

Pelletier Dam Removal and Engineering Design in Castleton, Vermont

STONE
ENVIRONMENTAL
100% EMPLOYEE-OWNED

Services / Expertise

Stream and Floodplain Restoration
Dam Removal Assessment & 30% Design
Aquatic Organism Passage Assessment & Design
Dam Safety Assessment
Topographic Survey & Geomorphic Analysis
Channel Restoration Plan & Design
Sediment Analysis, Characterization and Management
Infrastructure Stability Analysis
Erosion Prevention and Sediment Control Plan
Wetland Delineation
Hydrologic & Hydraulic Modeling
Cost-Benefit Analysis of Selected Alternative
Photographic Simulation
100% Design Plans & Opinion of Probable Cost

Markets

State & Regional Government
Community Organizations
Watershed Protection Organizations
Site Property Owners

Project Location

Castleton, Vermont

Duration

2018-Present

Project Owner

Vermont Natural Resources Council

Project ID#

18-068

Project Manager

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Project Team

Branden Martin, PE



View from the former dam site upstream along the restored channel of North Breton Brook, Castleton, Vermont.

THE VERMONT NATURAL RESOURCES COUNCIL (VNRC) retained Stone in 2018 to provide engineering and design services for the removal of the Pelletier Dam, located on North Breton Brook in Castleton. The Pelletier Dam was among several high-priority projects identified through the Vermont Dam Task Force—a collaborative effort led by the VNRC—to improve aquatic connectivity throughout the Lake Champlain watershed through the identification and removal of dams that no longer serve a useful purpose.

Over the past century, the Pelletier Dam became a significant impediment to stream flow, sediment transport and fish passage through North Breton Brook. The 20-foot-high by 180-foot-long dam, constructed c.1890 to generate power for milling operations, was acquired by the Vermont Fish and Wildlife Service in 1964. While the dam deteriorated, it continued to impound North Breton Brook, attenuating flows and trapping sediment upstream of the dam, as well as preventing aquatic organism passage (AOP). The main goals of the Pelletier Dam removal were to reconnect 37 miles of interconnected habitat for brook trout and similar fish, reconnect the channel to adjacent floodplains, reestablish natural sediment transport, and lower water surface elevations associated with large storms throughout the project area.

Stone's scientists and engineers completed a geomorphic assessment, created a sediment management plan, and developed a restoration design that included removing impounded sediment, regrading the pilot channel, and creating floodplain benches to reconnect the stream to adjacent floodplains. Stone collected historical aerial photography and maps, reviewed temporal planform adjustments, and



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collected longitudinal channel data to support geomorphic assessment and pilot channel design. Stone also collected sediment samples, performed grain size analysis, and evaluated sediment mobility using incipient motion calculations to support sediment management plan development.

In developing channel and bed restoration design plans, Stone performed a topographic survey of the site and created a Hydrologic & Hydraulic (H&H) model to evaluate dam removal and floodplain reconnection alternatives. The 100% design plans included measures to restore conveyance and sediment transport functions, and incorporated bed features that match reference conditions, such as long, deep pools and large wood structures, which will increase channel stability, dissipate flow energy, and add to fish habitat and refugia. Stone also provided permitting support, including the processing, submission, and overall coordination for a Vermont Dam Order permit (10 V.S.A Chapter 43), an Army Corps of Engineers Category 2 permit, a Vermont Stream Alteration Permit, and a Stormwater Construction General Permit.

In the spring of 2022, Stone created bid documents, solicited construction bids, and assisted VNRC with contractor negotiations and selection. Stone oversaw the construction of the project over the summer months.



Breached face of the Pelletier Dam and impoundment (August, 2022)



Before



After

Downstream face of the Pelletier Dam (left) and North Breton Brook following dam removal (right) in October 2022.

