

CLAYTON COUNTY WATER AUTHORITY'S STREAM IMPROVEMENT PROGRAM

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Abstract. Clayton County Water Authority (CCWA) initiated a holistic Stream Improvement Program in 2001 to assess, prioritize, and design improvements to degraded streams identified in the Watershed Management Plan (CH2M Hill, 2001a). The Stream Improvement Program is a four-step process that identifies and prioritizes potential stream improvement projects, collects detailed information to create a conceptual design, completes the final design and implements the improvement project, and monitors completed projects to ensure success.

Stream restoration is becoming more common as Georgia communities strive towards fishable and drinkable waterways. CCWA's phased approach created a road map for future stream restoration efforts and improved planning and budgeting forecasts. The phased approach followed in Clayton County is very similar to the approach outlined in the Metropolitan North Georgia Water Planning District (MNGWPD) draft Watershed Plan.

INTRODUCTION

Clayton County is a rapidly urbanizing county, located approximately 20 minutes south of downtown Atlanta (Figure 1). The county is split in half by a continental divide with the eastern portion of the county draining to the Ocmulgee River Basin and the western portion of the county draining to the Flint River Basin. The Clayton County Watershed Management Plan (CH2M Hill, 2001a) indicated that stream restoration would be required to address several degraded stream systems. Based on this recommendation, CCWA initiated a holistic Stream Improvement Program to address degraded streams. This four-step approach is similar to the Stream Improvement Program outlined in the draft MNGWPD Draft Watershed Plan.

PHASE I – PEDESTRIAN SURVEYS

In 2001, a Phase I investigation and pedestrian survey (stream walk and inventory) was completed for over 40 miles of stream. Streams were selected for the Phase I study based on documented impairment in the Watershed Management Plan, degree of watershed imperviousness, and influence upon drinking water supply watersheds. The Phase I investigation included most major streams in the county, excluding two areas in the upper Flint River Watershed that were previously assessed by Hartsfield Atlanta International Airport (HAIA) (CH2M Hill, 2001b). Figure 2 shows the streams that were evaluated and prioritized during the Phase I investigation.

Data collected during the pedestrian survey included habitat quality, stream morphology, and inventory items (pipes, ditches, obstructions, erosion, etc.). Each stream reach was assigned a degradation score, based on the habitat score (EPD, 2000) and the severity and frequency of degraded conditions.

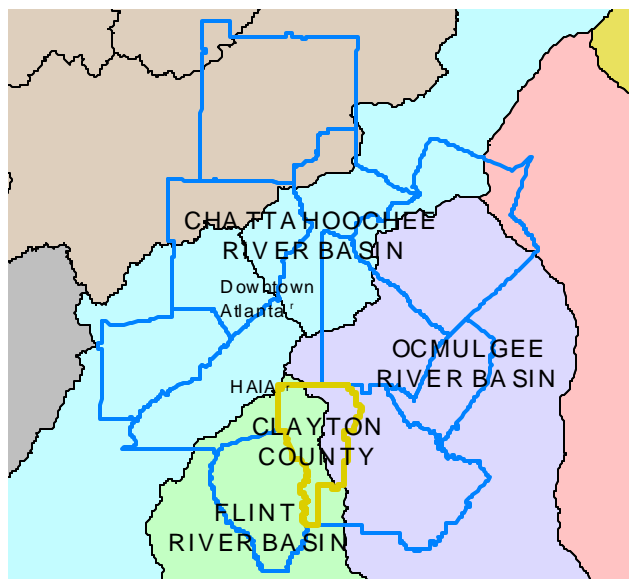


Figure 1. Clayton County, Georgia.

