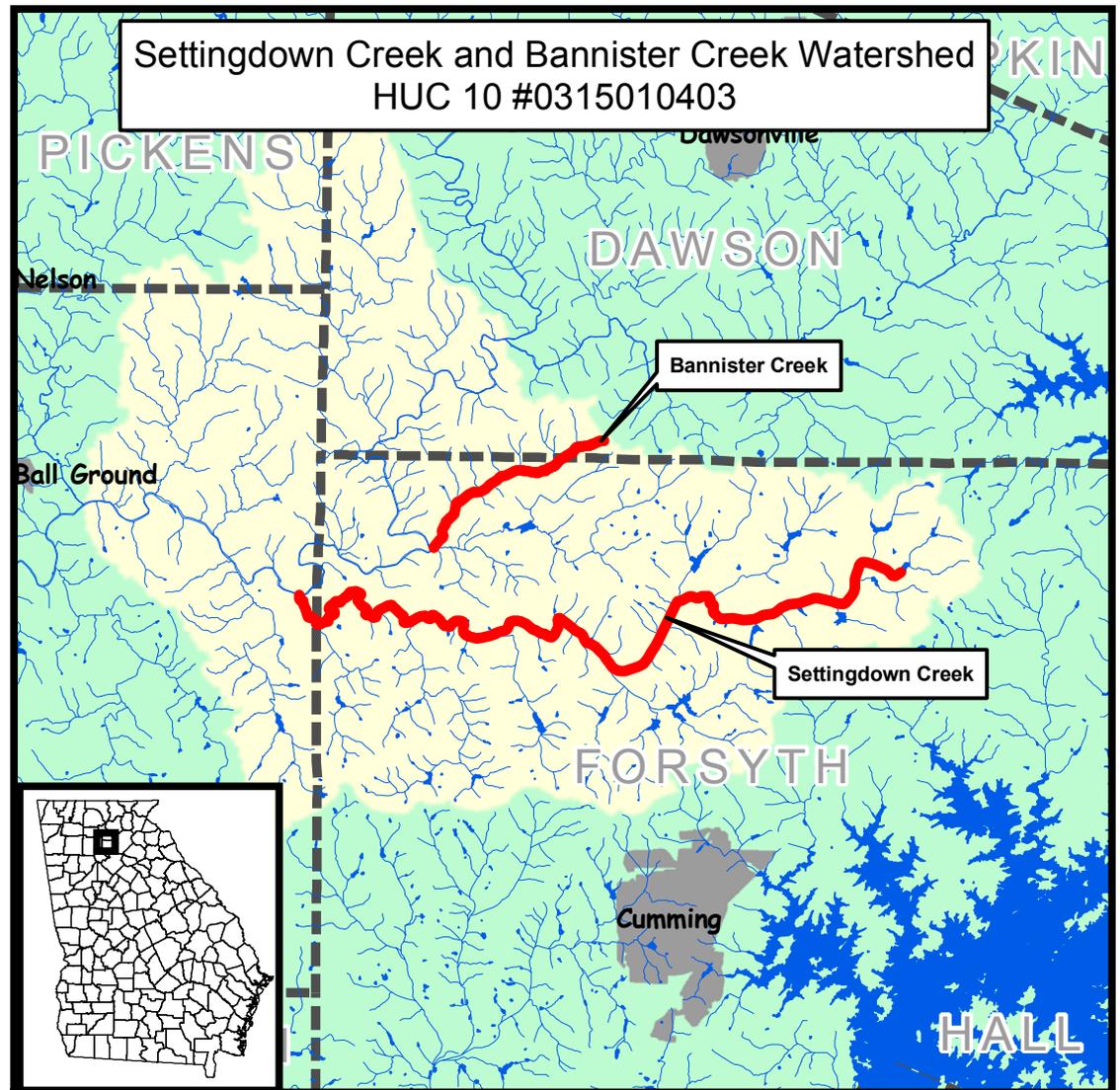


Table 1. IMPAIRMENTS

| IMPAIRED STREAM SEGMENT | IMPAIRED SEGMENT LOCATION | IMPAIRMENT | TMDL ID |
|-------------------------|-----------------------------------|---------------|------------|
| Bannister Creek | Dawson and Forsyth (EPA) | Biota/Habitat | CSA0000093 |
| Settingdown Creek | Dawson and Forsyth Counties (EPA) | Biota/Habitat | CSA0000026 |

II. GENERAL INFORMATION ABOUT THE WATERSHED

Write a narrative describing the watershed, HUC 10 #0315010403. Include an updated overview of watershed characteristics. Identify new conditions and verify or correct information in the TMDL document using the most current data. Include the size and location of the watershed, political jurisdictions, and physical features that could influence water quality. Describe the source and date of the latest land cover/use for the watershed. Describe and quantify major land uses and activities that could influence water quality. See the "Instructions for Completing the Georgia Total Maximum Daily Load (TMDL) Tier 2 Implementation Plan" for more information on what to include.

HUC 10 #0315010403 covers 45,370 acres, within which Settingdown Creek and Bannister Creek have been identified as not meeting their water quality standards due to biota/habitat parameters. The watershed is located mainly in northwest Forsyth County but also includes a small section of southwest Dawson County, eastern Cherokee County, and southeastern Pickens County.

Since 1995, the HUC 10 has experienced significant urban growth through residential and scattered commercial developments. Nonetheless, open land and agricultural lands are still found in abundance. The most recent land use update in the HUC 10 was performed in 2003 by Jordan Jones and Goulding for Forsyth County. The land use data identified major land use categories in the HUC 10 as undeveloped lands (14,000 acres), residential lands (16,698 acres), and agriculture lands (10,310 acres), which accounted for approximately 90% of the HUC 10 area in Forsyth County. Comparable land use data for Dawson, Cherokee, and Pickens Counties were unavailable. However, proportions of land use in these counties are similar to Forsyth County, although slightly less urbanized. Nonetheless, due to the rapid development this area is experiencing, even land use statistics from 2003 are outdated. A visual field survey and discussion with the stakeholder groups identified the probability that significantly higher percentages of residential and commercial land uses are now present within the HUC 10.

A number of activities are ongoing within the watershed including a storm water management program, local erosion control programs, and the Etowah River Habitat Conservation Plan (HCP). Forsyth County monitors water quality within the County's portion of the HUC 10 through the County's Storm Water Management Program, as required by the Phase II NPDES Storm Water Discharge Permit. In addition, Forsyth County has adopted an addendum to the Georgia Stormwater Management Manual to be used in conjunction with the County's stormwater management ordinance. Local erosion and sedimentation ordinances have been adopted by all local governments in the watershed, and each of these local governments serve as the issuing authority. Similarly, all local governments are preparing for the Erosion and Sedimentation Certification Process under HB 285, which becomes effective December 31, 2006. A review of the most significant environmental regulations by county is provided below:

| Regulation | Erosion and Sedimentation | Storm Water Regulations | Environmental Planning Criteria | Flood Damage Prevention | Tree Ordinance |
|-----------------|---------------------------|-------------------------|---------------------------------|-------------------------|----------------|
| Cherokee County | X | | | X | |
| Dawson County | X | | | | X |
| Forsyth County | X | X | X | X | |
| Pickens County | X | | X | X | |

The University of Georgia, Kennesaw State University, and the Georgia Conservancy are developing the Etowah Habitat Conservation Plan for the U.S. Fish and Wildlife Service. This plan is developing policies to minimize negative impacts on the 8 federally threatened or endangered species within the Upper Etowah Basin, which includes Cherokee, Dawson, Forsyth, and Pickens Counties. Upon completion of the plan, local governments will have the option to adopt these policies. Policy development for the Etowah HCP is expected to be completed in late 2006 or early 2007.

{Bannister Creek}

COMPLETE THE FOLLOWING TABLES FOR AND NARRATIVES ABOUT EACH IMPAIRED STREAM IN THE WATERSHED.

| STREAM SEGMENT NAME | LOCATION | MILES/AREA | DESIGNATED USE | PS/NS |
|---------------------|-----------------------------|-------------------|----------------|-------|
| Bannister Creek | Dawson and Forsyth Counties | 5 mi ² | Fishing | NS |

III. SOURCES AND CAUSES OF STREAM SEGMENT IMPAIRMENT LISTED IN TMDLs

After reviewing the TMDLs written for this stream, complete the following tables with the information found in the TMDLs. List each parameter for which the stream segment is impaired and the water quality standard not met. See the “Instructions for Completing the Georgia Total Maximum Daily Load (TMDL) Tier 2 Implementation Plan” for the water quality standards. Enter the needed reduction from the TMDL. Describe the sources and causes of each impairment identified in the TMDLs.

Table 2. SOURCES OF IMPAIRMENT AS INDICATED IN TMDLs

BANNISTER CREEK

| PARAMETER 1 | WQ STANDARD | SOURCES OF IMPAIRMENT | NEEDED REDUCTION FROM TMDL |
|----------------|-----------------------------------|----------------------------|----------------------------|
| Biota, Habitat | No degradation of fish community. | Urban (114 tons/yr) | 83% |
| | | Barren (42 tons/yr) | |
| | | Agriculture (1041 tons/yr) | |
| | | Forest (2953 tons/yr) | |
| | | Nonpoint Sources | |

IV. IDENTIFICATION AND RANKING OF POTENTIAL SOURCES OR CAUSES OF IMPAIRMENT

INVESTIGATE AND EVALUATE the extent and relative contributions from causes or sources of the impairment for each parameter listed in Table 2. Write a narrative describing efforts made or procedures used to verify the significance and extent of the sources or causes of each impairment listed in the TMDLs. Include: 1) involvement of stakeholder group; 2) review of land cover data; 3) field surveys; and 4) other pertinent sources of information consulted.

Verification of the significance and extent of impairment sources were identified through field surveys, review of land used data, and involvement of the stakeholder group. A field survey of Bannister Creek was conducted to characterize existing stream conditions and identify potential sources of impairment (Appendix C). The watershed survey noted the construction of numerous moderate to large sized residential developments within the watershed. These developments are being placed on lands historically used as forestland. The most recent update to Forsyth County's land use data was conducted in 2003 by Jordan, Jones, and Goulding. This land use data was evaluated during the watershed survey and, due to recent development activity within the watershed, was found to be outdated and did not provide an accurate representation of the watershed's current condition. Therefore, land use data were not used during stakeholder meeting discussions. The identification of potential sources of impairment was completed during the first and second stakeholder meetings. During the first stakeholder meeting, selected images from the field survey illustrating potential impairment sources were presented and discussed. The second stakeholder meeting focused on the identification of specific impairment sources within the watershed, as recognized by the stakeholder group. Additional discussion regarding the source, responsible agent, and methods of resolution for each of the impairments was performed. Finally, ranking of pollution sources was performed through discussion and development of a general consensus between attending stakeholders during the second stakeholder meeting.

Combining information provided in the TMDL document, stakeholder knowledge, existing watershed assessments, and the watershed evaluation conducted for this plan, identify the potential sources or causes most likely to contribute to each identified impairment (parameter) in Table 3. If available information is inadequate to estimate the extent and relative contribution of significant potential sources or causes, recommend appropriate management actions (watershed assessments, monitoring, etc.) to determine the potential sources or causes and relative contributions. In Table 3, list the significant potential sources or causes of each impairment. Estimate the geographic extent of each potential source or cause as percent of the contributing watershed area, percent of stream miles affected, or number per square mile and enter the appropriate rating (from the following table) in the column entitled "Rating (A)". Estimate the relative contribution of each major source or cause to the pollutant causing the impairment and enter the appropriate rating (from the following table) in the column entitled "Rating (B)". Calculate a relative impact ratings for each source or cause by multiplying "Rating (A)" by "Rating (B)". Comments on the source of information used to determine the extent or contribution may be entered in the applicable columns in Table 3.

The following table provides guidance for rating the estimated extent and portion of the contribution from each potential source and cause.

| Estimated Geographic Extent of the Source or Cause in the Contributing Watershed (Percent of area or stream miles) | Estimated Contribution of the Source or Cause to the Pollutant Load Causing the Impairment (Percent of load) | Rating |
|---|---|---------------|
| None or negligible (approximately 0-5%) | None or negligible (approximately 0-5%) | 0.5 |
| Scattered or low (approximately 5-20%) | Scattered or low (approximately 5-20%) | 1 |
| Medium (approximately 20-50%) | Medium (approximately 20-50%) | 3 |
| Widespread or high (approximately 50% or more) | Widespread or high (approximately 50% or more) | 5 |
| Unknown | Unknown | UNK |

Table 3. CONCLUSIONS MADE OF POTENTIAL SOURCES OF STREAM SEGMENT IMPAIRMENT

BANNISTER CREEK

PARAMETER 1: BIOTA/HABITAT.

| POTENTIAL SOURCES OR CAUSES | ESTIMATED EXTENT OF CONTRIBUTION | | ESTIMATED PORTION OF CONTRIBUTION | | IMPACT RATING (A X B) |
|------------------------------------|---|-------------------|--|-------------------|------------------------------|
| | Comments | Rating (A) | Comments | Rating (B) | |
| Residential Development | Widespread | 3 | High | 5 | 15 |
| Natural/Agriculture | Scattered | 3 | Medium | 3 | 9 |

V. STAKEHOLDERS

PUBLIC INVOLVEMENT AND THE ACTIVE PARTICIPATION OF STAKEHOLDERS is essential to the process of preparing TMDL implementation plans and improving water quality. Stakeholders can provide valuable information and data regarding their community, impaired water bodies, potential causes of impairments, and management practices and activities which may be employed to reduce the impacts of the causes of impairment.

Describe outreach activities to advise and engage stakeholders in the TMDL implementation plan preparation process. Describe the stakeholder group employed or formed to address the impaired segments in the watershed. Summarize the results of the number of attendees and meetings and describe major findings, recommendations, and approvals.

Stakeholders were identified through existing knowledge of local and regional governments, agencies, and organizations. Additional stakeholders were recognized during the field survey. These additional stakeholders included major landholders and concerned citizens. Three meetings for the listed stream segment were scheduled to provide adequate stakeholder input for the development of the TMDL Implementation Plan and to help address specific conditions found in the watershed. The first meeting included a description of the TMDL process, identification of the impaired waters, discussion of impairment parameters, characterization of watershed conditions, and a discussion of potential sources of impairment was initiated. The second round provided additional dialogue regarding potential sources of impairment followed by the identification of existing and proposed management measures. The final meeting provided the opportunity to discuss the implementation of additional management measures, monitoring, outreach, and the development of milestones, in addition to a review of the draft implementation plan.

