



NONPOINT SOURCE SUCCESS STORY

Maryland

North County Regional Park Project along the Upper Choptank River Benefits Water Quality and the Public

Waterbody Protected

The North County Park is a 207-acre riverfront parcel previously part of a 500-acre agricultural property. In 2016, Caroline County purchased half the park to provide public recreation opportunities and support local watershed restoration efforts. The County selected the area for a project site because of its proximity to the Choptank River and the presence of degraded and unstable stream channels. The erosion in various segments of the two stream channels bisecting the property generated sediment loads that discharged directly into the Choptank River. Project design and construction included creating wetlands, stabilizing streambanks and ditches, and constructing multiple stormwater management best management practices (BMP). According to 2023 sampling data, these implementation activities have led to decreases in sediment, nitrogen and phosphorus levels.

Water Quality Challenge

The North County Park is a 207-acre waterfront parcel next to the Upper Choptank River near Greensboro in Caroline County, Maryland. The property was historically farmed for corn and soybeans. The County purchased the parcel in 2016 following long-standing public interest in securing access to the Upper Choptank River, preserving environmentally important areas and providing future recreational facilities for local residents.

Property conditions had deteriorated, leading to the following water quality impacts: runoff into a southern agricultural ditch, concentrated runoff into northern gullies and groundwater flow from the farm fields through underground field drains. The gullies experienced deeply incised legacy sediment and spring drainage from neighboring fields flowing rapidly onto the property (Figure 1).

Caroline County developed an Upper Choptank River [watershed-based plan](#) in November 2010, which the EPA accepted in December 2010. Since adopting that plan, the County has analyzed the point and nonpoint source nutrient loads and potential load reductions for all 70 of its subwatersheds. The plan has been further refined via the Chesapeake Bay Total Maximum Daily Load (TMDL). A sediment TMDL was finalized by MDE for the Upper Choptank in 2019. The Upper Choptank River watershed is 56% farmland, and a 2012 report determined that both nitrogen and phosphorus are significant stressors on the watershed's water quality.



Figure 1. North County Park stream profiles, before project construction.

Project Highlights

The project addressed critical areas, specifically where a channel was progressively eroding deeper and further into the field. The County had established and expanded the grass buffers in these areas, but this only succeeded in slowing down the erosion problem. A swale paralleled the natural channel on the left side and directed runoff to drop pipes set at several locations. The pending failure of a 15-foot-tall eroding bank and the severe erosion that was extending out into the field and buffers also represented a significant concern.

The site’s proximity to the Upper Choptank River enhances its value for Caroline County’s surface water and stormwater management efforts. This project included constructing numerous BMPs, including 2.5 acres of Delmarva Bay wetlands (excavating two areas to recreate naturally occurring Delmarva Bay conditions, which are predominately groundwater-driven and include wetland habitats), 560 feet of a regenerative stormwater conveyance system, 700 feet of stream restoration, 222 feet of log boulder structures, 320 feet of riffle grade control for stream restoration, and 9,750 square feet of bioretention (Figures 2, 3 and 4).



Figure 2. North aerial view of restored area, after completion.

Best Management Practice	Number Installed	Units	Comments
Stream Channel Restoration (stream bed)	552	FT	222 feet of Log Boulder structures and 320 feet of Riffle Grade Control
Stream Habitat Improvement and Management	560	FT	560 feet of Regenerative Stormwater Conveyance (RSC) system
Wetland Creation	2.5	AC	2.5 acres of Delmarva Bay Wetlands. The construction of two excavated areas to recreate conditions similar to those found in naturally-occurring Delmarva Bays, which are predominately groundwater-driven wetland habitats
Stormwater Wetland	9750	SQUARE FEET	9,750 square feet of bioretention. By decreasing surface runoff through infiltration, there will be less impact to the stream channels, enhanced baseflow conditions, and a reduction in nutrients entering the stream system.
Ditch Stabilization	700	FT	700 feet of Stream Restoration. The restoration of the field ditch will address site-specific conditions related to the long-term stability of the channel, banks, and re-establishment of a floodplain