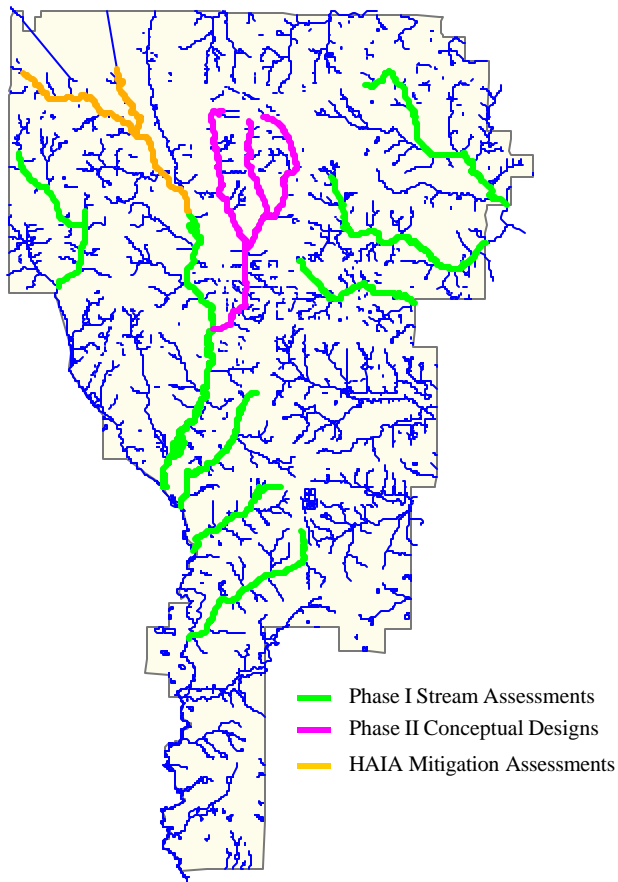


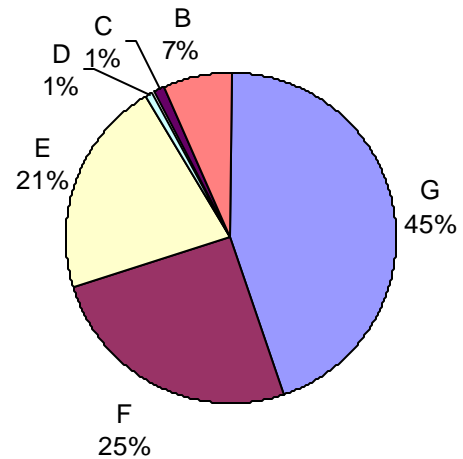
Figure 2. Streams Evaluated in Clayton County.

The results of the assessment, shown in Figure 2, indicate that 70% of the streams had “U” shaped banks and were deeply entrenched and were classified as “G” or “F” channels using the Rosgen classification system (CH2M Hill, 2002a; Rosgen, 1996). Habitat scores indicate 75% of the streams are considered degraded, as shown in Figure 4 (CH2M Hill, 2002a). The habitat

Table 1. Habitat Condition Categories

Score	Condition Category
0 to 47	Poor
48 to 59	Poor/Marginal
60 to 100	Marginal
101 to 112	Marginal/Sub-optimal
113 to 153	Sub-optimal
154 to 165	Sub-optimal/optimal
166 to 200	Optimal

Figure 3: Geomorphologic Stream Type Phase I Results



assessment provides a numeric score for the selected reach, with a maximum score of 200 points. Stream reaches with habitat scores less than 100 are considered degraded. Table 1 shows the condition category levels based on the habitat assessment score (EPD, 2000).