Meeting attendance was low with attendees numbering between 2 and 9 participants. However, stakeholder diversity was high which facilitated discussion regarding a wide range of issues within the HUC 10. Stakeholder attendance represented members from Forsyth County, Temple Inland, Georgia Department of Natural Resources-Environmental Protection Division, Etowah Water and Sewer Authority, CH2M Hill, Upper Chattahoochee Soil and Water Conservation District, USDA NRCS, and the Georgia Mountains Regional Development Center.

Discussion with stakeholders identified the most significant impairment source as on-going residential development activity within the watershed. Stream crossings were also noted as being problematic. Culverts in the Bannister Creek watershed are commonly undersized, resulting in channel constriction and high flow velocities that scour downstream channel banks during storm events. Similarly, ditches paralleling roadways showed indications of the conveyance of high volumes and high velocity stormwater discharges. This became most evident at the ditch outfall. In these locations, where the ditch intersected the stream, significant sized knick points were commonly found to be actively destabilizing the ditch, roadway, and/or culvert.

It is expected that continued residential development will occur in this watershed in coming years. Most importantly, development activities require continued regulation with specific consideration of stormwater discharges. Additional road maintenance and potential replacement of key culverts would help alleviate sediment loading in the stream channel.

List the watershed stakeholder advisory group committee members, described in Project Task #1 of the Scope of Services, in following table.

Table 4. STAKEHOLDER ADVISORY GROUP MEMBERS

| NAME/ORG | ADDRESS | CITY | STATE | ZIP | PHONE | E-MAIL |
|---|----------------------------------|--------------|-------|-------|--------------|------------------------------|
| Doris Cook Etowah Water and Sewer Authority | P.O. Box 769 | Dawsonville | GA | 30534 | 706-216-6168 | dorisc@etowahwater.org |
| Leonard Ridings Upper Chattahoochee SWCD | 5955 Keith Bridge Rd. | Cumming | GA | 30041 | 404-887-5186 | |
| Louise McPherson USDA-NRCS | 298 Academy Rd. | Dawsonville | GA | 30534 | 706-265-2374 | louise.mcpherson@ga.usda.gov |
| Heather Dyke CH2M Hill | | | GA | | 770-781-2148 | hhd@mindspring.com |
| Renee Hoge Forsyth County Engineering | 101 E. Main Street, Suite 120 | Cumming | GA | 30040 | 770-781-2165 | rphoge@forsythco.com |
| Steve Dempsey Forsyth County Engineering | 101 E. Main Street, Suite 120 | Cumming | GA | 30040 | 770-781-2165 | bsdempsey@forsythco.com |
| Shannon Winsness DNR-EPD | P.O. Box 3250 | Cartersville | GA | 30120 | 770-387-4930 | |
| Vivian Tanner Forsyth Co.-NRCS | 101 E. Main Street, Suite 120 | Cumming | GA | 30040 | 770-536-6981 | vltanner@forstyco.com |
| Christopher Ernst Georgia Mountains RDC | P.O. Box 1720 | Gainesville | GA | 30501 | 770-538-2626 | cernst@gmrhc.org |

In Appendix A, list the names, addresses, telephone numbers, and e-mail addresses for local governments, agricultural or commercial forestry organizations, significant landholders, businesses and industries, and local organizations including environmental groups and individuals with a major interest in this watershed, as described in Project Task #1 of the Scope of Services.

VI. MANAGEMENT MEASURES AND ACTIVITIES

Identify and list in Table 5A the significant management measures or activities which have or will be taken in the contributing watershed to address sources or causes of the impairment(s). List significant management measures and activities in Column 1 and responsible organizations in Column 2. Describe the measure or activity in Column 3 and sources of funding or resources in Column 4 (you may wish to adapt the generic language included in the “Standard Language for Management Measures and Activities” to local applications) In Column 5, enter one of the following codes describing the status of the measure or activity: (A) installed and active; (AE) active and **will be** enhanced or expanded; (R) required in the future by law, regulation or permit conditions; (P) currently proposed, but not required; and (N/R) **additional new recommended** or (N/E) **recommended enhanced** management measures and activities. In Column 6 enter the rating of the estimated existing or proposed extent of application of the measure or activity or percentage of individual sources to which the management actions have or will be applied (see the following table). In Column 7 enter a rating of the estimated effectiveness of the management measures and activities (see following table). Effectiveness may be estimated by local experts or derived from tables included in the “Standard Language for Management Measures and Activities”.

The following table provides guidance for rating the estimated extent and portion of the contribution for each significant potential source and cause.

| Estimated Extent of Application or Percentage of Individual Sources to Which the Mangement Measure or Activity Has or Will be Applied in the Contributing Watershed | Estimated Effectiveness or Percent Removal of Constituent (Percent of load) | Rating |
|--|--|---------------|
| None or negligible (approximately 0-5%) | None or negligible (approximately 0-5%) | .5 |
| Scattered or low (approximately 5-20%) | Low to medium (approximately 5-25%) | 1 |
| Medium (approximately 20-50%) | Medium to High (approximately 25-75%) | 3 |
| Widespread or high (approximately 50% or more) | High (approximately 75% or more) | 5 |
| Unknown | Unknown | UNK |

Table 5A. MANAGEMENT MEASURES AND ACTIVITIES

GENERAL MEASURES APPLICABLE TO ALL PARAMETERS

| MEASURE | RESPONSIBILITY | DESCRIPTION | SOURCES OF FUNDING & RESOURCES | STATUS CODE | TARGET DATE | EXTENT RATING (Area, #) | EFFECT. RATING (Reduction) |
|--|---|--|---------------------------------|-------------|-------------|-------------------------|----------------------------|
| Federal Clean Water Act, Section 305(b) and 303(d) | USEPA, Georgia DNR/EPD, Local/County Government | The congressional objective of the CWA “is to restore and maintain the chemical, physical, and biological integrity of the Nation’s waters.” Section 305 (the <i>National Water Quality Inventory</i>) requires states to report progress in restoring impaired waters to EPA on a biennial basis. Section 303(d) requires states to identify ‘impaired’ waters, submit a list to EPA every two years, and develop TMDLs for these waters. | Federal State | A | On-going | 5 | 3 |
| Georgia Planning Act | Local/County Government | Coordinated Planning Program, managed by Georgia DCA, assigns local governments Environmental Planning Criteria (set by Georgia DNR) to include in local long-term comprehensive plans: <ul style="list-style-type: none"> • Water Supply Watersheds • Groundwater • Wetlands • Protected Rivers • Protected Mountains Program also requires local governments to identify Developments of Regional Impact (DRI). | Forsyth County Dawson County | A | On-going | 5 | 2 |

GENERAL MEASURES APPLICABLE TO ALL PARAMETERS

| MEASURE | RESPONSIBILITY | DESCRIPTION | SOURCES OF FUNDING & RESOURCES | STATUS CODE | TARGET DATE | EXTENT RATING (Area, #) | EFFECT. RATING (Reduction) |
|--|--|--|--|-------------|-------------|-------------------------|----------------------------|
| Georgia Water Quality Control Act (OCGA 12-5-20) | Georgia Rules and Regulations for Water Quality Control, Chapter 391-3-6 | Law prohibiting discharge of excessive pollutants (sediments, nutrients, pesticides, animal wastes, etc.) into waters of the State in amounts harmful to public health, safety, or welfare, or to animals, birds, or aquatic life or the physical destruction of stream habitats. Law authorizing Georgia EPD to control water pollution, eliminate phosphate detergents and regulate sludge disposal; to require permits for agricultural ground and surface water withdrawals; to prohibit siltation of state waters by land disturbing activities and require undisturbed buffers along state waters; to require land-use plans that include controls to protect drinking water supply sources and wetlands; to require river basin management plans on a rotation schedule for all major river basins. | Federal, State, Forsyth County Dawson County | A | On-going | 5 | 3 |
| Georgia River Basin Management Planning Act, Georgia Code Section 12-5-521 | Georgia DNR/EPD | River Basin Management Plans describe strategies and measures necessary for local governments, businesses, and citizen groups to educate the general public on matters involving the environmental and ecological concerns specific to the river basin; improve water quality and reduce pollution at the source; improve aquatic habitat and reestablish native species of fish; restore and protect wildlife habitat; and provide recreational benefits. | State Forsyth County Dawson County | A | On-going | 5 | 1 |

GENERAL MEASURES APPLICABLE TO ALL PARAMETERS

| MEASURE | RESPONSIBILITY | DESCRIPTION | SOURCES OF FUNDING & RESOURCES | STATUS CODE | TARGET DATE | EXTENT RATING (Area, #) | EFFECT. RATING (Reduction) |
|--|--|--|-------------------------------------|-------------|-------------------|-------------------------|----------------------------|
| Georgia Erosion & Sedimentation Control Act, Construction Permit, 2003 Amendment | Local/County Government, Georgia DNR/EPD, Georgia Soil & Water Conservation Commission | Local/county government certified by Georgia EPD as Local Issuing Authority for land-disturbing activities. Requires Erosion & Sedimentation Control Plan incorporating best management practices plus "Qualified Personnel" Training and Certification Program adopted from Georgia Soil & Water Conservation Commission. Certification of on-site "Qualified Personnel" to ensure proper design, construction and maintenance of standard E & S control measures and storm water management practices. | State, Forsyth County Dawson County | P | December 31, 2006 | 5 | 5 |
| Additional Enforcement for Erosion and Sedimentation Control Ordinance | Forsyth County | Increase the numbers of county Erosion and Sedimentation Control officers. | Forsyth County | P | 2006-2007 | 5 | 5 |
| Construction Storm Water Discharge NPDES Permit | Georgia DNR/EPD | General storm water discharge permit for stand-alone construction sites; infrastructure projects; and common developments. Requires implementation of Erosion, Sedimentation and Pollution Control Plan plus monitoring of discharge for compliance with Georgia's in-stream water quality standards. | State | A | On-going | 5 | 5 |

GENERAL MEASURES APPLICABLE TO ALL PARAMETERS

| MEASURE | RESPONSIBILITY | DESCRIPTION | SOURCES OF FUNDING & RESOURCES | STATUS CODE | TARGET DATE | EXTENT RATING (Area, #) | EFFECT. RATING (Reduction) |
|-------------------------------------|---|---|--------------------------------|-------------|-------------|-------------------------|----------------------------|
| Georgia's Best Management Practices | Georgia Forestry Commission (matters involving enforcement are generally referred to GA EPD) | GFC program to inform landowners, foresters, timber buyers, loggers site preparation and reforestation contractors and others involved with silvicultural operations about commonsense, economical effective practices to minimize nonpoint source and thermal pollution. GFC encourages and monitors compliance and conducts a complaint resolution program. | State | A | On-going | 3 | 5 |
| Federal Clean Water Act Section 404 | EPA (situations involving forestry are normally referred to the GFC to determine compliance with this regulation) | Requires normal ongoing agricultural and silvicultural practice to adhere to BMPs and 15 baseline provisions for road construction and maintenance in and across waters of the US including lakes, rivers, perennial and intermittent streams, wetlands, sloughs in order to qualify for the exemption from the permitting process. | Federal | A | On-going | 3 | 5 |

MEASURES APPLICABLE TO SPECIFIC PARAMETER: BIOTA/HABITAT.

| MEASURE | RESPONSIBILITY | DESCRIPTION | POTENTIALSOURCES OF FUNDING & RESOURCES | STATUS | TARGET DATE | EXTENT RATING | EFFECT. RATING |
|--|-------------------------|---|---|--------|-------------|---------------|----------------|
| New Development Ordinance Revisions | Local/County Government | Review current local Erosion & Sediment Control ordinances and modify as appropriate. Include requirements for professionals involved in erosion and sediment control design and construction to provided state certification to the issuing authorities involved. Require pollution prevention at the construction site through preparation and implementation of Erosion, Sedimentation & Pollution Control Plan to address issues such as sedimentation, trash, construction debris, leaking vehicles, storage of chemicals, etc. Subdivision ordinances addressing channel protection and conservation will provide further guidelines for construction activities. | Forsyth/Dawson County | A | On-going | 5 | 4 |
| District-wide Watershed Management Plan | Forsyth County | Storm Water Management Ordinance. | Forsyth County | A | On-going | 5 | 3 |
| Storm Water BMP Guidance Document (Georgia Stormwater Management Manual and Forsyth County Addendum) | Forsyth County | Documents identifying design, performance, and review criteria for stormwater management practices, prepared under the direction of the Forsyth County Department of Engineering. | Forsyth County | A | On-going | 5 | 4 |

MEASURES APPLICABLE TO SPECIFIC PARAMETER: BIOTA/HABITAT.

| MEASURE | RESPONSIBILITY | DESCRIPTION | POTENTIALSOURCES OF FUNDING & RESOURCES | STATUS | TARGET DATE | EXTENT RATING | EFFECT. RATING |
|---|--|---|--|--------|-------------|---------------|----------------|
| Local County Land Development Guidelines | Local/County Government | Includes storm water quantity and quality requirements for new developments. Requires post-development controls for storm water quantity and quality intended to reduce storm water pollution loads from new developments. | Forsyth County Dawson County | AE | As Required | 5 | 5 |
| NPDES Phase II MS4 Municipal Storm Water Permit | Georgia DNR/EPD, Local/County Government | Requires local jurisdictions to develop a comprehensive Storm Water Management Program (SWPP) to include public education and outreach on storm water impacts, construction site storm water runoff control, post-construction storm water management in new development and redevelopment, and pollution prevention. | Forsyth County | A | On-going | 5 | 5 |
| Environmental Quality Incentives Program (EQIP) | Natural Resources Conservation Services | Voluntary program that provides technical and cost share assistance for protection of ground and surface water, erosion control, air quality, wildlife habitat, and plant health. | Federal 50% cost share with possible additional incentive payments | P | 2009 | 1 | 5 |
| Etowah Habitat Conservation Plan | U.S. Fish and Wildlife Service | Provides planning process and development guidelines to enhance the protection of threatened and endangered aquatic species in the upper Etowah Basin | Development of the Plan is funded through the USFWS. Adoption and implementation of management measures will be funded through the County governments. | AE | 2006-2007 | 5 | 5 |
| Commercial Mitigation Banking | Landowner | The purchase and conservation of natural greenspace and habitats in compensation for disturbance of sensitive environments in other areas. Proposed site is located at confluence of Bannister Creek and Brewton Creek. | Landowner and credit purchaser. | P | 2006-2007 | 1 | 5 |

MEASURES APPLICABLE TO SPECIFIC PARAMETER: BIOTA/HABITAT.

| MEASURE | RESPONSIBILITY | DESCRIPTION | POTENTIALSOURCES OF FUNDING & RESOURCES | STATUS | TARGET DATE | EXTENT RATING | EFFECT. RATING |
|---|---|--|---|---|-------------|---------------|----------------|
| Section 319(h) Non-point Source Implementation Grant | Georgia DNR/EPD Funds distributed to Etowah River Alliance | Funds are being used for a combination of the installation of agricultural BMPs, rain gardens, septic system repair, streambank restoration, and educational outreach activities. | Federal | A- The Upper Etowah River Alliance P-Upper Etowah River Alliance (2006-2007) | 2006 | 1 | 5 |
| Georgia Forestry Commission Monthly BMP Assurance Examination | Georgia Forestry Commission | In an effort to document “reasonable assurance” that water quality will be proactively protected during regular ongoing silvicultural operations, the GCF will offer a monthly BMP assurance examination of active sites. All active of ongoing sites will be identified either through monthly air patrol flights, courthouse records, riding the roads, notification or by landowners. Sites located within watersheds of specific biota (sediment) impaired streams will be given a higher priority to identify and conduct examinations. | Federal and State | A | On-going | 1 | 5 |
| Adopt-A-Stream water quality monitoring | Adopt-A-Stream-Upper Etowah River Alliance | Volunteer monitoring program established by Adopt-A-Stream and Upper Etowah River Alliance. | Volunteer/donations | A | On-going | 3 | 5 |

The purpose of Table 5B is to initiate and guide a “first-cut” evaluation of the capacity of existing, currently proposed, and future required management measures and activities to achieve the load reductions specified in the TMDL (and meet water quality goals) and where needed, identify potential feasible and effective measures and practices which could be encouraged and supported to further reduce pollutant loadings from significant potential sources. Though completely voluntary, such recommendations would provide an effective local guide to effective management actions to achieve local water quality goals, establish priorities for grant or loan programs (Section 319 (h), EQIP, SRF), establish eligibility for grants for Tier plans and implementation, and identify priorities for local watershed assessments and protection plans.

