

BUTLER CREEK AQUATIC ECOSYSTEM RESTORATION PROJECT

Dean Trawick^{1/}, Matthew Lang^{2/}, Inez Bergerson^{3/}, and Maria Chin^{4/}

AUTHORS: ^{1/} Project Manager/ Senior Planner, ^{2/} Biologist, ^{3/} Hydraulic Engineer, ^{4/} Economist, 109 Saint Joseph St, Mobile, AL 36602

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Abstract. The Butler Creek Aquatic Ecosystem Restoration Project is the first of many Section 206 projects of its kind identified by Cobb County, Georgia for the U.S. Army Corps of Engineers (Corps), Mobile District to study and implement solutions (under the Continuing Authorities Program) in the Metro-Atlanta area. The Section 206 authority allows for the Corps to participate, at the request of a non-Federal sponsor, in aquatic ecosystem restoration, if the project will improve the environment and is in the public interest. Butler Creek and several other creeks in this geographic area have been proven to support the Cherokee Darter, a small fish that is federally-listed as “threatened” by the U.S. Fish and Wildlife Service (USFWS). The Cherokee Darter is being adversely impacted because the rapid growth in the Kennesaw/Acworth areas of Cobb County is resulting in problems in the basin such as flashy stream flows, streambank erosion, and heavy deposits of silt in stream beds.

INTRODUCTION

Urbanization has significantly increased the overland flows throughout the Butler Creek Watershed resulting in increased flow and velocity in streams, heavy sedimentation, and streambank erosion. These problems are very common in metropolitan areas across the nation. Catching the frequent heavy rain events, and releasing them at a slower rate, is critical to the overall success of the recovery of many of these aquatic ecosystems. The USFWS and the U.S. Environmental Protection Agency (USEPA) have endorsed the concept of comprehensively addressing the impacts throughout this watershed and impacts (both beneficial and adverse) to the Cherokee Darter. Partnerships are critical to stabilizing and restoring the remnants of the piedmont region’s stream habitat as found in the ever growing urban setting of North Georgia. This project will help to increase the potential for recovery and, therefore, provide a brighter

future for aquatic species, including the Cherokee Darter. This paper will summarize the projects recommended measures and provide an update on the project status.

HABITAT ASSESSMENT

In 2001, an environmental consulting firm, Entrix, was contracted by the Corps to conduct stream walks and prepare a report of the problems they identified along Butler, Proctor, and Allatoona Creeks (all tributaries to Lake Allatoona). Aquatic habitat assessments were conducted using Georgia Department of Natural Resources (GADNR) stream assessment criteria and all parameters were qualitatively scored on a scale of 0 – 20, with the higher score being the best. These parameters consisted of 10 environmental metrics: epifaunal substrate/in-stream cover, embeddedness, velocity/depth combinations, channel alteration, sediment deposition, frequency of riffles, channel flow status, bank vegetation protection, bank stability, and riparian zone vegetation. A reference reach, based on the best habitat score, was established for each of the three watersheds.

The main contributors to the degraded habitat within this watershed were identified as flashy stormwater flows, associated sediment runoff from varying land usage within the basin, and bank erosion. While the environmental benefits for the proposed restoration project are widely recognized, the quantification of the environmental benefit is not quite so straightforward. No universally accepted environmental quantification “tool” or “method” is recognized. Therefore, the Corps, in consultation with an interagency team which included the USFWS, developed a habitat-based approach to quantify environmental benefits associated with the various measures considered as part of the restoration alternatives. Other associated separable environmental features were also evaluated during the plan formulation process for this project.



Figure 1. Severe Streambank Erosion In Butler Creek

Hydraulic engineers began modeling the basin for both flow and sediment to establish the existing hydraulic conditions and future conditions (to approximately 2030) based on land use predictions provided by Cobb County. Results of these models were used in combination with the GADNR scores to better define existing habitat conditions and anticipated future habitat conditions. New scores were assigned to each habitat assessment site to reflect the results of the modeling efforts. Each habitat score was expressed as a percentage of the same parameter for the reference reach.

In addition to habitat assessments, fish sampling was conducted by the University of Georgia's Institute of Ecology. This sampling was conducted to (1) obtain information on the diversity, health, and relative abundance of fishes, (2) determine the distribution of the Cherokee Darter, and (3) identify degraded habitats that would benefit from restoration activities. The results of this sampling effort revealed that the Cherokee Darter is widely distributed in the Butler, Proctor, and Allatoona basins. However, the population and diversity of fish species in each watershed is poor.

PROJECT EVALUATION

The Corps has partnered with the Cobb County Water System (the non-Federal sponsor) to take a comprehensive approach to address these problems throughout the entire watershed. A multi-discipline Project Delivery Team (PDT) was assembled consisting of members from the Cobb County, the Corps, the Cities of Kennesaw and Acworth, the USEPA, the USFWS, and the GADNR, including the Environmental Protection Division (GAEPD). This team is developing a plan

which includes the construction of different stream stabilization measures (some general measures as recommended by Rosgen and other bioengineering techniques), re-vegetating riparian corridors, creating wetlands, constructing off-line retention/detention basins, and enhancing the level of inspection and enforcement of storm water quality regulations for all future development.

In 2004, the Butler Creek Watershed (6,016 acres) was the only creek of the three that received funding to continue study. The findings of the Entrix report and the fish sampling were further evaluated by the PDT to determine restoration reaches and begin preparation of conceptual restoration measures to address those physical problems that are negatively impacting aquatic habitat. A total of 16 project sites was selected for implementation of a measure or combinations of measures. The basin was divided into four distinct restoration reaches (A - D), each having 3 - 5 project sites located within them that are interdependent for the successful restoration of each reach. The restoration of each reach, individually, and in any combination with the other restoration reaches were considered as alternative plans. Coincidentally from the 16 project sites that were divided into four reaches, a total of 16 alternative plans were considered, including "no action".