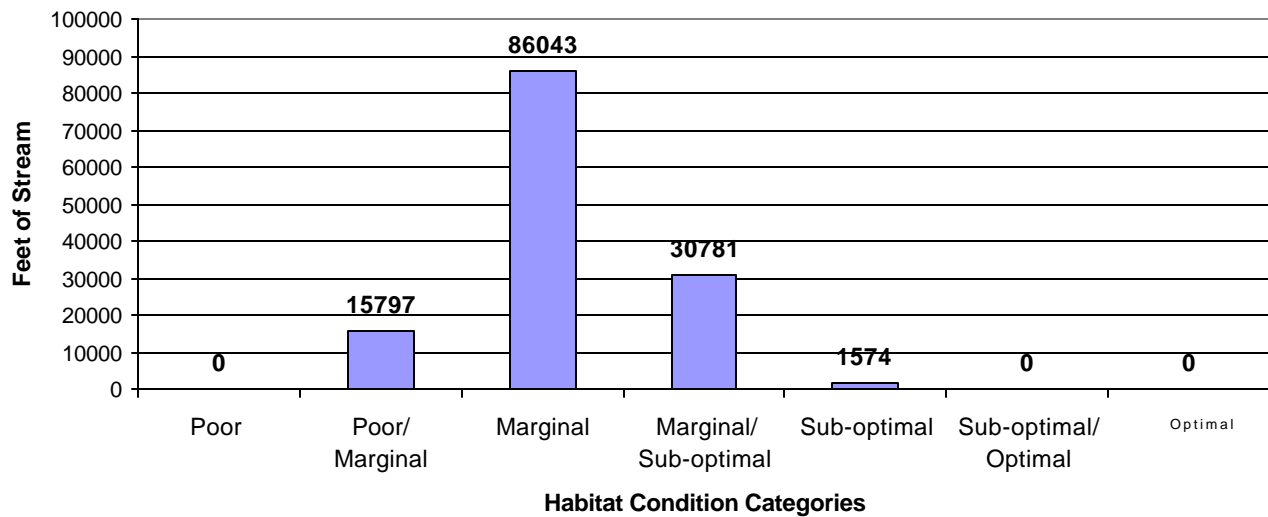
The semi-quantitative degradation score allows CCWA to rank streams in a given watershed or in the county to help prioritize future improvement projects. The degradation score also improved planning and budgeting forecasts for future restoration efforts based on the severity of the stream condition. Preliminary order-of-magnitude cost estimates indicate restoration costs will vary from \$300,000/linear mile to \$1.5 million/linear mile.

Given the extraordinarily costs associated with stream restoration, CCWA used the knowledge of stream improvement needs to garner grant funding. CCWA also hopes to share the cost of improvements with entities requiring mitigation credits.

PHASE II – CONCEPTUAL DESIGN

In 2001, CCWA also initiated a Phase II project to evaluate the conditions in the Jesters Creek Watershed (see Figure 2). The Jesters Creek Watershed is one of the largest (7,783 acres) and most urban (36% impervious) watersheds in the county. The Phase II report for Jesters Creek Watershed documented problem areas, recommended corrective measures, and

Figure 3: Habitat Score Results from Phase I



developed conceptual stream improvement plans for planning purposes.

The conceptual stream improvement plans were based on fluvial geomorphology techniques used to convert unstable, degraded stream channels to dynamically stable systems that neither aggrade nor degrade. The conceptual designs serve as a planning tool to assist with land acquisition, public acceptance, and permitting discussions.

The Jesters Creek Phase II project recommended 27 distinct stream improvement projects for a total of 8.5 miles of stream improvements (CH2M Hill, 2002c). These projects provide a holistic approach to restoring the entire watershed, instead of simply addressing localized problems. Fact sheets, developed for each project, include the conceptual plan and profile information for planning purposes. Figure 3 provides an example of a conceptual design developed during Phase II.

PHASE III – FINAL DESIGN AND IMPLEMENTATION

Final design is in progress for the Gateway Project, one of the projects recommended in the Jesters Creek Watershed Phase II report. The conceptual design, shown in Figure 4, represents 2,100 linear feet of East Jesters Creek. This section of East Jesters Creek lies to the west of the Gateway Village, a large mixed-use development planned for construction in 2003, and to the east of Reynolds Nature Preserve.

This section of East Jesters Creek was impacted by historical agricultural practices and existing urban development. Severe erosion and poor habitat conditions were observed throughout this segment of East Jesters Creek (CH2M Hill, 2002c).

The final design, increases the stream meander to reduce sediment loading in this drinking water supply stream, slow water velocity, and improve habitat quality to create a stable stream channel. The design is based on hydrologic modeling, hydraulic modeling, and Rosgen design principles for stream restoration. The Rosgen design principles for stream restoration create a stable stream channel based on a stable stream reach with similar watershed conditions. The final habitat restoration design will ensure a stable post-construction habitat without aggradation or degradation that demonstrates the use of natural channel restoration to improve habitat.