In Columns 1 and 2 of Table 5B, enter each significant potential source and its’ corresponding impact ratings from Table 3. Review Table 5A and list significant management practices and activities applicable to each significant cause or source. Evaluate and compare the estimated extent and relative contribution of each significant cause or source with the extent and effectiveness of the applicable management measures and in conjunction with appropriate local stakeholders or organizations, make a best current determination of whether the existing or proposed management practices would achieve the load reductions needed to achieve the TMDL. Summarize conclusions and rationale in Column 4. If more information is needed to adequately determine the significant sources or causes and their relative contributions so note and recommend management actions needed to adequately identify sources such as monitoring, watershed assessments, or Tier 1 implementation plans in the last column. If the current, proposed and required management measures are judged inadequate to achieve the needed load reductions for significant sources, recommend, in consultation with the advisory groups, additional management activities, programs, and measures which would effectively reduce pollutant loads from the source. List such measures in the final column and list as a recommended activity in the milestones (Table 8).

TABLE 5B: EVALUATION OF MANAGEMENT MEASURES AND ACTIVITIES APPLIED TO SPECIFIC SOURCES OR CAUSES

APPLICABLE TO SPECIFIC PARAMETER: BIOTA/HABITAT:

| SIGNIFICANT POTENTIAL SOURCE (S) OR CAUSE(S) (From Table 3) | | REQUIRED MANAGEMENT MEASURES OR ENHANCEMENTS APPLICABLE TO EACH SIGNIFICANT SOURCE (From Table 5A) | EVALUATION: WILL THE ESTIMATED EXTENT OF APPLICATION AND EFFECTIVENESS OF EXISTING, CURRENTLY PROPOSED, AND REQUIRED MANAGEMENT MEASURES BE ADEQUATE TO ACHIEVE THE SOURCE REDUCTION SPECIFIED BY THE TMDL? | IF MANAGEMENT MEASURES ARE ESTIMATED TO BE INSUFFICIENT, RECOMMEND ADDITIONAL MANAGEMENT MEASURES AND ACTIVITIES WHICH COULD EFFECTIVELY REDUCE LOADS FROM SIGNIFICANT SOURCES |
|--|----|--|---|--|
| Residential Development | 15 | Erosion and Sedimentation Control Permit Amendment | The Erosion and Sedimentation Control Permit Amendment is expected to improve the selection and installation of BMPs significantly. | Additional county inspection and enforcement officers. |
| | | Provide additional County inspectors and enforcement officers for Erosion and Sedimentation Control Regulations. | | Develop and implement storm water retrofit program. |
| | | Potential/partial adoption of Etowah River HCP Policies | Forsyth County is currently hiring six new enforcement officers, which will provide additional support for enforcement. | Identification of contractor permit before Erosion and Sedimentation certification program is initiated (Forsyth County). |
| | | | Although currently in the development stages, the HCP policies, if adopted by local governments, will be extremely progressive environmental regulations. | |
| Natural/ Agricultural | 9 | Commercial Mitigation Bank | Effectiveness of the mitigation bank, EQIP, and 319 program depends on landowner participation. | |
| | | NRCS EQIP Program | | |
| | | Section 319(h) Nonpoint Source Implementation Program | | |

VII. MONITORING PLAN

The purposes of monitoring are to obtain more data to determine the sources of pollution, describe baseline conditions, and evaluate the effects of management and activities on water quality. Describe any sampling activities or other surveys - active, planned or proposed (including monitoring required for watershed assessments, or stormwater permits) - and their intended purpose. Reference the development and submission of a Sample Quality and Assurance Plan (SQAP) if monitoring for listing decisions.

Table 6. MONITORING PLAN

| PARAMETER (S) TO BE MONITORED | ORGANIZATION | STATUS (CURRENT, PROPOSED, PLANNED) | TIME FRAME | | PURPOSE (If for delisting, date of SQAP submission) |
|---|------------------|---|---------------------|---------------------|---|
| | | | START | END | |
| Fecal Coliform, TSS, TP, Cu, TOC, NO ₃ -NO ₂ , DO, temperature, conductivity, PH, turbidity, and in- stream flow velocities. | Forsyth County | A | 1999 | On-going | Forsyth County Watershed Management Program |
| Multiple parameters | Etowah River HCP | Development of monitoring plan to be initiated in May, 2006 | To be determined | To be determined | Habitat monitoring for threatened and endangered species. Additional monitoring may be implemented through Adopt-A-Stream or the Upper Etowah River Alliance. |

VIII. PLANNED OUTREACH FOR IMPLEMENTATION

List and describe outreach activities, including those described in the Scope of Services that will be conducted to support this plan and the implementation of it.

Table 7. PLANNED OUTREACH

| RESPONSIBILITY | DESCRIPTION | AUDIENCE | DATE |
|---|---|---|------------------|
| Etowah River Habitat Conservation Plan (HCP) | The HCP is developing management policies that local governments can adopt for the protection of federal and state listed threatened and endangered species. Public and governmental education is a strong component of this plan. | General public and local governments | On-going |
| Keep America Beautiful-Forsyth County Affiliate: Rivers Alive | Annual cleanup of waterbodies in Forsyth County through Rivers Alive Program. | General public | On-going |
| Adopt-A-Stream | Provides educational material, workshops/training, and stream monitoring. | General public | On-going |
| Upper Etowah River Alliance | Outreach through educational seminars, brochures, and sponsoring of Adopt-A-Stream events. The Upper Etowah River Alliance has recently applied for an additional 319 Nonpoint Source Implementation Grant, much of which will be focused towards educational outreach. | General public | On-going |
| Project WET | Environmental education for local school systems. Project WET provides teaching resources, events, and grants to participating school systems. Riverview Middle School is a local active participant in Project WET. | Preschool to 12 grade | On-going |
| Georgia Mountains RDC | Complete plan outreach activities specified in Section 106 grant fund contract | Local governments, major stakeholders, public | By June 30, 2006 |

IX. MILESTONES/ MEASURES OF PROGRESS OF BMPs AND OUTREACH

This table will be used to periodically track and report progress of significant management practices and activities identified or recommended in Tables 5A, 5B, and other sections of this plan, including outreach, additional monitoring and assessments, and the enhancement or installation of management measures and activities. Identify and list significant planned or recommended activities and the target date of accomplishment. Provide room to comment on the effectiveness of the management measure, how much support the measure was given by the community, what was learned, how the measure might be improved in the future, and any other observations made. This table can be "pulled out" of this template and used to report and track progress.

Table 8. MILESTONES

| MANAGEMENT MEASURE OR ACTIVITY | RESPONSIBLE ORGANIZATIONS | STATUS | | COMMENT |
|---|--|----------|-----------|--|
| | | PROPOSED | INSTALLED | |
| Erosion and Sedimentation Control Permit Amendment | State, Dawson County, Forsyth County | X | | To be installed December 31, 2006. |
| Update Local County Land Development Guidelines | Dawson County, Forsyth County | X | | Dawson and Forsyth Counties update land development guidelines as appropriate. |
| Adoption of Etowah River HCP Policies | Dawson County, Forsyth County | X | | Policies currently being developed and should be completed by 2007. Once completed, Dawson and Forsyth Counties should consider adoption of these policies, where appropriate. |
| Section 319(h) Nonpoint Source Implementation Program | Upper Etowah River Alliance | X | X | The Upper Etowah River Alliance is currently administering a 319 grant to improve water quality in the Etowah River watershed and has been recommended to receive additional funding through a second 319 grant. |
| Environmental Quality Incentives Program | Natural Resources Conservation Service | | X | On-going. |

| MANAGEMENT MEASURE OR ACTIVITY | RESPONSIBLE ORGANIZATIONS | STATUS | | COMMENT |
|--|----------------------------------|----------|-----------|--|
| | | PROPOSED | INSTALLED | |
| Storm Water Management Audit/Assessment | Dawson County, Forsyth County | X | | Stormwater structures are privately owned and maintained. Audit/assessment would occur through comprehensive inspection of stormwater systems. |
| Additional county enforcement for Erosion and Sedimentation Ordinance. | Forsyth County | X | | Addition of 6 Erosion and Sedimentation control inspectors to Forsyth County Engineering Department by 2007. |
| Installation of Mitigation Bank | Landowner | X | | Scheduled to be initiated by 2007 at the confluence of Bannister Creek and Brewton Creek. |
| Development of Etowah Habitat Conservation Monitoring Program | Etowah Habitat Conservation Plan | X | | The HCP monitoring program will serve as a basis for monitoring in the region. |

{Settingdown Creek}

COMPLETE THE FOLLOWING TABLES FOR AND NARRATIVES ABOUT EACH IMPAIRED STREAM IN THE WATERSHED.

| STREAM SEGMENT NAME | LOCATION | MILES/AREA | DESIGNATED USE | PS/NS |
|---------------------|-----------------------------|--------------------|----------------|-------|
| Settingdown Creek | Dawson and Forsyth Counties | 45 mi ² | Fishing | NS |

III. SOURCES AND CAUSES OF STREAM SEGMENT IMPAIRMENT LISTED IN TMDLs

After reviewing the TMDLs written for this stream, complete the following tables with the information found in the TMDLs. List each parameter for which the stream segment is impaired and the water quality standard not met. See the “Instructions for Completing the Georgia Total Maximum Daily Load (TMDL) Tier 2 Implementation Plan” for the water quality standards. Enter the needed reduction from the TMDL. Describe the sources and causes of each impairment identified in the TMDLs.

Table 2. SOURCES OF IMPAIRMENT AS INDICATED IN TMDLs

SETTINGDOWN CREEK

| PARAMETER 2 | WQ STANDARD | SOURCES OF IMPAIRMENT | NEEDED REDUCTION FROM TMDL |
|----------------|----------------------------------|-----------------------------|----------------------------|
| Biota, Habitat | No degradation of fish community | Urban (19 tons/yr) | 78% |
| | | Barren (61 tons/yr) | |
| | | Agriculture (1,895 tons/yr) | |
| | | Forest (4,466 tons/yr) | |

IV. IDENTIFICATION AND RANKING OF POTENTIAL SOURCES OR CAUSES OF IMPAIRMENT

INVESTIGATE AND EVALUATE the extent and relative contributions from causes or sources of the impairment for each parameter listed in Table 2. Write a narrative describing efforts made or procedures used to verify the significance and extent of the sources or causes of each impairment listed in the TMDLs. Include: 1) involvement of stakeholder group; 2) review of land cover data; 3) field surveys; and 4) other pertinent sources of information consulted.

Verification of the significance and extent of impairment sources were identified through a field survey, review of land used data, and involvement of the stakeholder group. A field survey of Settingdown Creek was conducted to characterize existing stream conditions and identify potential sources of impairment (Appendix D). The watershed survey noted significant residential development and a limited amount of commercial development occurring within the watershed. The conversion of farmland has been the leading land source for both residential and commercial developments. The most recent update to Forsyth County's land use data was conducted in 2003 by Jordan, Jones, and Goulding. This land use data was evaluated during the watershed survey and, due to recent development within the watershed, was found to be outdated and did not provide an accurate representation of the watershed's current conditions. Therefore, land use data were not used during the stakeholder meetings. The identification of potential sources of impairment was completed during the first and second stakeholder meetings. During the first stakeholder meeting, selected images illustrating potential impairment sources from the field survey were presented and discussed. During the second stakeholder meeting, stakeholders identified specific impairment sources. Additional discussion regarding the source, responsible agent, and methods of resolution for each of the impariments was performed. Finally, ranking of pollution sources was completed through discussion and development of a general consensus between attending stakeholders during the second stakeholder meeting.

Combining information provided in the TMDL document, stakeholder knowledge, existing watershed assessments, and the watershed evaluation conducted for this plan, identify the potential sources or causes most likely to contribute to each identified impairment (parameter) in Table 3. If available information is inadequate to estimate the extent and relative contribution of significant potential sources or causes, recommend appropriate management actions (watershed assessments, monitoring, etc.) to determine the potential sources or causes and relative contributions. In Table 3, list the significant potential sources or causes of each impairment. Estimate the geographic extent of each potential source or cause as percent of the contributing watershed area, percent of stream miles affected, or number per square mile and enter the appropriate rating (from the following table) in the column entitled “Rating (A)”. Estimate the relative contribution of each major source or cause to the pollutant causing the impairment and enter the appropriate rating (from the following table) in the column entitled “Rating (B)”. Calculate a relative impact ratings for each source or cause by multiplying “Rating (A)” by “Rating (B)”. Comments on the source of information used to determine the extent or contribution may be entered in the applicable columns in Table 3.

