

Executive Summary

The Gills Creek Watershed Association (GCWA) has, as part of a comprehensive commitment to the environment and community, established a goal and vision for the health and well being of the watershed and its citizens, as follows:

In 2017 the Gills Creek Watershed is a national model for watershed management and planning. Citizens are enjoying the bike and walking trails throughout the watershed and it serves as the basis for an environmental education curriculum for Richland County Schools. All new development is carefully studied for its impact on the watershed and many of the mistakes of the past have been corrected. The stream corridors have received special attention, accommodate diverse wildlife and natural flows and capacities have been restored. Water quality is much improved and best management practices are working. An example is that there has been no net loss of pervious surfaces, in fact, there has been a measurable reduction in impervious surfaces in the past 3 years. Current codes reflect strong support from the public and encourage "green" development. The watershed is litter free and sedimentation in the lakes has been drastically reduced. A task force composed of governmental representatives and citizens is a model for a coordinated approach to planning, regulation and development in an environmentally sensitive area.

The Gills Creek Watershed Management Plan has been developed as a cooperative effort between the GCWA, Richland County, the City of Columbia, The University of South Carolina, SC Department of Health and Environmental Control (SCDHEC), Tetra Tech and BP Barber in order to provide a comprehensive framework for the achievement of the stated goals of the community. The report provided herein addresses current watershed conditions, including pollutant sources and types, development conditions, environmental conditions such as stream and buffer quality, and flooding concerns. These data were compiled through collection and analysis of existing watershed information and input from coordinating public and private entities. The information was then evaluated through a matrix analysis to determine the critical areas of concern within the watershed. These critical areas were deemed the most impaired, and as such, restoration within or upstream of these areas would provide the most cost-effective overall environmental benefit to the watershed. Further, the report presents an overall management plan and strategy for the watershed based on the critical area matrix. This plan has been provided based on current watershed conditions. Thusly, as implementation of the plan continues, and development within the watershed grows, this plan should be revisited and updated periodically to ensure that the plan still meets the overall goal and vision of the GCWA and its partners. The plan has been divided into eight (8) primary sections describing existing conditions, implementation and management scenarios, as detailed below.

Section 1 of the plan presents the overall purpose and organizational framework of the watershed management plan. A planning committee, formed by GCWA, will provide oversight of the overall plan. This committee will direct planning operations and public education and outreach efforts within the watershed. The overall implementation of the individual BMPs and restoration and preservation areas is described further in Section 8. Section 1 also identifies the primary stakeholders involved with the plan. This section, including the organizational chart, should be revised on an annual basis in case additional agencies become more actively involved in the management of the project. If non-profit organizations are recruited to play a larger roll in the implementation of the plan, it may be necessary to include them in the overall management structure.

Overall baseline data are presented in Section 2 of the plan. This includes discussions of the size, surface and groundwater water resources, and demographics within the watershed. This information is utilized as a foundation for identifying the areas of high existing and future population density and projected growth.

The demographic information provided herein is a key component to locating existing and future sources of water quality problems. Information on natural resources provides a foundation for understanding the ecological processes within the watershed and for identifying important resources for protection. Unique characteristics of the watershed include its seven endangered species and over 100 lakes and ponds.

Water quality standards, impairments, and available data are identified in Section 3 of the plan. This includes 303(d) listed waterbodies, existing and potential use designations for waterbodies within the watershed, and available data from USGS, state and local governments, and stakeholders. Impaired uses include recreation, aquatic life, and fish consumption, and these uses are impaired by bacteria, low dissolved oxygen, and elevated mercury concentrations within the watershed. This section also describes the sources of stakeholder data utilized in the assessment portion of the management plan. Stakeholder input was collected through a preliminary public meeting as well as a survey; the information collected included locations within the watershed, termed "hot spots," where severe sedimentation, trash build-up, and other problems have been observed. The photograph to the right, showing sedimentation in Lake Katherine, is an example of a hot spot identified by stakeholders (photo courtesy of Elliott Powell, GCWA). Public comments on the plan were received during a public meeting and two week comment period.



Section 4 identifies the potential pollution sources associated with the impairments and other problem areas identified in Section 3. While not all pollution sources identified in this section are actively contributing to the degradation of the Gills Creek watershed, the potential exists for these sources to become influential as development and demographic shifts occur. The primary pollution sources associated with watershed degradation in this plan are identified as urban/suburban runoff, streambank erosion, waterfowl, NPDES point sources, atmospheric deposition of Mercury, sanitary sewer overflows (SSOs), and a combination of industrial sources (hazardous materials facilities, brownfields, underground storage tanks, landfills, etc.).

A two-tiered approach to assessment of watershed concerns was developed and is described in Section 5. Tier I concerns include an overall assessment of watershed function. A review of stakeholder input, available data, and other information on the watershed was conducted and the following major watershed concerns were identified:

- **Flooding:** Flooding hazards exist that endanger human life and have caused or may cause property damage in the future.
- **Sedimentation:** Streams, lakes, and other waterbodies have and continue to receive excessive sediment loads during storm events, which reduce the aesthetic and recreational value of these water bodies and impact fish and other aquatic life.
- **Trash:** Streams and other waterbodies contain excessive amounts of trash which reduce the aesthetic and recreational value of the watershed, endanger wildlife, and threaten to clog infrastructure.

- Water Quality and Aquatic Ecosystems: Water quality degradation in streams and other waterbodies has impaired designated uses and threatens human health as well as aquatic life.
- Wildlife: Wildlife habitat has significantly declined, and some remaining wildlife habitat is currently unprotected.