The future watershed with project conditions (aquatic habitat scores) were then projected for each of the 16 alternative plans. The cost was also estimated for each of these plans. At this point, a detailed economic analysis was performed to evaluate the habitat unit outputs as compared to the price for each plan. This analysis eliminated inefficient and ineffective alternatives. It also identified which of the plans may be considered with Cobb County for the National Ecosystem Restoration (NER) Plan, in which the Corps may participate with a 35 percent cost share requirement from Cobb County, Georgia and the remaining 65 percent to be paid by the Corps. An incremental cost analysis is completed and then the successive outputs are compared to the incremental costs. That is, the results of the incremental costs are compared and then used as a decision-making tool by progressively proceeding through the available level of outputs and asking if the next level is "worth it" or "is the habitat value of the additional unit of environmental benefit in the next available level of output worth its additional monetary costs"?

After thorough scrutiny, four plans, including "no action" surfaced as potential NER Plans. The most comprehensive of these three plans was mutually selected for participation with Cobb County, thus becoming the "Recommended Plan". This plan included the

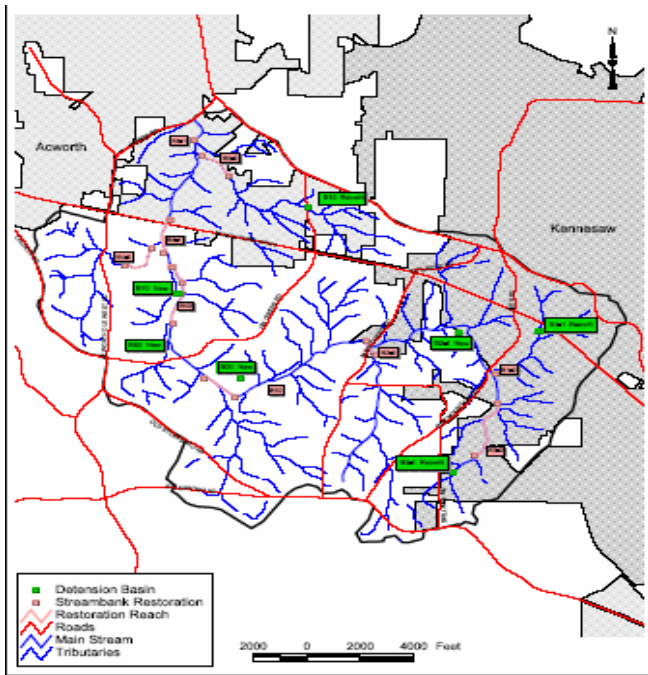


Figure 2. Butler Creek Proposed Projects

implementation of all measures at all 16 project sites identified for evaluation within the watershed and had a total project cost of approximately \$5.5 Million to be cost shared 65%/35% with Cobb County.

RECOMMENDED PLAN

The Recommended Plan consists of implementing a wide variety of measures. Perhaps the most important of these are the seven (7) retention/detention sites, both retrofits of existing three structures and four new off-line sites along tributaries which do not support a base flow. Wetland creation is a planned feature at five (5) of these sites. In the final state, water will be captured from intermittent streams and some from the main stem of Butler Creek during high flow events and released over a twenty-four hour period excluding the minimum flow needed to support wetland vegetation. These measures accomplish multiple tasks, but primarily are designed to attenuate peak flows and capture sediment before it enters the main stem of Butler Creek.

In addition to retention/detention sites, a multitude of in-stream measures are planned. These include streambank protection by use of rootwads, where possible, in combination with longitudinal stone toe protection and riparian zone restoration. The flash effect from a two-inch rainfall event creates velocities throughout the watershed in excess of 4.5 feet per second (considered the channel forming velocity for the soils of this region). It is not feasible to use bioengineering, such as rootwads, without supplementing them with stone toe protection at the base of the stream bank. The combination of the root masses and the crevices between

the stone toe protection provide excellent habitat for many fish species and the organisms on which they feed.

Debris dam removal, creation of channel benches, and the strategic placement of cross vanes and J-hooks complete the array of measures identified in the recommended plan for construction. This truly comprehensive approach to aquatic ecosystem restoration should prove very successful in the Butler Creek Basin.

PROJECT STATUS

Currently, all potential impacts to the Cherokee Darter, and its habitat, in the Butler Creek basin are being addressed through the formal consultation process with the USFWS as prescribed by Section 7 of the Endangered Species Act. The USFWS is partnering closely with the Mobile District to assure the best outcome to sustain and restore the habitat for the darter and other aquatic life. The recommended plan has also been presented to the USEPA, GADNR, and GAEPD to assure a truly collaborative and comprehensive effort is made to coordinate and accomplish the restoration goals. Once these peer reviews are complete and a final public workshop is held, the Ecosystem Restoration Report (ERR) can be completed, provided Federal funding becomes available.

CHALLENGES AHEAD

The Section 206 project authority of the Continuing Authorities Program, within which this project resides, is severely impaired nationwide by minimal funding. All of the projects funded nationwide have specific congressional language in recent Energy and Water Bills. Without congressional help, many of the aquatic ecosystem restoration projects already identified will sit dormant, perhaps for many years, as the conditions of the ecosystems degrade at an increasing rapid pace.

SELECTED REFERENCES

- Entrix, 2002. Ecosystem Restoration Report, Problems Area Report, Butler, Proctor, Allatoona Creek Watersheds, Cobb County, Georgia
- Freeman, B. J., University of Georgia Institute of Ecology, 2002. Fish Community Analysis of Butler Creek Watershed, Etowah River Basin, Cobb County, Georgia