The following table provides guidance for rating the estimated extent and portion of the contribution from each potential source and cause.

| Estimated Geographic Extent of the Source or Cause in the Contributing Watershed (Percent of area or stream miles) | Estimated Contribution of the Source or Cause to the Pollutant Load Causing the Impairment (Percent of load) | Rating |
|---|---|---------------|
| None or negligible (approximately 0-5%) | None or negligible (approximately 0-5%) | 0.5 |
| Scattered or low (approximately 5-20%) | Scattered or low (approximately 5-20%) | 1 |
| Medium (approximately 20-50%) | Medium (approximately 20-50%) | 3 |
| Widespread or high (approximately 50% or more) | Widespread or high (approximately 50% or more) | 5 |
| Unknown | Unknown | UNK |

Table 3. CONCLUSIONS MADE OF POTENTIAL SOURCES OF STREAM SEGMENT IMPAIRMENT

PARAMETER 1: BIOTA/HABITAT.

| POTENTIAL SOURCES OR CAUSES | ESTIMATED EXTENT OF CONTRIBUTION | | ESTIMATED PORTION OF CONTRIBUTION | | IMPACT RATING (A X B) |
|--|---|-------------------|--|-------------------|------------------------------|
| | Comments | Rating (A) | Comments | Rating (B) | |
| Residential Development | Widespread | 3 | High | 5 | 15 |
| Commercial Development | Scattered | 3 | Medium | 3 | 9 |
| Existing Agriculture | Scattered | 1 | Medium | 3 | 3 |
| Historic Activity (Agriculture and Channel Dredging) | Scattered | 1 | Medium | 3 | 3 |
| Infrastructure Development | Widespread | 5 | Low | 1 | 5 |

V. STAKEHOLDERS

PUBLIC INVOLVEMENT AND THE ACTIVE PARTICIPATION OF STAKEHOLDERS is essential to the process of preparing TMDL implementation plans and improving water quality. Stakeholders can provide valuable information and data regarding their community, impaired water bodies, potential causes of impairments, and management practices and activities which may be employed to reduce the impacts of the causes of impairment.

Describe outreach activities to advise and engage stakeholders in the TMDL implementation plan preparation process. Describe the stakeholder group employed or formed to address the impaired segments in the watershed. Summarize the results of the number of attendees and meetings and describe major findings, recommendations, and approvals.

Stakeholders were identified through existing knowledge of local and regional governments, agencies, and organizations. Three rounds of meetings for each of the listed stream segments were scheduled to provide adequate stakeholder input into the development of the TMDL Implementation Plan and to help address specific conditions found in the watershed of each listed stream segment. The first round of meetings included a description of the TMDL process, identification of the impaired waters, discussion of impairment parameters, characterization of watershed conditions, and a discussion was initiated of potential sources of impairment. The second round provided additional dialogue regarding potential sources of impairment, followed by the selection of management measures. The final round of meetings allowed for consideration regarding the implementation of additional management measures, monitoring, outreach, and the development of milestones, in addition to a review of the draft implementation plan.

Meeting attendance was low with attendees numbering between 2 and 6 participants. However, stakeholder diversity was high which facilitated discussion regarding a wide range of issues within the watershed. Stakeholder attendance represented members from Forsyth County, the University of Georgia and the Habitat Conservation Plan, Temple Inland, GADNR/EPD, Etowah Water and Sewer Authority, NRCS, and the Georgia Mountains Regional Development Center.

The stakeholder group especially noted the rate and type of development occurring in the watershed, which is clearly illustrated by comparing 1995 land use data identified in the TMDL document and 2003 Forsyth County land use data. The TMDL utilized the National Land Cover Dataset of 1995 to estimate the distribution of land coverage categories for the watershed. This analysis noted that forestry and agriculture uses were the primary land cover in the watershed. The TMDL identifies the relative sediment contributions for each of the land cover categories, which are identified below:

Plan for Settingdown Creek and Bannister Creek Watershed
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| Waterbody | Urban (acres) | Barren (acres) | Commercial, Industry (acres) | Agriculture (acres) | Water (acres) | Wetlands (acres) | Forest (acres) | Total (acres) |
|-------------------|---------------|----------------|------------------------------|---------------------|---------------|------------------|----------------|---------------|
| Settingdown Creek | 85 | 271 | 194 | 8,416 | 203 | 24 | 19,838 | 29,301 |

Forsyth County has experienced rapid population growth since the 1995. As southern Forsyth County nears its build-out capacity, increased development pressure has been focused on the northern portion of the County. As such, the sources of sedimentation and habitat impairment have also shifted. Existing agriculture no longer plays a leading role as a sediment source in the watershed. Instead, land-disturbing activity associated with residential and commercial development has become the principal origin of sediment. Although existing agricultural activity is no longer a primary sediment source, legacy sediment from past agricultural and channel straightening is still making its way downstream through the watershed. Furthermore, additional sedimentation is occurring as spoils from channel-straightening are actively being eroded and entering into the stream system. The 2003 land use data from Forsyth County, although somewhat outdated, provides some indication of the extent of land use changes that have occurred in the Settingdown Creek watershed since 1995.

| Waterbody | Agriculture (acres) | Residential (acres) | Undeveloped (acres) | Commercial (acres) | Industrial (acres) | Public/Institutional (acres) | Parks/Recreation/Conservation (acres) | ROW (acres) | Total (acres) |
|------------------|---------------------|---------------------|---------------------|--------------------|--------------------|------------------------------|---------------------------------------|-------------|---------------|
| Settindown Creek | 7,855 | 14,278 | 8,993 | 294 | 421 | 436 | 715 | 1,798 | 34,790 |

Despite the high rate of development over the past 10 years, considerable portions of the watershed remain open space, agriculture, or vacant lands. Development within Settingdown Creek's watershed will likely continue until the watershed becomes completely urbanized. During this period, special attention needs to be given to the management of land disturbing activity associated with residential and commercial development and the installation of infrastructure, especially water and sewer lines that are placed in close proximity to waterbodies. Continued enforcement of existing regulations such as the Erosion and Sedimentation Control Ordinance, Stormwater Ordinance, and Regulated Floodplain Ordinance is necessary to provide protection to Forsyth and Dawson Counties' water resources. Similarly, the implementation of new environmental technologies such as the capture and reuse of stormwater and greywater should be promoted throughout the watershed. The number of inspection and enforcement officers should be maintained in sufficient numbers to provide adequate inspection of land disturbance sites.

The U.S Fish and Wildlife Service, the University of Georgia, Kennesaw State University, and the Georgia Conservancy, among others, are currently developing the Etowah River Habitat Conservation Plan (HCP). The goal of the HCP is to protect imperiled aquatic species within the Etowah River Watershed. The HCP is developing a set of development policies that are to be adopted by local governments within the Etowah basin, and include: stormwater management policies, erosion and sedimentation control policies, a stream buffer policy, stream crossings policies, a conservation subdivision policy, and water supply planning policy. Adoption of these policies by Forsyth and Dawson Counties will promote improvements in biotic and habitat quality. Therefore, this plan recommends that Forsyth and Dawson Counties consider adoption of the HCP policies as they become available.

List the watershed stakeholder advisory group committee members, described in Project Task #1 of the Scope of Services, in following table.

Table 4. STAKEHOLDER ADVISORY GROUP MEMBERS

| NAME/ORG | ADDRESS | CITY | STATE | ZIP | PHONE | E-MAIL |
|--|--|--------------|-------|-------|--------------|----------------------------------|
| Doris Cook/ Etowah Water and Sewer Authority | P.O. Box 769 | Dawsonville | GA | 30534 | 706-216-6168 | dorisc@etowahwater.org |
| Leonard Ridings/ Upper Chattahoochee Soil and Water Conservation District | 5955 Keith Bridge Rd. | Cumming | GA | 30041 | 404-887-5186 | |
| Louise McPherson/ USDA-NRCS | 298 Academy Rd. | Dawsonville | GA | 30534 | 706-265-2374 | louise.mcpherson@ga.usda.gov |
| Heather Dyke/ CH2M Hill | | | GA | | 770-781-2148 | hhd@mindspring.com |
| Renee Hoge/ Forsyth County Engineering | 101 E. Main Street, Suite 120 | Cumming | GA | 30040 | 770-781-2165 | rphoge@forsythco.com |
| Steve Dempsey/ Forsyth County Engineering | 101 E. Main Street, Suite 120 | Cumming | GA | 30040 | 770-781-2165 | bsdempsey@forsythco.com |
| Shannon Winsness/ DNR-EPD | P.O. Box 3250 | Cartersville | GA | 30120 | 770-387-4930 | |
| Vivian Tanner/ Forsyth Co.-NRCS | 101 E. Main Street, Suite 120 | Cumming | GA | 30040 | 770-536-6981 | vltanner@forstyco.com |
| Curt Gervich/ UGA-Etowah HCP | P.O. Box 287 | Acworth | GA | 30101 | 678-758-0781 | curt@etowahhcp.org |
| Sam Breyfogle/ Temple Inland | 208 Springdale Rd | LaGrange | GA | 30240 | 706-884-8077 | smauelbreyfogle@templeinland.com |
| Mary Gazaway/ GAEPD | 4220 International Parkway, Suite 101 | Atlanta | GA | 30354 | 404-675-1745 | mary_gazaway@dnr.state.ga.us |

In Appendix A, list the names, addresses, telephone numbers, and e-mail addresses for local governments, agricultural or commercial forestry organizations, significant landholders, businesses and industries, and local organizations including environmental groups and individuals with a major interest in this watershed, as described in Project Task #1 of the Scope of Services.

VI. MANAGEMENT MEASURES AND ACTIVITIES

Identify and list in Table 5A the significant management measures or activities which have or will be taken in the contributing watershed to address sources or causes of the impairment(s). List significant management measures and activities in Column 1 and responsible organizations in Column 2. Describe the measure or activity in Column 3 and sources of funding or resources in Column 4 (you may wish to adapt the generic language included in the “Standard Language for Management Measures and Activities” to local applications) In Column 5, enter one of the following codes describing the status of the measure or activity: (A) installed and active; (AE) active and **will be** enhanced or expanded; (R) required in the future by law, regulation or permit conditions; (P) currently proposed, but not required; and (N/R) **additional new recommended** or (N/E) **recommended enhanced** management measures and activities. In Column 6 enter the rating of the estimated existing or proposed extent of application of the measure or activity or percentage of individual sources to which the management actions have or will be applied (see the following table). In Column 7 enter a rating of the estimated effectiveness of the management measures and activities (see following table). Effectiveness may be estimated by local experts or derived from tables included in the “Standard Language for Management Measures and Activities”.

The following table provides guidance for rating the estimated extent and portion of the contribution for each significant potential source and cause.

| Estimated Extent of Application or Percentage of Individual Sources to Which the Mangement Measure or Activity Has or Will be Applied in the Contributing Watershed | Estimated Effectiveness or Percent Removal of Constituent (Percent of load) | Rating |
|--|--|---------------|
| None or negligible (approximately 0-5%) | None or negligible (approximately 0-5%) | .5 |
| Scattered or low (approximately 5-20%) | Low to medium (approximately 5-25%) | 1 |
| Medium (approximately 20-50%) | Medium to High (approximately 25-75%) | 3 |
| Widespread or high (approximately 50% or more) | High (approximately 75% or more) | 5 |
| Unknown | Unknown | UNK |

Table 5A. MANAGEMENT MEASURES AND ACTIVITIES

GENERAL MEASURES APPLICABLE TO ALL PARAMETERS

| MEASURE | RESPONSIBILITY | DESCRIPTION | SOURCES OF FUNDING & RESOURCES | STATUS CODE | TARGET DATE | EXTENT RATING (Area, #) | EFFECT. RATING (Reduction) |
|--|---|--|---------------------------------|-------------|-------------|-------------------------|----------------------------|
| Federal Clean Water Act, Section 305(b) and 303(d) | USEPA, Georgia DNR/EPD, Local/County Government | The congressional objective of the CWA “is to restore and maintain the chemical, physical, and biological integrity of the Nation’s waters.” Section 305 (the <i>National Water Quality Inventory</i>) requires states to report progress in restoring impaired waters to EPA on a biennial basis. Section 303(d) requires states to identify ‘impaired’ waters, submit a list to EPA every two years, and develop TMDLs for these waters. | Federal State | A | On-going | 5 | 3 |
| Georgia Planning Act | Local/County Government | Coordinated Planning Program, managed by Georgia DCA, assigns local governments Environmental Planning Criteria (set by Georgia DNR) to include in local long-term comprehensive plans: <ul style="list-style-type: none"> • Water Supply Watersheds • Groundwater • Wetlands • Protected Rivers • Protected Mountains Program also requires local governments to identify Developments of Regional Impact (DRI). | Forsyth County Dawson County | A | On-going | 5 | 2 |

GENERAL MEASURES APPLICABLE TO ALL PARAMETERS

| MEASURE | RESPONSIBILITY | DESCRIPTION | SOURCES OF FUNDING & RESOURCES | STATUS CODE | TARGET DATE | EXTENT RATING (Area, #) | EFFECT. RATING (Reduction) |
|--|--|--|--|-------------|-------------|-------------------------|----------------------------|
| Georgia Water Quality Control Act (OCGA 12-5-20) | Georgia Rules and Regulations for Water Quality Control, Chapter 391-3-6 | Law prohibiting discharge of excessive pollutants (sediments, nutrients, pesticides, animal wastes, etc.) into waters of the State in amounts harmful to public health, safety, or welfare, or to animals, birds, or aquatic life or the physical destruction of stream habitats. Law authorizing Georgia EPD to control water pollution, eliminate phosphate detergents and regulate sludge disposal; to require permits for agricultural ground and surface water withdrawals; to prohibit siltation of state waters by land disturbing activities and require undisturbed buffers along state waters; to require land-use plans that include controls to protect drinking water supply sources and wetlands; to require river basin management plans on a rotation schedule for all major river basins. | Federal, State, Forsyth County Dawson County | A | On-going | 5 | 3 |
| Georgia River Basin Management Planning Act, Georgia Code Section 12-5-521 | Georgia DNR/EPD | River Basin Management Plans describe strategies and measures necessary for local governments, businesses, and citizen groups to educate the general public on matters involving the environmental and ecological concerns specific to the river basin; improve water quality and reduce pollution at the source; improve aquatic habitat and reestablish native species of fish; restore and protect wildlife habitat; and provide recreational benefits. | State Forsyth County Dawson County | A | On-going | 5 | 1 |

