

FOLLOW-UP ON CHANNELIZATION IN SPRING CREEK SUB-WATERSHED

Justin R. Beebe, Department of Earth Sciences, University of South Alabama, Mobile, AL 36688. jrb308@jaguar1.usouthal.edu.

Spring Creek is a tributary within the Dog River watershed, located in Mobile, Alabama. In February 2002 the lower portion of the creek underwent a physical modification called channelization. Significant amounts of sediment have been deposited since the channelization project, contributing to an environmental impact on the Dog River watershed. I prove this by measuring the amount of sediment that has been deposited at certain points in the creek. Gabions were placed along the bottom and sides of the creek, so measuring the total gabion height minus the exposed height from the current creek floor; I was able to approximate a deposition depth. Since the project end, sedimentation has occurred at Spring Creek, filling nearly half of the total gabion height. With the results of this project, groups like the Dog River Clearwater Revival Program can support projects that have the least amount of impact on the watershed. Groups concerned with the watershed can also stand against future efforts of channelization based on undesired results now outlined by this project.

Keyword: Channelization, Spring Creek, Gabion

Introduction

Spring Creek is a tributary within the Dog River watershed, located in Mobile, Alabama. A watershed of a particular stream is all the area that contributes to overland flow and groundwater to that stream (McKnight 2002). In February 2002 the lower portion of Spring Creek underwent a physical modification called channelization. A channel is a trough through which water runs at the bottom of a valley (Press 2001). Steven Summersell acquired baseline data of the physical changes to Spring Creek and the relations to the Dog River watershed in 2003 as a student in field work at USA. Stevens's study outlined an importance in finding the overall health of the sub-watershed before, during, and after modifications took place. This study will acquire and document data on sedimentation in the channel approximately five years after the modifications were made to the area. Sedimentation is the geological process whereby material is added to a landform (Wikipedia 2007). Before the project began, Spring Creek was mostly natural with the exception of some riprap in areas that erosion was severe. Spring Creek

was channelized for better flow, in an attempt to stop flooding in certain areas of the watershed and gabions were also placed in the creek for bank stabilization. Gabion is defined as a corrosion resistant wire container filled with stone used for structural purposes. They are fastened together and used for retaining walls, revetments, slope protection, channel linings and other structures. (IECA 2007). The project was authorized by the City of Mobile, and cost \$1,247,675.60. The stated purpose of the Spring Creek drainage project was “to lower the water surface elevation and prevent the continuation of severe erosion along the existing channel through out the drainage basin.” (Land and Water 2003).

Research Question

Has sedimentation occurred in the channelized portion of Spring Creek in five years since the project ended?

Methods

In order to determine any change in sedimentation, the use of before and after photographs at portions of Spring Creek were used. Field reconnaissance to Spring Creek was also helpful in determining change since the project end in 2002. I broke down the area of construction into three parts so that I could analyze recorded data better. The first part of the Spring Creek construction was labeled section 1, it is found between Girby Road, and Highway 90. Section 2 of the creek was then labeled from the area running between Highway 90 and Halls Mill Road. Section 3 was labeled as the area south of Halls Mill Road beside the property of Two Dollar Bills Restaurant (Figure 1).

I determined the amount of sediment deposition by recording how many gabion shelves were placed at the time of construction. This data came from photographs obtained during construction. I then utilized photographs of the same area after completed construction, to the recent spring of 2007. The yearly photographs after construction allowed me to estimate how much sediment had been deposited by counting the gabion shelves still exposed. By knowing the approximate heights of each gabion shelf, I counted the number of visible shelves, and then subtracted that by the total number of shelves. The number obtained by that process was then multiplied by the height of each gabion shelf, thus giving me the amount of deposition. I then had to add one foot to this calculation due to the scour protection apron placed for foundation of the gabion walls.



Figure 1. Spring Creek with markers at Section 1, 2 and 3.

Results

The data collected was recorded and summarized in Table 1 below. Sedimentation in section one totaled 5 ft, while section two totaled 5.5 ft. Section three totaled 4 ft. The total approximate deposition for each section was then averaged. I found that sedimentation occurring in Spring Creek after construction has averaged 4 feet 10 inches in the span of 5 years. The average depth of gabion construction was 9 feet. Photo-interpretive analysis also shows that sedimentation has occurred, and can give the observer an idea of change over time (Figures 2,3,4).

Table 1

Section	Section 1	Section 2	Section 3
# Gabion Shelves	3	3 ft	2 ft
Approximate Shelf Height	3	3 ft	3 ft
Shelves * Heights	9	9 ft	6 ft
Exposed Gabion Height	5 ft	4.5 ft	3 ft
Shelve Height - Exposed Height	4 ft	4.5 ft	3 ft
Scour Protection Apron	1 ft	1 ft	1 ft
Total Approximate Deposition	5 ft	5.5 ft	4 ft



Figure 2 During and after pictures of Spring Creek at section three.



Figure 3 During and after construction looking downstream from section two.



Figure 4 Before and after construction looking upstream from section three.

Conclusion

To conclude, I found that sedimentation has occurred in the channelized portion of Spring Creek since 2002. Before and after photographs show this along with the data presented. It is clear that sediment has been deposited, and according to my data, filling on average just over half of the total height of the gabion walls. This is significant in that knowing what is occurring as far as sedimentation goes, and further actions to mitigate this could be studied. Finding the

source of sedimentation might prove useful in future studies and explanations of phenomena associated with gabion structures to the Dog River watershed.

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