

Deer Brook Gully Restoration, Georgia, Vermont

STONE
ENVIRONMENTAL
100% EMPLOYEE-OWNED

Services / Expertise

Vermont Water Quality
Conventional Stormwater and Retrofit
Planning
Developed Lands Erosion Solutions
Hydraulic and Hydrologic Modeling
Stormwater BMPs and GSI Design
Open Channel Flow
Stream and Bank Restoration
Stakeholder Involvement & Stewardship

Markets

Watershed Organizations
Local and Regional Government
State Government

Project Location

Georgia, Vermont

Duration

2017-2019; 2021-2024

Project Owner

Friends of Northern Lake Champlain

Point of Contact / Reference

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Project ID#

17-084
20-116

Project Manager (20-116)

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Project Team

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Installation of the new outfall and energy dissipating stone step pools in September 2022.

DEER BROOK, with an 8.4-square-mile watershed located in Georgia and Fairfax, Vermont, flows south to Arrowhead Mountain Lake. It is part of the Lamoille River and eventually drains into Lake Champlain. The brook is classified as sediment-impaired from its confluence with Arrowhead Mountain Lake to 2.5 miles upstream. The construction of Interstate 89 and related U.S. Route 7 improvements in the 1960s and 70s, as well as the subsequent addition of homes and businesses near the intersection with Route 104A, have contributed to a substantial increase in stormwater runoff discharging to the head of the Deer Brook Gully. These stormwater flows, combined with deteriorating culverts along Route 7 and 104A in Georgia, have caused the gully to erode and deposit sediment into Deer Brook. The problem was first documented by the consulting team of ESPC and Stone in a 2007 report for the Northwest Regional Planning Commission (NRPC). Stone further evaluated the site and provided stormwater retrofit options as part of a 2013 Stormwater Master Plan for the Town of Georgia and Friends of Northern Lake Champlain (FNLC).

In 2017, Stone once again worked with these stakeholders using VT DEC Ecosystem Restoration Grant funding awarded to FNLC to identify and design stormwater management practices in upland areas and within the gully. Stone produced final designs for gully stabilization and restoration, as well as seven stormwater retrofit practices in the contributing watershed. The upland restoration designs included four gravel wetlands, two catch-basin risers, and a series of off-line deep sump catch basins along US Route 7. The outlet and gully restoration designs included culvert upsizing and a drop manhole at the outlet, as well as stone step pools that reduce flow velocities and stabilize the gully banks at the outlet. As implemented, these measures mitigate sediment loads from the watershed and the gully to Deer Brook.



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Following the submittal of 100 percent designs in mid-2019, Stone supported FNLC's efforts to secure funding to complete construction plans, permitting, and project implementation. In late 2020, FNLC and Stone received a Lake Champlain Basin Program grant administered by VT DEC, and the first phase of construction was completed in September and October 2022. Stone assisted FNLC through the bidding process by creating bid documents, advertising the project to prospective bidders, reviewing proposals, and selecting a contractor. Stone also provided construction oversight, including daily field reports and photos. The portion of the project constructed included gully and bank stabilization, installation of a properly sized outlet, a deep



Left: The lower reach of the Deer Brook gully in November 2017. Gray water in the channel is due to fine sediment transport. Right: Construction of closed drainage system outlet improvements and energy-dissipating stone step pools in September 2022.

manhole, a deep sump catch basin, and associated piping. In 2023, Stone supported FNLC's application to the Missisquoi Clean Water Service Provider (CWSP) and Basin Water Quality Counsel (BWQC) to construct the next phase of the project—upland closed drainage stormwater retrofits including off-line deep sump catch basins to capture sediment and direct surface flow to the stabilized outlet at the gully head. Ultimately, while the CWSP and BWQC were supportive of the project, the construction costs and limited phosphorus removal made funding a challenge.



Installation of deep sump catch basin, drainage manhole, and associated stormwater culverts, April 2024

Stone then supported FNLC through the Watershed United Vermont (WUV) Block Grant application process that ultimately secured funding for the second phase of construction. FNLC chose to enter into an agreement with the contractor who constructed Phase I to also construct Phase II. Stone assisted with contracting and provided construction management, oversight, and reporting services throughout the duration of the second phase of construction. The work took place in spring of 2024 and was complete by early May.