GENERAL MEASURES APPLICABLE TO ALL PARAMETERS

| MEASURE | RESPONSIBILITY | DESCRIPTION | SOURCES OF FUNDING & RESOURCES | STATUS CODE | TARGET DATE | EXTENT RATING (Area, #) | EFFECT. RATING (Reduction) |
|--|--|--|-------------------------------------|-------------|-------------------|-------------------------|----------------------------|
| Georgia Erosion & Sedimentation Control Act, Construction Permit, 2003 Amendment | Local/County Government, Georgia DNR/EPD, Georgia Soil & Water Conservation Commission | Local/county government certified by Georgia EPD as Local Issuing Authority for land-disturbing activities. Requires Erosion & Sedimentation Control Plan incorporating best management practices plus "Qualified Personnel" Training and Certification Program adopted from Georgia Soil & Water Conservation Commission. Certification of on-site "Qualified Personnel" to ensure proper design, construction and maintenance of standard E & S control measures and storm water management practices. | State, Forsyth County Dawson County | P | December 31, 2006 | 5 | 5 |
| Construction Storm Water Discharge NPDES Permit | Georgia DNR/EPD | General storm water discharge permit for stand-alone construction sites; infrastructure projects; and common developments. Requires implementation of Erosion, Sedimentation and Pollution Control Plan plus monitoring of discharge for compliance with Georgia's in-stream water quality standards. | State | A | On-going | 5 | 5 |
| Industrial Storm Water Discharge NPDES Permit | Georgia DNR/EPD | General storm water discharge permit for manufacturing facilities; mining, oil & gas operations; storage or disposal facilities; recycling centers; steam electric power generating facilities; transportation facilities; domestic sewage or sewage sludge treatment. Requires implementation of Storm Water Pollution Prevention Plan. May require storm water monitoring program targeting discharges into/near 303(d) listed waters. | State | A | On-going | .5 | 5 |

GENERAL MEASURES APPLICABLE TO ALL PARAMETERS

| MEASURE | RESPONSIBILITY | DESCRIPTION | SOURCES OF FUNDING & RESOURCES | STATUS CODE | TARGET DATE | EXTENT RATING (Area, #) | EFFECT. RATING (Reduction) |
|--|---|---|--------------------------------|-------------|-------------|-------------------------|----------------------------|
| Federal Clean Water Act Section 404 | EPA (situations involving forestry are normally referred to the GFC to determine compliance with this regulation) | Requires normal ongoing agricultural and silvicultural practice to adhere to BMPs and 15 baseline provisions for road construction and maintenance in and across waters of the US including lakes, rivers, perennial and intermittent streams, wetlands, sloughs in order to qualify for the exemption from the permitting process. | Federal | A | On-going | 3 | 5 |
| Georgia's Best Management Practices | Georgia Forestry Commission (matters involving enforcement are generally referred to GA EPD) | GFC program to inform landowners, foresters, timber buyers, loggers site preparation and reforestation contractors and others involved with silvicultural operations about commonsense, economical effective practices to minimize nonpoint source and thermal pollution. GFC encourages and monitors compliance and conducts a complaint resolution program. | State | A | On-going | 3 | 5 |
| Additional Enforcement for Erosion and Sedimentation Control | Forsyth County | Increase the numbers of county Erosion and Sedimentation Control officers. | Forsyth County | P | 2006-2007 | 5 | 5 |
| NPDES Phase II MS4 Municipal Storm Water Permit | Georgia DNR/EPD, Local/County Government | Requires local jurisdictions to develop a comprehensive Storm Water Management Program (SWPP) to include public education and outreach on storm water impacts, construction site storm water runoff control, post-construction storm water management in new development and redevelopment, and pollution prevention. | Forsyth County | A | On-going | 5 | 5 |

MEASURES APPLICABLE TO SPECIFIC PARAMETER: BIOTA/HABITAT.

| MEASURE | RESPONSIBILITY | DESCRIPTION | POTENTIALSOURCES OF FUNDING & RESOURCES | STATUS | TARGET DATE | EXTENT RATING | EFFECT. RATING |
|--|-------------------------|---|---|--------|-------------|---------------|----------------|
| New Development Ordinance Revisions | Local/County Government | Review current local Erosion & Sediment Control ordinances and modify as appropriate. Include requirements for professionals involved in erosion and sediment control design and construction to provided state certification to the issuing authorities involved. Require pollution prevention at the construction site through preparation and implementation of Erosion, Sedimentation & Pollution Control Plan to address issues such as sedimentation, trash, construction debris, leaking vehicles, storage of chemicals, etc. Subdivision ordinances addressing channel protection and conservation will provide further guidelines for construction activities. | Forsyth/Dawson County | A | On-going | 5 | 5 |
| District-wide Watershed Management Plan | Forsyth County | Storm Water Management Ordinance. | Forsyth County | A | On-going | 5 | 4 |
| Storm Water BMP Guidance Document (Georgia Stormwater Management Manual and Forsyth County Addendum) | Forsyth County | Documents identifying design, performance, and review criteria for stormwater management practices, prepared under the direction of the Forsyth County Department of Engineering. | Forsyth County | A | On-going | 5 | 4 |

MEASURES APPLICABLE TO SPECIFIC PARAMETER: BIOTA/HABITAT.

| MEASURE | RESPONSIBILITY | DESCRIPTION | POTENTIALSOURCES OF FUNDING & RESOURCES | STATUS | TARGET DATE | EXTENT RATING | EFFECT. RATING |
|--|-------------------------|--|---|--------|-------------|---------------|----------------|
| Storm Water Management Audit/ Assessment | Local/County Government | Internal assessment of storm water pollution prevention plan (map of facility and responsibilities for upkeep): municipal operations, automobile maintenance, car washing, illegal dumping control, landscaping and lawn care, parking lot and street cleaning, roadway and bridge maintenance, septic system controls, storm drain system cleaning, storm water detention basins maintenance, alternative products, hazardous materials storage, road salt application and storage, spill response and prevention, used oil recycling, materials management, leaking fluids from vehicles, and street sweeping. The county needs to ensure that they are meeting all applicable storm water requirements. | Forsyth County | P | On-going | 5 | 3 |
| County Land Development Guidelines | Local/County Government | Includes storm water quantity and quality requirements for new developments. Requires post-development controls for storm water quantity and quality intended to reduce storm water pollution loads from new developments. | Forsyth County Dawson County | AE | As Required | 5 | 5 |

MEASURES APPLICABLE TO SPECIFIC PARAMETER: BIOTA/HABITAT.

| MEASURE | RESPONSIBILITY | DESCRIPTION | POTENTIALSOURCES OF FUNDING & RESOURCES | STATUS | TARGET DATE | EXTENT RATING | EFFECT. RATING |
|---|---|---|--|--------|-------------|---------------|----------------|
| Environmental Quality Incentives Program (EQIP) | Natural Resources Conservation Services | Voluntary program that provides technical and cost share assistance for protection of ground and surface water, erosion control, air quality, wildlife habitat, and plant health. | Federal 50% cost share with possible additional incentive payments | P | 2009 | 1 | 5 |
| Wildlife Habitat Incentives Program (WHIP) | Natural Resources Conservation Services | Provides technical and cost share assistance for the creation of high quality wildlife habitat. Habitats of special concern include riparian areas and endangered and threatened species habitat. | Federal 75% of cost of the installation of practice provided | P | 2009 | 1 | 5 |
| Etowah Habitat Conservation Plan | U.S. Fish and Wildlife Service | Provides planning process and development guidelines to enhance the protection of threatened and endangered aquatic species in the upper Etowah Basin | Development of the Plan is funded through the USFWS. Adoption and implementation of management measures will be funded through the County governments. | AE | 2006-2007 | 5 | 5 |

MEASURES APPLICABLE TO SPECIFIC PARAMETER: BIOTA/HABITAT.

| MEASURE | RESPONSIBILITY | DESCRIPTION | POTENTIALSOURCES OF FUNDING & RESOURCES | STATUS | TARGET DATE | EXTENT RATING | EFFECT. RATING |
|---|---|--|---|---|-------------|---------------|----------------|
| Section 319(h) Non-point Source Implementation Grant | Georgia DNR/EPD Funds distributed to Etowah River Alliance | Funds are being used for a combination of the installation of agricultural BMPs, rain gardens, septic system repair, streambank restoration, and educational outreach activities. | Federal | A- The Upper Etowah River Alliance P-Upper Etowah River Alliance (2006-2007) | 2006 | 1 | 5 |
| Georgia Forestry Commission Monthly BMP Assurance Examination | Georgia Forestry Commission | In an effort to document “reasonable assurance” that water quality will be proactively protected during regular ongoing silvicultural operations, the GCF will offer a monthly BMP assurance examination of active sites. All active of ongoing sites will be identified either through monthly air patrol flights, courthouse records, riding the roads, notification or by landowners. Sites located within watersheds of specific biota (sediment) impaired streams will be given a higher priority to identify and conduct examinations. | Federal and State | A | On-going | 1 | 5 |
| Adopt-A-Stream water quality monitoring | Adopt-A-Stream-Upper Etowah River Alliance | Volunteer monitoring program established by Adopt-A-Stream and Upper Etowah River Alliance. | Volunteer/donations | A | On-going | 3 | 5 |

The purpose of Table 5B is to initiate and guide a “first-cut” evaluation of the capacity of existing, currently proposed, and future required management measures and activities to achieve the load reductions specified in the TMDL (and meet water quality goals) and where needed, identify potential feasible and effective measures and practices which could be encouraged and supported to further reduce pollutant loadings from significant potential sources. Though completely voluntary, such recommendations would provide an effective local guide to effective management actions to achieve local water quality goals, establish priorities for grant or loan programs (Section 319 (h), EQIP, SRF), establish eligibility for grants for Tier plans and implementation, and identify priorities for local watershed assessments and protection plans.

In Columns 1 and 2 of Table 5B, enter each significant potential source and its’ corresponding impact ratings from Table 3. Review Table 5A and list significant management practices and activities applicable to each significant cause or source. Evaluate and compare the estimated extent and relative contribution of each significant cause or source with the extent and effectiveness of the applicable management measures and in conjunction with appropriate local stakeholders or organizations, make a best current determination of whether the existing or proposed management practices would achieve the load reductions needed to achieve the TMDL. Summarize conclusions and rationale in Column 4. If more information is needed to adequately determine the significant sources or causes and their relative contributions so note and recommend management actions needed to adequately identify sources such as monitoring, watershed assessments, or Tier 1 implementation plans in the last column. If the current, proposed and required management measures are judged inadequate to achieve the needed load reductions for significant sources, recommend, in consultation with the advisory groups, additional management activities, programs, and measures which would effectively reduce pollutant loads from the source. List such measures in the final column and list as a recommended activity in the milestones (Table 8).

TABLE 5B: EVALUATION OF MANAGEMENT MEASURES AND ACTIVITIES APPLIED TO SPECIFIC SOURCES OR CAUSES APPLICABLE TO SPECIFIC PARAMETER: BIOTA/HABITAT.

| SIGNIFICANT POTENTIAL SOURCE (S) OR CAUSE(S) (From Table 3) | IMPACT RATING | EXISTING, CURRENTLY PROPOSED, OR REQUIRED MANAGEMENT MEASURES OR ENHANCEMENTS APPLICABLE TO EACH SIGNIFICANT SOURCE (From Table 5A) | EVALUATION: WILL THE ESTIMATED EXTENT OF APPLICATION AND EFFECTIVENESS OF EXISTING, CURRENTLY PROPOSED, AND REQUIRED MANAGEMENT MEASURES BE ADEQUATE TO ACHIEVE THE SOURCE REDUCTION SPECIFIED BY THE TMDL? | IF MANAGEMENT MEASURES ARE ESTIMATED TO BE INSUFFICIENT, RECOMMEND ADDITIONAL MANAGEMENT MEASURES AND ACTIVITIES WHICH COULD EFFECTIVELY REDUCE LOADS FROM SIGNIFICANT SOURCES |
|--|---------------|---|---|--|
| Residential Development | 15 | Erosion and Sedimentation Control Permit Amendment | Application and enforcement of sedimentation control ordinance and land development guidelines should achieve a large (>75%) reduction | Additional county inspection and enforcement officers. |
| | | Update Local County Land Development Guidelines | | Develop and implement storm water retrofit program. |
| | | Potential/partial adoption of Etowah River HCP Policies | Adoption, application, and enforcement of the Etowah HCP policies should achieve a large (>75) reduction | Identification of contractor permit before E and S certification program is initiated (Forsyth County) |
| Agriculture Activity | 9 | Section 319(h) Nonpoint Source Implementation Program | Application of Section 319 funds and NRCS-EQIP funds should achieve a large (>75%) reduction | NRCS Wildlife Habitat Incentives Program |
| | | NRCS EQIP Program | | |
| Historic Activity (Agriculture and Channel Dredging) | 3 | Section 319(h) Nonpoint Source Implementation Program | Application of Section 319 funds and NRCS-EQIP funds should achieve a large (>75%) reduction | |
| | | NRCS EQIP Program | | |
| Commercial Development | 3 | New Development Ordinance Revisions | Application and enforcement of new development ordinance revisions and completion of storm water management audit and assessment should achieve a large (>75%) reduction | Additional addendums to the Georgia Stormwater Management Manual, as adopted by Forsyth County. |
| | | Storm Water Management Audit/Assessment | | Identification of contractor permit before Erosion and Sedimentation certification program is initiated (Forsyth County) |
| | | | | Storm Water Retrofit Program |
| Infrastructure Development | 5 | Use of additional BMPs for stormwater runoff | Effectiveness of the application of additional stormwater BMPs will vary by BMP type | |
| | | | | |

VII. MONITORING PLAN

The purposes of monitoring are to obtain more data to determine the sources of pollution, describe baseline conditions, and evaluate the effects of management and activities on water quality. Describe any sampling activities or other surveys - active, planned or proposed (including monitoring required for watershed assessments, or stormwater permits) - and their intended purpose. Reference the development and submission of a Sample Quality and Assurance Plan (SQAP) if monitoring for listing decisions.

Table 6. MONITORING PLAN

| PARAMETER (S) TO BE MONITORED | ORGANIZATION | STATUS (CURRENT, PROPOSED, PLANNED) | TIME FRAME | | PURPOSE (If for delisting, date of SQAP submission) |
|---|------------------|--|---------------------|---------------------|---|
| | | | START | END | |
| Fecal Coliform, TSS, TP, Cu, TOC, NO ₃ -NO ₂ , DO, temperature, conductivity, PH, turbidity, and in- stream flow velocities. | Forsyth County | A | 1999 | On-going | Forsyth County Watershed Management Program |
| Multiple parameters | Etowah River HCP | Planned Development of monitoring plan to be initiated in May, 2006 | To be determined | To be determined | Habitat monitoring for threatened and endangered species. Additional monitoring may be implemented through Adopt-A-Stream or the Upper Etowah River Alliance. |

VIII. PLANNED OUTREACH FOR IMPLEMENTATION

List and describe outreach activities, including those described in the Scope of Services that will be conducted to support this plan and the implementation of it.

