

## Upper Sandy Creek Watershed & Stream Restoration

The Durham Soil and Water Conservation District (SWCD) has undertaken a unique partnership with Duke University in an effort to improve water quality in Durham County and study the effectiveness of innovative approaches to watershed restorations. The Upper Sandy Creek Watershed and Stream Restoration is a multi-year, multi-phased project that is a first of its kind in Durham or North Carolina where an entire watershed has been restored and enhanced with innovative best management practices in order to study their effectiveness on water quality improvement.

Upper Sandy Creek is a state-designated Natural Heritage Program Priority Area and a headwater for the Cape Fear River watershed in the North Carolina Piedmont. The Creek drains 1,228 acres of Duke University, southwestern Durham County and the City of Durham, before flowing into Sandy Creek, then the New Hope Creek, and eventually into the Jordan Lake Reservoir. Jordan Lake serves as a drinking water source for much of the Triangle region. Sandy Creek, New Hope Creek and Jordan Lake have all been declared impaired on the state's 303d lists. Development of the Upper Sandy Creek Watershed has led to a high percentage of impervious surface (20.6%) in the watershed. The impervious areas and drainage systems contributed to the rapid deliveries of nutrient-rich stormwater runoff to the creek which lead to channel incising and a straightened stream profile, cutting off the stream from its adjacent floodplain. To further stress the watershed, the adjoining municipal sewer lines would often overflow during storm events, resulting in elevated fecal coliform levels.

The Durham SWCD partnered with Duke University's Wetland Center and professor Dr. Curtis Richardson on the project. Because of the scope of project and the intended public use of the site, the site became known as the Stream and Wetland Assessment Management Park (SWAMP). All totaled, the District has received and administered over \$2.2 million in grant funds to implement Phases III, IV, V (stream and wetland restorations) and the Anabranching special project. The goals were to: measure the effectiveness of multiple restored systems in a model complex urban/forest watershed and to translate these findings across the state by offering workshops and field training sessions for local and state agencies and the public on modern approaches to stormwater-management systems using integrated stream and wetland restoration. The Anabranching special project developed and tested a new floodplain restoration design for enhancing stream-floodplain interactions focused on restoring water quality, groundwater interactions and sediment retention functions. This design is a state-of-the-art approach for restoring wetland services on the landscape. The entire SWAMP project brings new approaches to stormwater management for urban dominated watersheds. Most importantly the multiphase assessment will provide a quantification of several different approaches to water quality improvement via testing of an ecological based stream restoration, a low-berm treatment system, as well as the use of a regulated stormwater settlement system placed near the headwaters of a representative piedmont stream.

Duke University's Wetland Center has been closely monitoring the water quality effects from each phase of the watershed restoration. Monitoring has shown a 64% reduction of nitrogen, a 28% reduction of phosphorus and almost 500 tons of sediment saved per year from further impacting the water quality of downstream systems. In addition to the restoration work, the District holds monitors the conservation easements on approximately 20 acres of SWAMP. Protecting the land from development for future generations.

The District partnered with Duke to present a two day workshop for resource professionals from across the US on the success of the restoration and the findings from water quality studies. Students from Duke University continue to use the restoration as a learning lab and have conducted several research experiments on various other environmental parameters at the site.

Educational signage along the trail and boardwalks inform the public about the project and the role of wetlands in promoting water quality. Local schools visit the site and are given a tour of the different project areas and research being conducted. SWAMP is a water quality example for the state and nation.

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