A Tier I critical area matrix was developed to identify which subwatersheds within Gills Creek were most adversely affected by the above concerns. Once these subwatersheds were identified, a Tier II matrix was evaluated which identified the most applicable management strategies to be implemented in each subwatershed. The following management strategies were considered:

- Stormwater BMP Retrofits – Best Management Practices (BMPs), either structural or non-structural, that are implemented within existing development to reduce impacts from stormwater runoff.
- Stream and Riparian Buffer Restoration – Revegetation and/or restructuring of a stream channel, banks, and/or floodplain area to reduce high flows, downstream flooding, and erosion and to restore the biological and water quality functions of a stream.
- Preservation – Acquisition and permanent protection of undisturbed natural areas to protect wildlife habitat and downstream water quality.
- New Development Policies – Requirements or other policies to encourage control and treatment of stormwater runoff from new development to protect watershed functions, including water quality and aquatic habitat.
- Other Policies and Outreach – Programs implemented to educate watershed citizens and promote watershed protection efforts.

This section of the plan provides the most detailed analytical analysis of the watershed. As such, these matrices should be reevaluated regularly to determine their applicability based on newly collected data or visual information.

Section 6 reiterates the overall goals of the GCWA and Richland County as part of the overall watershed management plan. It defines the primary concerns of the citizenry and the long-term goals of the management plan. This is a critical component in the implementation of any management plan. While this plan does not provide the means to address and restore every water quality issue within the Gills Creek watershed, it serves as a guide to be used as a tool for implementation and achievement to the maximum extent practicable of the GCWA goals and objectives.

Based on the Tier II scoring and identification of subwatershed concerns, a two-scenario implementation approach is developed and described in Section 7. The two scenarios differ in the type of management and the area of water quality treatment. As a corollary to the difference in the scenario, the section also provides rough cost estimates for each scenario. While both scenarios provide water quality treatment and watershed restoration suitable for achieving the GCWA goals, it should be understood that Scenario 1 is the optimum treatment option for the watershed. This scenario recommends the following:

- BMP retrofits: 1270 acres of drainage area to be treated, estimated to cost between \$26.4 million and \$51.4 million.
- Trash management: 1330 acres of drainage area and one in-stream trash boom, estimated to cost between \$0.4 and \$0.6 million.
- Stream restoration: 25,000 feet, estimated to cost between \$6.4 and \$7.9 million.
- Riparian buffer restoration: 210 acres, estimated to cost between \$2.7 and \$4 million.
- Preservation: 4800 acres, estimated to cost between \$30 and \$104 million.

Scenario 2 includes similar management recommendations within smaller areas and at a reduced cost. New development policies (including the use of innovative design techniques) and public outreach and education are also recommended for both scenarios. A “green street” is shown in the photograph to the right, an example of BMP techniques recommended as part of the management scenarios.



While specific project sites are not identified in this report, locations and target areas are recommended within each subwatershed where projects should be focused, during implementation, in order to address watershed concerns. Targets have been identified based on treatment drainage area. These criteria should be followed during the site identification and construction portion of the implementation. Treatment effectiveness and pollutant removal efficiency are more critical in the overall restoration of the watershed as opposed to the overall number of BMPs implemented. Thus, the cost estimates may vary as new technology develops and site-specific BMPs are identified. This section provides a suite of BMP retrofit options and details the general stream restoration and preservation approach. Field data will need to be collected during implementation to further define site-specific restoration needs.

The total estimated costs for plan implementation are \$68 to \$169 million for Scenario 1 and \$27 to \$48 million for Scenario 2. To achieve implementation, this plan recommends a three-phase approach in which the following would occur:

- Phase I: Begin to implement Scenario 2 with small, neighborhood BMP retrofit projects (bioretention, rain barrels/cisterns, etc.) and riparian buffer restoration or preservation. Provide outreach, education, assistance to public on reducing watershed impacts. Conduct septic system inventory. Estimated cost: \$1 million for Scenario 2; \$155,000 per year for outreach; \$10,000 to \$100,000 for a septic system inventory.
- Phase II: Complete implementation of Scenario 2 when larger funding sources are available. Continue public outreach, education, and assistance efforts. Estimated cost: \$26 to \$47 million for Scenario 2 and \$155,000 per year for outreach.
- Phase III: Implement the remaining management proposed in Scenario 2 that is not proposed in Scenario 1. Continue public outreach, education, and assistance efforts. \$41 to \$121 million for Scenarios 1 and 2; \$155,000 per year for outreach.

The implementation of the watershed management plan is detailed in Section 8. This includes the management strategy for the implementation of the plan, acquisition and identification of funding sources, and a timeline for implementation. While this timeline is not identified as permanent and can shift based on property acquisition issues and economic factors, it provides a guideline of measureable goals to achieve watershed improvement that supports the GCWA mission. This section also outlines the necessary steps required for identification, data collection, design and installation of the BMPs, stream restoration and preservation areas discussed in this report. As part of any plan implementation, the most important component is effective and identifiable results. A monitoring program is outlined in this section to provide tangible results to the GCWA, Richland County, the City of Columbia and SCDHEC. This monitoring is crucial in identification of successful restoration activities and serves as a basis of justification for future implementation.

The Gills Creek Watershed Management Plan recommends the strategies critical to restoring watershed functions, addressing impairments, and protecting the natural resources of the Gills Creek watershed. The

recommendations were developed through an evaluation of both existing data and stakeholder input and, therefore, provide a publically supported watershed management plan with a scientific foundation. The implementation of this plan will require coordinated efforts among GCWA, Richland County, City of Columbia, and other local governments and partners. Through careful attention to implementation recommendations herein as well as changing watershed conditions, the partners have an opportunity to begin a watershed management program that can ultimately succeed at restoring and protecting watershed functions.



Photo of Forest Lake courtesy of Elliott Powell, GCWA