Table 7. PLANNED OUTREACH

| RESPONSIBILITY | DESCRIPTION | AUDIENCE | DATE |
|---|---|---|--------------|
| Etowah River Habitat Conservation Plan (HCP) | The HCP is developing management policies that local governments can adopt for the protection of federal and state listed threatened and endangered species. | General public and local governments | On-going |
| Keep America Beautiful-Forsyth County Affiliate | Boy Scouts identify and mark storm water structures throughout the county. | Boy Scouts | On-going |
| Keep America Beautiful-Forsyth County Affiliate: Rivers Alive | Annual cleanup of waterbodies in Forsyth County | General public | On-going |
| Adopt-A-Stream | Provides educational material, workshops/training, and stream monitoring. | General public | On-going |
| Upper Etowah River Alliance | Outreach through educational seminars, brochures, and sponsoring of Adopt-A-Stream events. The Upper Etowah River Alliance has recently applied for an additional 319 Nonpoint Source Implementation Grant. | General public | On-going |
| Project WET | Environmental education for local school systems. Project WET provides teaching resources, events, and grants to participating school systems. Riverview Middle School is a local participant of Project WET. | Preschool to 12 grade | On-going |
| Georgia Mountains RDC | Complete plan outreach activities as specified in Section 106 grant funded contract. | Local governments, major stakeholders, public | June 1, 2006 |

IX. MILESTONES/ MEASURES OF PROGRESS OF BMPs AND OUTREACH

This table will be used to periodically track and report progress of significant management practices and activities identified or recommended in Tables 5A, 5B, and other sections of this plan, including outreach, additional monitoring and assessments, and the enhancement or installation of management measures and activities. Identify and list significant planned or recommended activities and the target date of accomplishment. Provide room to comment on the effectiveness of the management measure, how much support the measure was given by the community, what was learned, how the measure might be improved in the future, and any other observations made. This table can be "pulled out" of this template and used to report and track progress.

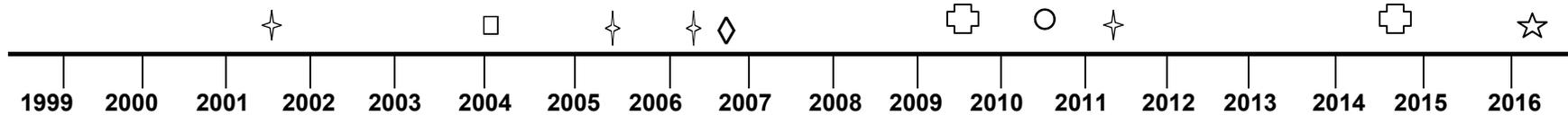
Table 8. MILESTONES

| MANAGEMENT MEASURE OR ACTIVITY | RESPONSIBLE ORGANIZATIONS | STATUS | | COMMENT |
|---|--|----------|-----------|--|
| | | PROPOSED | INSTALLED | |
| Erosion and Sedimentation Control Permit Amendment | State, Dawson County, Forsyth County | X | | To be installed December 31, 2006. |
| Update Local County Land Development Guidelines | Dawson County, Forsyth County | X | | Dawson and Forsyth Counties update land development guidelines as appropriate. |
| Adopt Etowah River HCP Policies | Dawson County, Forsyth County | X | | Policies currently being developed and should be completed by 2007. Once completed, Dawson and Forsyth Counties should consider adoption of these policies, where appropriate. |
| Section 319(h) Nonpoint Source Implementation Program | Upper Etowah River Alliance | X | X | The Upper Etowah River Alliance is currently administering a 319 grant to improve water quality in the Etowah River watershed and has been recommended to receive additional funding through a second 319 grant. |
| Environmental Quality Incentives Program | Natural Resources Conservation Service | | X | On-going. |

| MANAGEMENT MEASURE OR ACTIVITY | RESPONSIBLE ORGANIZATIONS | STATUS | | COMMENT |
|--|----------------------------------|----------|-----------|--|
| | | PROPOSED | INSTALLED | |
| Storm Water Management Audit/Assessment | Dawson County, Forsyth County | X | | Stormwater structures are privately owned and maintained. Audit/assessment would occur through comprehensive inspection of stormwater systems. |
| Additional county enforcement for Erosion and Sedimentation Ordinance. | Forsyth County | X | | Addition of 6 Erosion and Sedimentation control inspectors to Forsyth County Engineering Department by 2007. |

PROJECTED ATTAINMENT DATE

The projected date to attain and maintain water quality standards in this watershed is 10 years from acceptance of the TMDL Implementation Plan by Georgia EPD.



- Scheduled EPD Basin Group Monitoring ✦
- TMDL Completed □
- Revised TMDL Implementation Plan Accepted ◇
- Plan Status Evaluation Report ✦
- Plan Update or Revision, if Necessary ○
- Project Attainment for Plans Prepared in 2006 ☆

| | | | |
|------------------------|---|-----------|------------|
| Prepared By: | Christopher Ernst | | |
| Agency: | Georgia Mountains Regional Development Center | | |
| Address: | P.O. Box 1720 | | |
| City: | Gainesville | ST: GA | ZIP: 30503 |
| E-mail: | cernst@gmrdc.org | | |
| Date Submitted to EPD: | March 31, 2006 | Revision: | |

The preparation of this report was financed in part through a grant from the U.S. Environmental Protection Agency under the provisions of Section 106 of the Federal Water Pollution Control Act, as amended.

APPENDIX A.
STAKEHOLDERS

List the names, addresses, telephone numbers, and e-mail addresses for local governments, agricultural or commercial forestry organizations, significant landholders, businesses and industries, and local organizations including environmental groups and individuals with a major interest in this watershed.

| NAME/ORG | ADDRESS | CITY | STATE | ZIP | PHONE | E-MAIL |
|--|----------------------------------|--------------|-------|-------|--------------|----------------------------------|
| Doris Cook/ Etowah Water and Sewer Authority | P.O. Box 769 | Dawsonville | GA | 30534 | 706-216-6168 | dorisc@etowahwater.org |
| Leonard Ridings/ Upper Chattahoochee Soil and Water Conservation District | 5955 Keith Bridge Rd. | Cumming | GA | 30041 | 404-887-5186 | |
| Louise McPherson/ USDA-NRCS | 298 Academy Rd. | Dawsonville | GA | 30534 | 706-265-2374 | louise.mcpherson@ga.usda.gov |
| Heather Dyke/ CH2M Hill | | | GA | | 770-781-2148 | hhd@mindspring.com |
| Renee Hoge/ Forsyth County Engineering | 101 E. Main Street, Suite 120 | Cumming | GA | 30040 | 770-781-2165 | rphoge@forsythco.com |
| Steve Dempsey/ Forsyth County Engineering | 101 E. Main Street, Suite 120 | Cumming | GA | 30040 | 770-781-2165 | bsdempsey@forsythco.com |
| Shannon Winsness/ DNR-EPD | P.O. Box 3250 | Cartersville | GA | 30120 | 770-387-4930 | |
| Vivian Tanner/ Forsyth Co.-NRCS | 101 E. Main Street, Suite 120 | Cumming | GA | 30040 | 770-536-6981 | vltanner@forstyco.com |
| Curt Gervich/ UGA-Etowah HCP | P.O. Box 287 | Acworth | GA | 30101 | 678-758-0781 | curt@etowahhcp.org |
| Sam Breyfogle/ | 208 Springdale Rd | LaGrange | GA | 30240 | 706-884-8077 | smauelbreyfogle@templeinland.com |

Plan for Settingdown Creek and Bannister Creek Watershed
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| | | | | | | |
|---|--|-------------|----|-------|--------------|------------------------------|
| Temple Inland | | | | | | |
| Mary Gazaway/ GAEPD | 4220 International Parkway, Suite 101 | Atlanta | GA | 30354 | 404-675-1745 | mary_gazaway@dnr.state.ga.us |
| Ray Rickett | | | | | 770-887-0568 | |
| Dennis Martin Georgia Forestry Commission | 3008 Atlanta HWY | Gainesville | GA | 30507 | 770-531-6048 | |
| Buddy Belflower USDA-NRCS | 101 East Maple Street County Office Building, Room 5 | Cumming | GA | 30040 | | |
| Joe Riley Chestatee- Chattahoochee RC&D | 170 Scoggins Dr. | Demorest | GA | 30535 | 706-894-1597 | |
| Robert Amos GASWCC Region 2 | P.O. Box 8024 | Athens | GA | 30603 | 706-542-9233 | |
| James S. Stokes Georgia Conservancy | 817 West Peachtree St. Suite 200 | Atlanta | GA | 30308 | 404-876-2900 | |
| April Ingle Georgia River Network | 126 South Milledge Ave. Suite E3 | Athens | GA | 30605 | 706-549-4508 | |
| Keith Hastie U.S. Fish and Wildlife Service | 105 Westpark Drive #D | Athens | GA | 30606 | 706-613-9493 | |
| Robin Drake Upper Etowah River Alliance | Rt.2 Box 104 | Eastanolee | GA | 30538 | 706-779-5756 | |
| Curt Gervich Etowah Habitat Conservation Plan | P.O. Box 287 | Acworth | GA | 30101 | 768-801-4013 | |
| Doug Cabe Limestone Valley RC&D | 125 Red Bud Road, Suite 7 | Calhoun | GA | 30701 | 706-625-9943 | |
| Kyle Sturtevant Forsyth Chapter of the Greater Atlanta Home Builders Association | P.O. Box 450749 | Atlanta | GA | 31145 | 770-536-8282 | |

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| | | | | | | |
|---|--------------------------------------|--------------|----|-------|--------------|--|
| Dr. Bert Langley Georgia Environmental Protection Divison- Mountain District (Cartersville Office) | P.O Box 3250 | Cartersville | GA | 30120 | 770-387-4900 | |
| Wayne Jenkins Georgia Forest Watch | 15 Tower Rd. | Ellijay | GA | 30540 | 706-635-8733 | |
| Jack Conway Forsyth County Commission | 110 E. Main St., Suite 210 | Cumming | GA | 30040 | 770-781-2101 | |
| Bobby Thomas Forsyth County Development Authority Chairman | 110 E. Main St. Suite 210 | Cumming | GA | 30040 | 770-887-6092 | |
| John Cunard Forsyth County Engineering Dept. | 110 E. Main St. Suite 210 | Cumming | GA | 30040 | 770-78-2165 | |
| Jeff Chance Forsyth County Planning and Development Department | 110 E. Main St. Suite 100 | Cumming | GA | 30070 | 770-781-2115 | |
| Terry Propes Forsyth County Environmental Health Department | 428 Canton Highway | Cumming | GA | 30040 | 770-781-6909 | |
| Tammy Wright Keep Forsyth County Beautiful | 875 Lanier 400 Parkway, Suite 112 | Cumming | GA | 30040 | 770-205-4573 | |
| Joni Owens Cumming/Forsyth County Chamber of Commerce | 212 Kelly Mill Rd. | Cumming | GA | 30040 | 770-887-6461 | |
| Mike Berg Dawson County Board | 76 Howard Ave. E. Suite 120 | Dawsonville | GA | 30534 | 706-344-3501 | |

Plan for Settingdown Creek and Bannister Creek Watershed
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| | | | | | | |
|---|-------------------------------------|-------------|----|-------|-------------------------|--|
| of Commissioners | | | | | | |
| Phil Anderson Dawson County Manager | 76 Howard Avenue East, Suite 120 | Dawsonville | GA | 30534 | 706-344-3501 ext 233 | |
| Randy Bowen Dawson County Public Works Department | 76 Howard Ave. East, Suite 120 | Dawsonville | GA | 30534 | 706-344-3501 ext 246 | |
| Lynn Tulley Dawson County Planning Department | 76 Howard Ave. East, Suite 100 | Dawsonville | GA | 30534 | 706-344-3650 | |
| Linda Williams Dawson County Chamber of Commerce | P.O. Box 299 | Dawsonville | GA | 30534 | 706-265-6278 | |
| Dawson County Health Department | P.O. Box 245 | Dawsonville | GA | 30534 | 706-265-2611 | |
| Ray Rickett | 73 Kelly Bridge Ct | Dawsonville | GA | 30534 | 706-887-0568 | |

APPENDIX B.

UPDATES TO THIS PLAN

Describe any updates made to this plan. Include the date, section or table updated, and a summary of what was changed and why.

APPENDIX C

BANNISTER CREEK FIELD SURVEY FORM

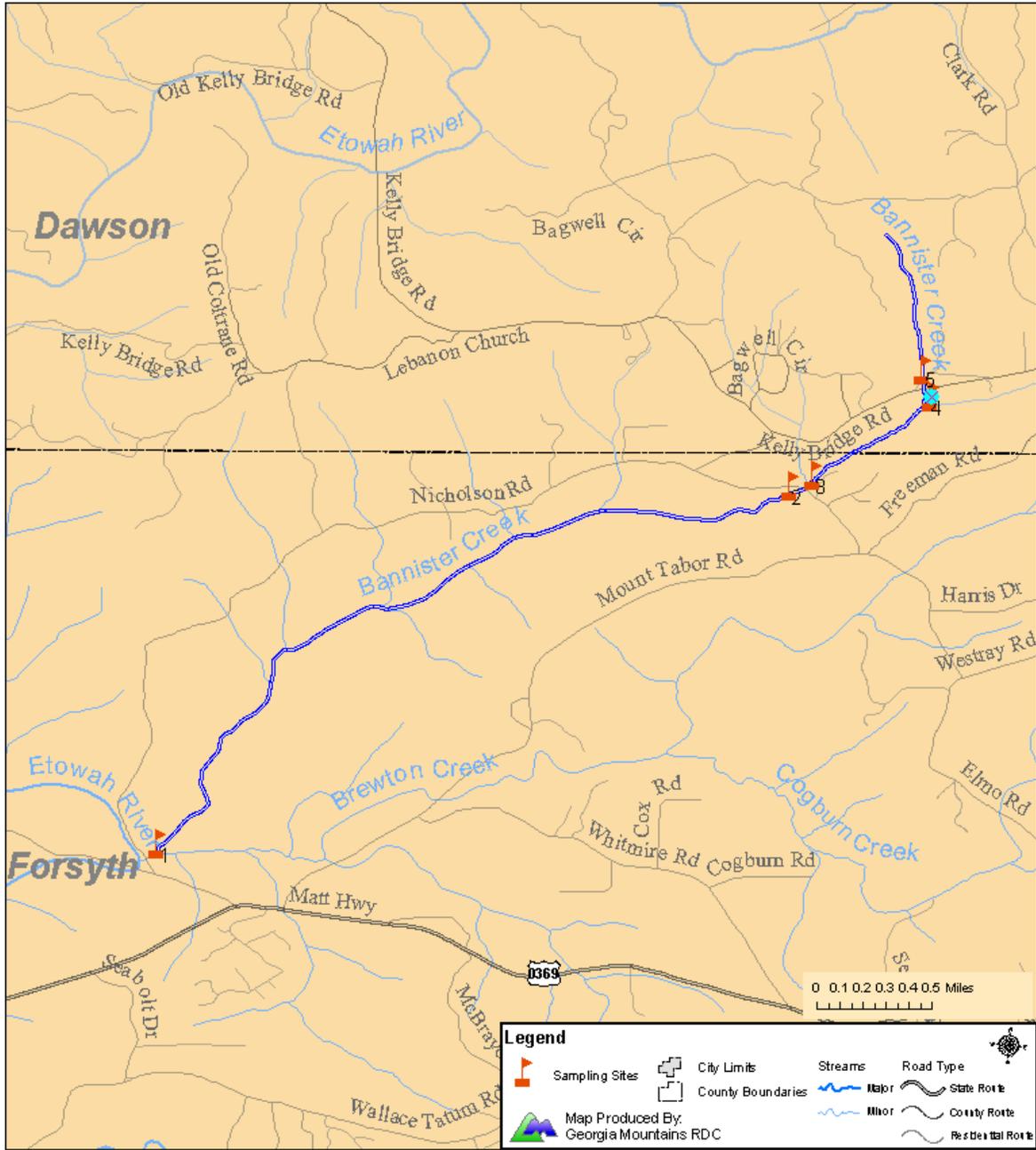
GEORGIA ADOPT-A-STREAM

Watershed Survey and Map Assessment

| | |
|---|---|
| AAS group name: <u>Bannister Creek</u> | Investigator(s): <u>Chris Ernst</u> |
| Type of waterbody: <u>Stream</u> | |
| Water body name: <u>Bannister Creek</u> | County(ies): <u>Forsyth and Dawson</u> |
| Approximate size of drainage/study area: <u>3,200</u> acres | |
| Date: <u>04/19/2006</u> Time: <u>12:00</u> | Picture/photo documentation? <u>Yes</u> |