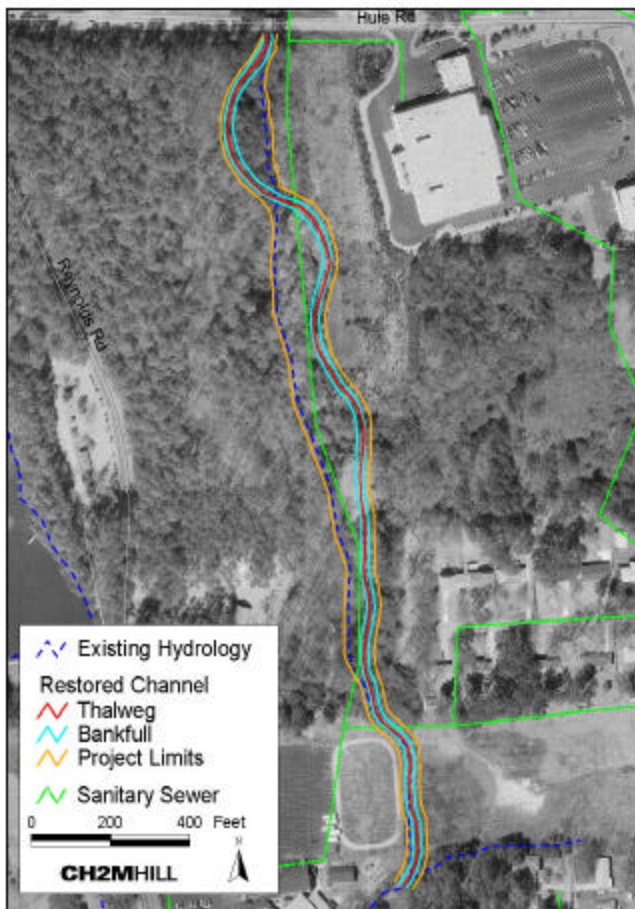
The final design for the Gateway Project will be completed in May 2003; construction is planned from October 2003 until April 2004. With the proximity to Reynolds Nature Preserve, this project plans to offer passive recreational opportunities and wooden signs to educate the public on water quality issues and this specific project.

Additional planned projects include the 2,100 linear feet of stream immediately below the Gateway Project site on East Jesters Creek. This project is partially funded by a 319(h) grant. CCWA is working with several other funding agencies to continue implementing the restoration plans based on the studies completed to date.

PHASE IV – POST-CONSTRUCTION MONITORING AND MAINTENANCE

Monitoring and maintenance of the stream restoration project following construction will be critical to the project success. CCWA hopes that the stream restoration will demonstrate improvement in both water quality and physical habitat.

Currently, CCWA is working with Clayton College and State University to create an enhanced sampling regime that will quantify the full benefits of the stream restoration project. Planned research includes bacterial analysis, biological and mammal tracking, and nutrient load analysis. This sampling will be in addition to the required biological, chemical, and vegetative sampling required by the Army Corp of Engineers (ACOE) for stream restoration projects. CCWA also plans to assess the benefit of stream restoration to future sediment loads, since East Jesters Creek is located within a drinking water supply watershed.



**Figure 4: Conceptual Gateway Project Stream
Restoration Design**

CONCLUSIONS

The four-step stream improvement process has allowed CCWA to successfully assess, prioritize, and plan restoration projects. The phased assessments have assisted with planning, budgeting, public acceptance, and permitting requirements. Collecting information on a county scale also reinforces the need to restore an entire watershed instead of fixing localized problems.

Improvement projects are critical to the future health of Clayton County watersheds, as the county is now faced with degraded habitat in 75% of the streams assessed during the Phase I project and has eight stream segments on the Georgia list of impaired waters. Stream restoration also plays a critical in protecting drinking water supplies in Clayton County and maintaining compliance with water and wastewater operating permits.

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