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Lessons and Experiences From a Stream Restoration Project in the Piedmont of North Carolina

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Abstract

Mulkey, Inc. is participating in a stream restoration study with the Ecosystem Enhancement Program in Yadkin County, North Carolina. The purpose of this study is to restore approximately 4,300 linear feet of Rocky Branch, a second order stream located in the western Piedmont of North Carolina. Stream restoration in North Carolina is generally conducted to provide compensatory mitigation for stream impacts from both highway construction and private development. Since the late 1990s, North Carolina has served at the forefront for stream restoration activities due to the state’s tremendous population growth and stringent water quality standards. In an effort to provide mitigation for the state’s needs in an efficient manner, the Ecosystem Enhancement Program was created in 2003 under an agreement with the North Carolina Department of Environment and Natural Resources, the North Carolina Department of Transportation, and the U.S. Army Corps of Engineers. There are approximately 400 streams and wetland restoration projects that are currently under development across 54 watersheds in North Carolina. Those resources having the greatest repair needs are prioritized and the Ecosystem Enhancement Program works with public and private organizations in an effort to restore, to enhance and to preserve wetlands, streams, and buffers, statewide. The Ecosystem Enhancement Program serves as the nucleus for consolidating and streamlining mitigation activities within the state. The project presented here is one of the many projects this program administers in an effort to meet the ever growing mitigation needs in the state.

The Rocky Branch site comprises approximately 24 acres of pasture and woodlands immediately adjacent to the Interstate 77 corridor in Yadkin County, North Carolina. The project site has a drainage area of approximately 3.1 square miles and is part of the South Yadkin River Watershed. The site was once heavily forested, but over the last 100 years has been cleared primarily for pasture and row crops. Cattle have been a significant part of the land-use since the early part of the 20th century and their impact is highly visible through compaction, erosion, and denuded vegetation along the stream. The objectives of the Rocky Branch stream restoration project were and continue to be: 1) to provide mitigation for future needs in the area, 2) to improve water quality by excluding cattle from the stream, 3) to provide a stable and functional stream channel, 4) to improve the overall quality of the stream and riparian areas and 5) to provide long-term protection of the project through a conservation easement.

The restoration of Rocky Branch’s main channel and its associated tributary were completed using methods based on the work of David L. Rosgen, PhD, which emphasize the use of natural stability concepts. The stream restoration project created a new stream channel with the appropriate dimension, pattern, and profile for its specific location within the watershed. The new channel contains in-stream boulder structures which provide grade control, bank stabilization, and aquatic habitat. Boulder structures used in conjunction with this project include cross vanes, rock vanes, and j-hooks. The stream banks were stabilized using erosion control matting, native seed mixes, bare root seedlings, rootwads, and live vegetation stakes. A permanent riparian buffer was established using native vegetation specific to the region. Vernal pools were established throughout the riparian buffer to provide habitat, water storage capacity and micro-topography. To protect the project from disturbance, permanent fencing was established around the entire site.

As is true for projects of this type, an as-built report documenting stream restoration and enhancement is developed to provide a baseline for future monitoring or success criteria. A monitoring program will be implemented to document system development and progress toward achieving the success criteria as stipulated in the mitigation requirements for the project permit. Monitoring will take place over a 5-year period or until final success criteria are achieved.