To be conducted at least once a year

Bannister Creek TMDL Implementation Plan
Observation Site Locations



II. LAND USES/ACTIVITIES AND IMPERVIOUS COVER

1. Identify land uses and activities in the watershed which have the highest potential to impact water bodies:

Check all boxes that apply, describe the location of the activity(ies) under Notes on Location & Frequency of Activities and also mark the locations on your map. If too frequently occurring to record locations, so note. If you don't know some of the information below, write DK under Notes.

Please indicate if you: surveyed only adjacent to the waterbody
 surveyed the whole watershed
Provide notes as necessary

| Land Disturbing Activities & Other Sources of Sediment | Adjacent to Water | In Watershed | Notes on location & frequency of activity |
|---|--------------------------|--------------------------|---|
| Extensive areas disturbed by land development or construction of utilities, roads & bridges | <input type="checkbox"/> | X | Residential construction |
| Large or extensive gullies | X | X | Located in adjacent to Kelly Bridge Rd. |
| Unpaved roads near or crossing streams | <input type="checkbox"/> | X | _____ |
| Croplands | <input type="checkbox"/> | <input type="checkbox"/> | _____ |
| Pastures with cattle access to water bodies | <input type="checkbox"/> | X | Scattered cattle and equestrian activity in watershed. |
| Commercial forestry activities including harvesting and site-preparation | <input type="checkbox"/> | X | Scattered |
| Extensive areas of streambank failure or channel enlargement | X | <input type="checkbox"/> | Located at mouth of Bannister Creek and in tributaries parallel to Kelly Bridge Rd. |
| Other Agricultural Activities | | | |
| Confined animal (cattle or swine) feeding operations and concentrations of animals | <input type="checkbox"/> | <input type="checkbox"/> | _____ |
| Animal waste stabilization ponds | <input type="checkbox"/> | <input type="checkbox"/> | _____ |

Poultry houses _____

Highways and Parking Areas

Shopping centers & commercial areas _____

Interstate and controlled access highways and interchanges _____

Major highways and arterial streets _____

Other extensive vehicle parking areas _____

Mining

Quarries with sediment basins in live flowing streams _____

Transportation and Motor Vehicle Services

| | | |
|----------------------|-----------------|--|
| Adjacent to Water | In Watershed | Notes on location & frequency of activity |
|----------------------|-----------------|--|

Truck cleaning services _____

Public and private automobile repair facilities _____

Car washes and large auto dealers _____

Rail or container transfer yards _____

Airports with fuel handling/aircraft repair _____

Business & Industry, General

Activities with exterior storage or exchange of materials. _____

Activities with poor housekeeping practices indicated by stains leading to streams or storm drains or on-site disposal of waste materials _____

Heavy industries such as textiles & _____

carpet, pulp & paper, metal, and vehicle
production or fabrication

Dry cleaners/outside chemical storage _____

Food & Kindred Products

Fertilizer production plants _____

Feed preparation plants _____

Meat and poultry slaughtering or
processing plants _____

Construction Materials

Wood treatment plants _____

Concrete and asphalt batch plants _____

**Waste Recycling, Movement
& Disposal**

Adjacent In Notes on location &
to Water Watershed frequency of activity

Junk and auto salvage yards _____

Solid waste transfer stations _____

Landfills and dumps (old & active) _____

Recycling centers _____

Drum cleaning sites _____

Illicit Waste Discharges*

Sanitary sewer leaks or failure _____

Overflowing sanitary sewer manholes due
to clogging or hydraulic overloading _____

Bypasses at treatment plants or relief valves
in hydraulically overloaded sanitary sewer lines _____

Domestic or industrial discharges _____

Extensive areas with aged/malfunctioning _____

septic tanks

Dry-weather flows from pipes
(with detectable indications of pollution) _____

Streamside areas of illegal dumping _____

* If found (most likely during stream surveys), these activities should be immediately reported to the local government or the EPD regional office. These phone numbers are listed in Chapter 4.

III. GENERAL WATERBODY AND WATERSHED CHARACTERISTICS

This information will be gathered from your wetland, lake or stream segment.

1. Note the number of hydrologic modifications on your waterbody: structures that alter water flow

| | | | |
|------------|-------|---------------|-------|
| None | _____ | Beaver dams | _____ |
| Dams | _____ | Dredge spoils | _____ |
| Bridges | 2 | Pipes | _____ |
| Waterfalls | _____ | Other | _____ |

2. Note the approximate length of the stream that is affected by the following: if assessing a wetland, lake or pond, some of the following may also affect your waterbody

| | | | | |
|--------------------------------|-------|---------------|---------------|--------------------|
| Stream culvert | 60 | feet or _____ | mile or _____ | % of stream length |
| Stream straightening | _____ | feet or _____ | mile or _____ | % |
| Concrete streambank/bottom | _____ | feet or _____ | mile or _____ | % |
| Dredging/channelization | _____ | feet or _____ | mile or _____ | % |
| Riprap/gabion | _____ | feet or _____ | mile or _____ | % |
| Cattle crossing | _____ | # | | |
| Stream crossing (for vehicles) | _____ | # | | |

3. Note extent of vegetative buffer along the banks: at a minimum of 5 sites*, at regular intervals (every 500 ft. in a ½ mile. section) note the following

* See Appendix A for observation site photographs

| # | Width in feet | Location (Left bank, Right bank or N, S, E, W side of wetland or lake) | Characteristics and comments |
|---|---------------|--|--|
| 1 | 10ft | Confluence of Bannister Creek and Cogburn Creek | Stream velocity is low (1 fps) with some woody debris in channel. Channel material is composed of sand, pebbles, and cobbles. Right stream bank is near vertical with a light cover of grasses. The left bank rises near vertically for 2ft to a small bench that is 3ft wide. This lower bank and the bench is lightly vegetated by grasses and shows some indications of bank instability. The upper portion of the stream bank is 3ft tall and well vegetated with grasses and small trees. The floodplain both banks is a grassed field. |
| 2 | 4ft | 30 yards downstream of Nicholson Rd. bridge on Bannister Creek. | Stream velocity is moderate with a depth of 6-8 inches. Substrate is composed of pebbles and cobbles and no woody debris is present in the channel. Site is located at a sharp right turn in stream. Left bank is 5ft tall |

| | | | |
|----------|------|--|--|
| | | | and highly unstable due to undercutting. Right bank is stable and sloped at 20 degrees to the top of the floodplain. This bank is well vegetated with grasses and small trees. The floodplains are wooded. |
| 3 | 6ft | 30 yards upstream of Nicholson Rd. bridge on Bannister Creek | Stream velocity is moderate to low (2 fps). Flow is centered in stream channel with a depth of 2-3 inches, and no woody debris is present. Substrate is composed of pebbles and cobbles. Stream banks are stable and vegetated with vines, small shrubs, and small trees. Bank height is 5ft. Floodplains are wooded on both sides. |
| 4 | 15ft | At Kelly Bridge Rd. looking downstream. | Stream velocity is low (1 fps) with no distinct flow. Substrate is composed of sands, pebbles, cobbles, and boulders. Woody debris is scattered throughout channel and composed of leaf litter and sticks. Right stream bank is stable, 3ft in height, and densely vegetated with shrubs. Right bank is highly undercut and unstable. Large oak tree and fence from nearby field have slumped into stream channel. The floodplain on river right is densely vegetated with shrubs, while the floodplain on the left is fenced pastureland. |
| 5 | 10ft | At Kelly Bridge Rd. looking upstream. | Stream velocity is moderate (2 fps) with flow constricted into two channels by exposed bedrock. This bedrock feature crosses the entire stream width and creates a 2ft cascade. The substrate is sand, pebbles, cobbles, and exposed bedrock. The left and right banks are 3ft in height, vegetated with shrubs, and appear stable. The river left floodplain has a 15ft buffer of shrubs before reaching a fenced pasture. River right floodplain is densely vegetated with shrubs. |

4. Check the categories that best describe the general appearance of the waterbody:

Litter:

- No litter visible
- Small litter occasionally (i.e., cans, paper)
- Small litter common
- Large litter occasionally (i.e., tires, pallets, shopping carts)
- Large litter common

Special Problems:

- Spills of chemicals, oil, etc.
- Fish kills
- Wildlife, waterfowl kills

Erosion:

- No bank erosion or areas of erosion very rare; no artificial stabilization
- Occasional areas of bank erosion
- Areas of bank erosion common
- Artificial bank stabilization (i.e., riprap) present

5. Comments on general waterbody and watershed characteristics: (e.g. date and size of fish kill, increased rate of erosion evident, litter most evident after storms)

* Fish kills should be immediately reported to DNR Wildlife Resources Division at 770-918-64

The watershed has historically been used for agriculture and forestry with a limited amount of light intensity residential use. However, moderate density subdivisions are being constructed throughout the watershed, which is resulting in widespread land disturbing activity. Similarly, numerous culverts have been placed along an unnamed stream that flows parallel to Kelly Bridge Rd. These culverts seem to constrict the stream flow during storm discharges and are causing excessive bank instability directly downstream of the culverts.

6. Summarize notable changes that have taken place since last year (if this is not your first year conducting the Watershed Survey).

First year conducting watershed survey.

Appendix A

BANNISTER CREEK OBSERVATION SITE PHOTOGRAPHS

Site# 1



Site# 2



Site# 3



Site# 4



Site# 5



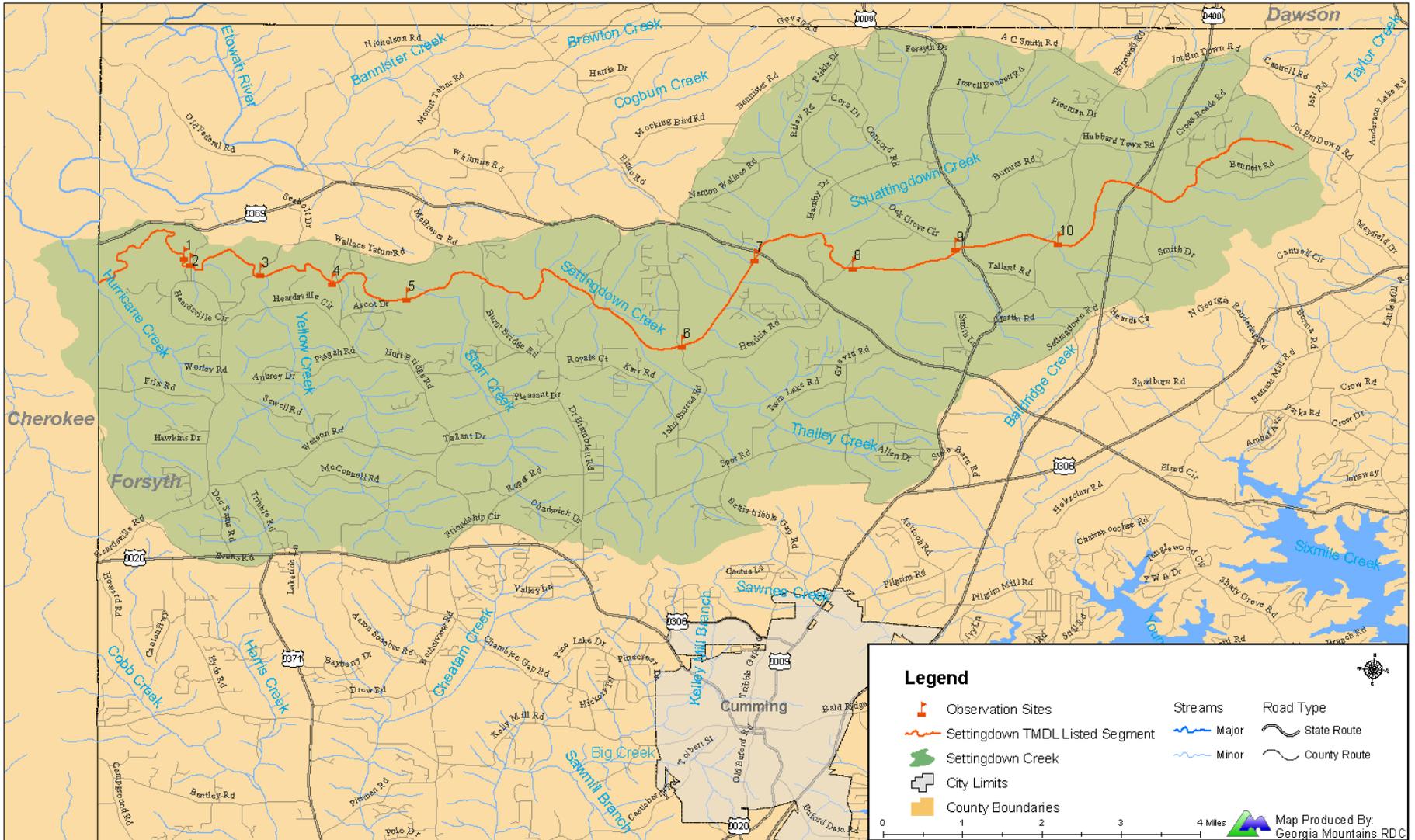
APPENDIX C

SETTINGDOWN CREEK FIELD SURVEY FORM

GEORGIA ADOPT-A-STREAM
Watershed Survey and Map Assessment
To be conducted at least once a year

| | |
|--|--|
| AAS group name: <u>Settingdown Creek</u> | Investigator(s): <u>Chris Ernst</u> |
| Type of waterbody: stream / wetland / lake | <u>Stream</u> |
| Water body name: <u>Settingdown Creek</u> | County(ies): <u>Forsyth and Dawson</u> |
| Approximate size of drainage/study area: <u>29,000</u> acres | |
| Date: <u>4/19/2006</u> Time: <u>3:00</u> | Picture/photo documentation? Yes |

Settingdown Creek Observation Sites



II. LAND USES/ACTIVITIES AND IMPERVIOUS COVER

1. Identify land uses and activities in the watershed which have the highest potential to impact water bodies:

Check all boxes that apply, describe the location of the activity(ies) under Notes on Location & Frequency of Activities and also mark the locations on your map. If too frequently occurring to record locations, so note. If you don't know some of the information below, write DK under Notes.

