

Johnsons Mill Dam Removal and Long-Term Monitoring

STONE
ENVIRONMENTAL
100% EMPLOYEE-OWNED

Services / Expertise

Aquatic Organism Passage (AOP)
Dam Removal Feasibility & Assessment
Preliminary Design
Final Design
Stream Restoration
Sediment Analysis, Characterization, and Management
Topographic Survey
Stream Geomorphic Assessment
Hydrologic & Hydraulic Modeling
Infrastructure Stability Analysis
Erosion Prevention & Sediment Control Plan
Stakeholder Collaboration & Stewardship
Construction Management & Oversight
Post-Construction Monitoring

Markets

Watershed Protection Organizations
Local and Regional Government
Site/Property Owners

Project Location

Bakersfield, Vermont

Duration

2019–Present

Project Owner

Franklin County Natural Resources Conservation District

Project ID#

19-093

Project Manager (Long-Term Monitoring)

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Project Team

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Looking upstream at the Johnsons Mill Dam along Bogue Branch in Bakersfield, Vermont in 2019.

IN 2019, the Franklin County Natural Resources Conservation District (FCNRCD) retained Stone to perform a dam removal feasibility assessment of Johnsons Mill Dam, located on the Bogue Branch in Bakersfield, Vermont. Once used to power a nearby sawmill, the obsolete dam caused adverse impacts on the habitat and migration of brook trout, a Species of Greatest Conservation Need in Vermont watersheds. Acting on behalf of a private landowner, the FCNRCD secured funding from the Vermont Department of Fish and Wildlife to remove the dam, restore the Bogue Branch to a free-flowing state, and improve water quality, flood resilience, and aquatic organism passage (AOP).

Stone completed surveying and sediment probing to determine if removing the dam structure would improve passage for brook trout and performed a geomorphic assessment of the reach upstream of the dam impoundment. These preliminary assessments indicated that AOP was likely following dam removal.

The Halloween storm in October 2019 brought over 4.5 inches of rain in less than 24 hours. Extreme floodwaters overtopped the dam and breached it at a vulnerable point. Following consultation with FCNRCD and assessment of the dam's condition, the design phase resumed with a resurvey of the site to account for adjustments following the storm. Survey data indicated downcutting of the former impoundment and upstream channel ranged from 0.5 to 4.5 feet from original grade, leaving near-vertical banks throughout the project area. Working with FCNRCD staff, Stone developed an adapted conceptual design for dam removal and bank stabilization, including estimating the volume of impounded sediment remaining. A one-dimensional hydraulic model was developed to simulate peak flows under existing conditions and proposed dam removal scenarios.



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Stone developed 100% engineering design plans and secured permits in 2020. Stone assisted with selecting a contractor and oversaw construction in 2021. Construction included dam removal, achievement of full AOP, and regrading of upstream banks to stable slopes, which were planted with native willows obtained onsite.

In spring 2022, FCNRCD retained Stone to perform long-term monitoring of channel adjustments and vegetation patterns over a four-year period. Starting in summer 2022 and during each monitoring year through 2025, Stone will collect longitudinal and cross-section survey data, bed material distribution via pebble counts, recruitment of large wood in the channel, and distribution, survival, and success of planted willows. Lateral bank adjustment and other details will be captured via seasonal drone aerial imagery (16 total flights), and sediment volume calculations will be performed using survey data. Plots of monitored longitudinal profile data versus design phase profiles will inform vertical adjustment patterns. This is one of the first dam removal long-term monitoring programs in the state.



Looking downstream at the former Johnsons Mill Dam location along Bogue Branch in Bakersfield, Vermont in 2023.