Results

Transect monitoring data were used to calculate the cross-sectional area of stream lost annually for each transect. This area was then multiplied by the approximate length of the stream that each transect occupies to get a volume of soil; then, each section was summed up to get an approximate annual total sediment loss volume. To assess the sediment reduction achieved by the project, the County conducted monthly transect monitoring over a one-year period before and after BMP construction. This monitoring allowed the project team to capture seasonal variations and accurately calculate the sediment

volume changes before and after the project was implemented. Using the U.S. Department of Agriculture’s Web Soil Survey bulk density values for Caroline County, Maryland, the County converted these sediment volumes into tons by applying an appropriate bulk density factor.

For the nutrient analysis, the County applied typical nitrogen and phosphorus concentrations for agricultural soils in Maryland’s Eastern Shore region. These values were applied to sediment loads from the before and after construction monitoring to quantify nutrient loads and determine reductions. Data show a 70% reduction in sediment and associated nutrient loss due to BMP implementation, equating to around 103 tons of sediment retained on the project site (Figure 5).

Assuming the post-construction transects continue to remain stable, it is predicted that this sediment reduction will continue in perpetuity, preventing significant amounts of nutrients from entering the receiving water bodies for many years to come.



Figure 3. South aerial view of restored area, after completion

Partners and Funding

Partner Type	Agency	Funding	Notes
State	MARYLAND DEPARTMENT OF NATURAL RESOURCES	\$1,100,000	Funding construction
State	MARYLAND DEPARTMENT OF THE ENVIRONMENT - 319 FUNDS	\$430,800	Oversee project progress, accomplishments and grant reimbursement of expenditures.
County	CAROLINE COUNTY, MD DEPARTMENT OF RECREATION AND PARKS	-	Oversee and coordinate project locally. Assist with implementation of on-site project described in this Scope of Work. Submit quarterly and final reports and invoices during the grant period.
County	CAROLINE COUNTY, MD DEPARTMENT OF PLANNING AND CODES	-	Assist with implementation and outreach for on-site project described in this Scope of Work
University/College	UNIVERSITY OF MARYLAND SEA GRANT EXTENSION	-	Assist with implementation and outreach for on-site project described in this Scope of Work.
University/College	WASHINGTON COLLEGE CENTER FOR ENVIRONMENT AND SOCIETY	-	Oversee and coordinate 60-acres native grassland and meadow plantings (not included in the MDE 319 Program funding request)



Figure 4. Marshy growth, after project implementation.

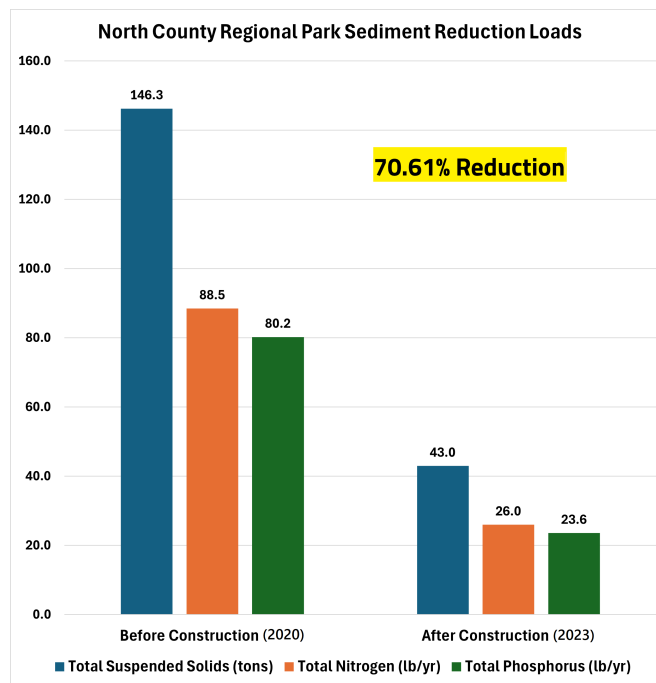


Figure 5. Sediment and nutrient load reductions due to project implementation.



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