Please indicate if you: surveyed only adjacent to the waterbody
 surveyed the whole watershed
 Provide notes as necessary

| Land Disturbing Activities & Other Sources of Sediment | Adjacent to Water | In Watershed | Notes on location & frequency of activity |
|---|--------------------------|--------------------------|--|
| Extensive areas disturbed by land development or construction of utilities, roads & bridges | X | X | Too frequently occurring Byres Rd. John Burrus Rd. Hendrix Rd. HWY 9 Cross Roads Rd. Heardsville Rd. Wallace Tatum Rd. HWY 369 GA 400 |
| Large or extensive gullies | <input type="checkbox"/> | <input type="checkbox"/> | _____ |
| Unpaved roads near or crossing streams | <input type="checkbox"/> | <input type="checkbox"/> | _____ |
| Croplands | <input type="checkbox"/> | <input type="checkbox"/> | _____ |
| Pastures with cattle access to water bodies | X | X | John Burrus Rd. at Thaley Creek |
| Commercial forestry activities including harvesting and site-preparation | <input type="checkbox"/> | <input type="checkbox"/> | _____ |
| Extensive areas of streambank failure or channel enlargement | <input type="checkbox"/> | X | HWY 369 to Etowah River |
| Other Agricultural Activities | | | |
| Confined animal (cattle or swine) feeding operations and concentrations of animals | <input type="checkbox"/> | <input type="checkbox"/> | _____ |
| Animal waste stabilization ponds | <input type="checkbox"/> | <input type="checkbox"/> | _____ |
| Poultry houses | <input type="checkbox"/> | <input type="checkbox"/> | _____ |
| Highways and Parking Areas | | | |
| Shopping centers & commercial areas | <input type="checkbox"/> | X | Along HWY 20 HWY 9 HWY 369 GA 400 |

| | | | |
|--|--------------------------|---|--------------------------------------|
| Interstate and controlled access highways and interchanges | <input type="checkbox"/> | X | GA 400 |
| Major highways and arterial streets | <input type="checkbox"/> | X | HWY 20 HWY 9 HWY 369 GA 400 |
| Other extensive vehicle parking areas | <input type="checkbox"/> | X | Liberty Middle School |

Mining

| | | | |
|---|---|--------------------------|--|
| Quarries with sediment basins in live flowing streams | X | <input type="checkbox"/> | Vulcan Materials at Forsyth and Cherokee line. |
|---|---|--------------------------|--|

Transportation and Motor Vehicle Services

| | Adjacent to Water | In Watershed | Notes on location & frequency of activity |
|---|--------------------------|--------------------------|---|
| Truck cleaning services | <input type="checkbox"/> | <input type="checkbox"/> | _____ |
| Public and private automobile repair facilities | <input type="checkbox"/> | <input type="checkbox"/> | _____ |
| Car washes and large auto dealers | <input type="checkbox"/> | <input type="checkbox"/> | _____ |
| Rail or container transfer yards | <input type="checkbox"/> | <input type="checkbox"/> | _____ |
| Airports with fuel handling/aircraft repair | <input type="checkbox"/> | <input type="checkbox"/> | _____ |

Business & Industry, General

| | | | |
|---|--------------------------|--------------------------|-------|
| Activities with exterior storage or exchange of materials. | <input type="checkbox"/> | <input type="checkbox"/> | _____ |
| Activities with poor housekeeping practices indicated by stains leading to streams or storm drains or on-site disposal of waste materials | <input type="checkbox"/> | <input type="checkbox"/> | _____ |
| Heavy industries such as textiles & carpet, pulp & paper, metal, and vehicle production or fabrication | <input type="checkbox"/> | <input type="checkbox"/> | _____ |
| Dry cleaners/outside chemical storage | <input type="checkbox"/> | <input type="checkbox"/> | _____ |

Food & Kindred Products

| | | | |
|--|--------------------------|--------------------------|-------|
| Fertilizer production plants | <input type="checkbox"/> | <input type="checkbox"/> | _____ |
| Feed preparation plants | <input type="checkbox"/> | <input type="checkbox"/> | _____ |
| Meat and poultry slaughtering or processing plants | <input type="checkbox"/> | <input type="checkbox"/> | _____ |

Construction Materials

| | | | |
|-----------------------------------|--------------------------|--------------------------|-------|
| Wood treatment plants | <input type="checkbox"/> | <input type="checkbox"/> | _____ |
| Concrete and asphalt batch plants | <input type="checkbox"/> | <input type="checkbox"/> | _____ |

Waste Recycling, Movement & Disposal

Adjacent to Water In Watershed Notes on location & frequency of activity

| | | | |
|------------------------------------|--------------------------|--------------------------|-------|
| Junk and auto salvage yards | <input type="checkbox"/> | <input type="checkbox"/> | _____ |
| Solid waste transfer stations | <input type="checkbox"/> | <input type="checkbox"/> | _____ |
| Landfills and dumps (old & active) | <input type="checkbox"/> | <input type="checkbox"/> | _____ |
| Recycling centers | <input type="checkbox"/> | <input type="checkbox"/> | _____ |
| Drum cleaning sites | <input type="checkbox"/> | <input type="checkbox"/> | _____ |

Illicit Waste Discharges*

| | | | |
|--|--------------------------|--------------------------|-------|
| Sanitary sewer leaks or failure | <input type="checkbox"/> | <input type="checkbox"/> | _____ |
| Overflowing sanitary sewer manholes due to clogging or hydraulic overloading | <input type="checkbox"/> | <input type="checkbox"/> | _____ |
| Bypasses at treatment plants or relief valves in hydraulically overloaded sanitary sewer lines | <input type="checkbox"/> | <input type="checkbox"/> | _____ |
| Domestic or industrial discharges | <input type="checkbox"/> | <input type="checkbox"/> | _____ |
| Extensive areas with aged/malfunctioning septic tanks | <input type="checkbox"/> | <input type="checkbox"/> | _____ |
| Dry-weather flows from pipes (with detectable indications of pollution) | <input type="checkbox"/> | <input type="checkbox"/> | _____ |
| Streamside areas of illegal dumping | <input type="checkbox"/> | <input type="checkbox"/> | _____ |

* If found (most likely during stream surveys), these activities should be immediately reported to the local government or the EPD regional office. These phone numbers are listed in Chapter 4.

III. GENERAL WATERBODY AND WATERSHED CHARACTERISTICS

This information will be gathered from your wetland, lake or stream segment.

1. Note the number of hydrologic modifications on your waterbody: structures that alter water flow

| | | | |
|------------|-------|---------------|-------|
| None | _____ | Beaver dams | _____ |
| Dams | _____ | Dredge spoils | _____ |
| Bridges | 15 | Pipes | _____ |
| Waterfalls | 1 | Other | _____ |

2. Note the approximate length of the stream that is affected by the following: if assessing a wetland, lake or pond, some of the following may also affect your waterbody

| | | | | | | |
|--------------------------------|-------|---------|-------|---------|-------|--------------------|
| Stream culvert | _____ | feet or | _____ | mile or | _____ | % of stream length |
| Stream straightening | 500 | feet or | _____ | mile or | _____ | % |
| Concrete streambank/bottom | _____ | feet or | _____ | mile or | _____ | % |
| Dredging/channelization | _____ | feet or | _____ | mile or | _____ | % |
| Riprap/gabion | _____ | feet or | _____ | mile or | _____ | % |
| Cattle crossing | _____ | 1 # | | | | |
| Stream crossing (for vehicles) | _____ | # | | | | |

3. Note extent of vegetative buffer along the banks: at a minimum of 5 sites*, at regular intervals (every 500 ft. in a 1/2 mile. section) note the following

* See Appendix A for observation site photographs.

| # | Width in feet | Location (Left bank, Right bank or N, S, E, W side of wetland or lake) | Characteristics and comments |
|---|---------------|--|--|
| 1 | 200 | Right, at Pools Mill Park. | Site is located in a pool directly downstream of a 12ft bedrock cascade with a 30 degree slope. Stream velocity is moderate, although very high as the water flows over the cascade. Substrate material is bedrock with some accumulations of silt and sand with a depth of 2-3ft. Some very large (trees) woody debris is located in the pool and on left bank. Bank on left is vertical rock with no vegetation. Bank height is 12ft. A steep (60 degrees) wooded slope is located beyond the bank on the left. The right bank is 1 ft tall and is vegetated with sparse grasses and some shrubs. Recreational foot traffic has reduced much of the vegetation cover in this area. The floodplain on river right extends 200 ft away from the river and is lightly |

| | | | |
|----------|------|---|--|
| | | | vegetated with grass, shrubs, and small trees. Again foot traffic has reduced vegetation cover in this area. |
| 2 | 40ft | Left bank at Pools Mill Rd. | Stream flow is slow, nearly standing. Depth is 3-4ft with as substrate of heavy silt. Woody debris is scattered throughout the stream channel in the form of leaf litter. The banks are 1-3ft tall and are well vegetated with mature trees, shrubs, and grasses. River right lacks a floodplain and rises to a wooded ridge, while river left is an open with mature trees dispersed throughout the area. |
| 3 | 30ft | Looking upstream of bridge at Wallace Tatum Rd. | Stream flow is high (3 fps) with a depth of 6 in to 2 ft. Flow is evenly distributed across channel. Channel and riverbanks have been recently disturbed due to installation of utility line across river. Therefore, substrate is boulder sized rip rap as are the banks. The banks are angled to 30 degrees and contain no vegetation. Silt fencing is in place. |
| 4 | 35ft | Downstream of Wrights Bridge Rd. | Stream velocity is slow, nearly stagnant. Substrate is heavy slit with some sand. One large piece of woody debris is located near the center of the channel. Banks are well vegetated with kudzu and vines. Bank height is 5ft. Both floodplains have been disturbed for the installation of sewer lines. |
| 5 | 35ft | Right, behind Liberty Middle School | Stream velocity is medium (2 fps) with greatest flow near center of channel. Depth is 2-3ft with little woody debris. Channel banks are vertical and 3ft in height. Some undercutting is occurring on both banks, despite being well vegetated with kudzu. The left floodplain is kudu covered, while the right floodplain has a 30ft buffer of cane and small trees between the river bank and area cleared for the installation of a new sewer line. |
| 6 | 35 | Center upstream of bridge on John Burgess Rd. | Stream velocity is medium (2 fps), with no distinct thalweg. Channel material is silt and sand that has developed dune type features on channel bottom. Depth is constant at 2 ft. Channel banks are 10 feet on the left bank and 8ft on right bank. Both sides are vegetated with kudzu and are near vertical. Floodplain on the right is kudzu covered, |

| | | | |
|----|------|---|---|
| | | | while floodplain on left has a 10ft buffer of kudzu adjacent to the stream bank, followed by forest cover. |
| 7 | 10ft | Left, downstream of bridge at 369. | Stream velocity is high (3 fps), with flow concentrated at center of channel. Stream depth is 3ft with a substrate of sand. Banks are 12ft in height on left side and 15ft on right with angles of 60 degrees. Although both banks are covered in rip rap, they are both thickly vegetated with brush. |
| 8 | 15ft | Center, upstream of bridge on Hubert Martin Rd. | Stream velocity is medium (2 fps), with no distinct thalweg. Stream depth is 2ft with a substrate of sand (both tan and black colored sand). Banks are 12ft tall with near vertical slopes and densely vegetated with cane and shrubs. Left bank is covered with large rip rap. |
| 9 | 12ft | Center, downstream from bridge on HWY 9. | Stream velocity is medium (2 fps), with no distinct thalweg. Stream depth is 2ft with a substrate of sand. Right bank is near vertical with a height of 15ft and shows some signs of instability. Auto salvage site is beyond bank. On river left, the bank is 3ft tall and well vegetated with shrubs and small trees. The floodplain on the left is composed of trees, shrubs, and grasses. |
| 10 | 10ft | Center, upstream from bridge on Hopewell Rd. | Stream velocity is medium (2 fps) with flow concentrated near center. Depth is 2ft. Substrate consists of sands with dune formations. Banks are 4ft tall, near vertical, and densely vegetated with cane and shrubs. Both floodplains are pasturelands with 20ft buffers between the streams that are composed of trees, shrubs, and grasses. |

4. Check the categories that best describe the general appearance of the waterbody:

Litter:

- No litter visible
- Small litter occasionally (i.e., cans, paper)
- Small litter common
- Large litter occasionally (i.e., tires, pallets, shopping carts)
- Large litter common

Special Problems:

- Spills of chemicals, oil, etc.
- Fish kills
- Wildlife, waterfowl kills

Erosion:

- No bank erosion or areas of erosion very rare; no artificial stabilization
- Occasional areas of bank erosion
- Areas of bank erosion common
- Artificial bank stabilization (i.e., riprap) present

5. Comments on general waterbody and watershed characteristics: (e.g. date and size of fish kill, increased rate of erosion evident, litter most evident after storms)

* Fish kills should be immediately reported to DNR Wildlife Resources Division at 770-918-64

Rapid residential development in watershed.

6. Summarize notable changes that have taken place since last year (if this is not your first year conducting the Watershed Survey).

First year of watershed survey.

APPENDIX A
OBSERVATION SITE PHOTOGRAPHS

Site# 1



Site# 2



Site# 3



Site# 4



Site# 5



Site# 6



Site# 7



Site# 8



Site# 9



Site# 10

