

Stevens River Bank Stabilization Barnet, Vermont



Services / Expertise

Stream Restoration & Floodplain Protection, Channel Migration, Infrastructure Protection, Topographic Survey & Geomorphic Analysis, Hydrologic & Hydraulic Modeling, Erosion Prevention & Sediment Control Plan, Infrastructure Stability Analysis, Aquatic Organism Passage Design, Flood Mitigation Design, Channel Restoration Plan, Project Implementation, Stakeholder Collaboration & Stewardship, 100% Design Plans, Specifications & Opinion of Probable Cost

Regulatory Compliance and Permitting

Vermont Stream Alteration Permit, Vermont Dam Order Permit, Flood Hazard and River Corridor Permit, Army Corps of Engineers 404 Permit, Federal funding from USDA NRCS

Market

Watershed Protection Organizations
Local and Regional Government
Site/Property Owners

Project ID#

18-067

Project Location

Barnet, Vermont

Date Completed

2017—2019

Project Owner

Connecticut River Conservancy

Point of Contact / Reference

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Project Team

Branden Martin, PE
Meghan Arpino



Eroding bank along meander bend of Stevens River adjacent to private property and horse farm (left); same meander bend following construction of bank stabilization measures (right).

STONE ENVIRONMENTAL was hired by the Connecticut River Conservancy to provide engineering design and construction management services for a bank stabilization project along a portion of the Stevens River in Barnet, Vermont. The project area included an incised meander bend that was migrating towards residential property, threatening to cut off access to a portion of the property used as horse pasture. Stone performed a geomorphic assessment to determine the source of the issue and concluded that the replacement of approximately 200 feet of stream channel with a concrete culvert had added excess energy in the system, accelerating the bend's migration.

To ensure the proposed work did not raise the 100-year flood water surface elevation, Stone developed a HEC-RAS model that tied into the Base Flood Elevations of the FEMA Flood Insurance Rate Maps and submitted a No-Rise certification. Stone used model output to create a map that provided the flood inundation limits for the pre-project and post-project condition. Model results indicated the project would not raise the 100-year flood water surface elevation.

The bank stabilization design plans included a large wood structure with over 50 pieces of wood and a toe reinforced with large stone. Channel and floodplain elevations were modified to mimic reference conditions, and the top of the wood structure was set at an elevation such that flood events beyond the 1.6 to 2-year recurrence interval will engage the floodplain. Erosion prevention measures, such as securing erosion control fabric and planting native shrubs, were completed in the newly graded floodplain. The large wood structure was designed to resist buoyancy, momentum, and drag forces associated with large flood events, as evaluated through hydraulic modeling.