

Kristen L. Underwood¹, Mandar M. Dewoolkar¹, Donna M. Rizzo¹, Beverley C. Wemple², Arne Bomblies¹
 University of Vermont: Civil & Environmental Engineering¹, Department of Geography²

Introduction

Lowering of rail beds to restore floodplain function (Figure 1) is a river restoration practice with great potential, but which must also consider the multiple uses and functions of river and rail corridors, along with the potential impacts and benefits to adjacent infrastructure, life safety and health, and the environment.



Figure 1. Flooding on rail bed connection site, Fairfield, VT.

Objective 1 – Demonstration Site

Using a two-dimensional hydraulic model and digital elevation model derived from an Unmanned Aerial Survey, the team will evaluate several alternatives for enhanced floodplain reconnection at a landowner-approved demonstration site on the Black Creek in Fairfield (Figure 2) that would seek to restore 22 acres of floodplain by modifying 1,300 feet of embankment.

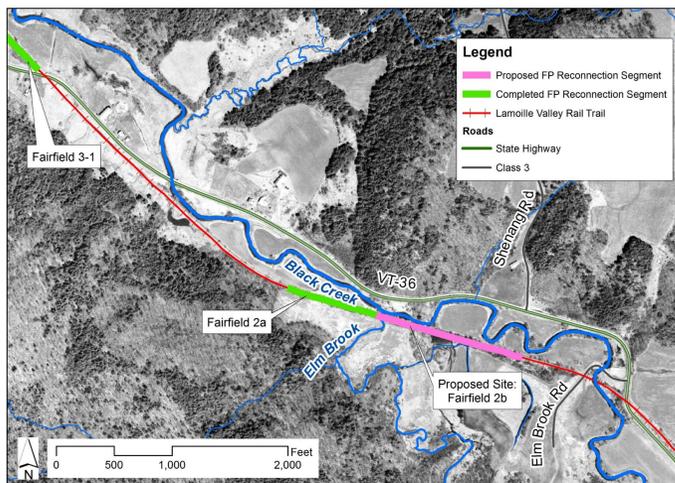


Figure 2. Location of proposed floodplain reconnection demonstration sites, Fairfield 2b, at the confluence of Elm Brook and Black Creek, alongside VT Route 36 in Fairfield, VT.

We will evaluate potential changes in flood stage resulting from several reconnection alternatives (Figure 3), and quantify the effectiveness of flood-water attenuation and sediment / nutrient storage over a range of design flows.

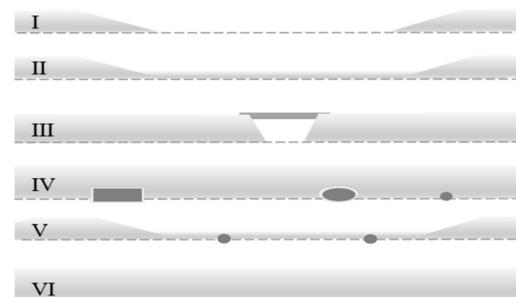


Figure 3. Potential floodplain reconnection alternatives for rail embankment.

Objective 2 – Statewide Protocol for Prioritizing Sites

We will develop a protocol that relies on existing data sets for identifying and prioritizing floodplain reconnection sites based on site topography, geomorphology, river network position, and empirically-based estimates of flood, sediment and nutrient attenuation potential.

This protocol will be tested on the Lamoille River and Black Creek corridors along the Lamoille Valley Rail Trail to understand (retroactively) how twelve already completed reconnection sites (Figure 4; Schiff et al., 2008) would have ranked in the prioritization scheme.

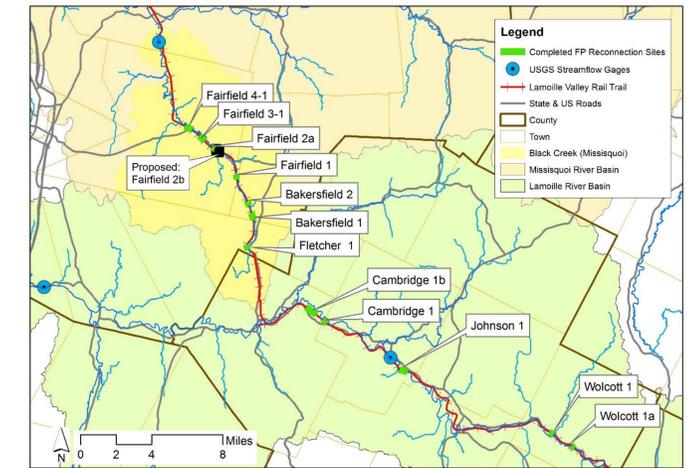


Figure 4. Location of completed floodplain reconnection sites on the Lamoille Valley Rail Trail.

Objective 3 – Technical Transfer

Research products will be transferred to VTrans staff and other stakeholders in a proposed training session near the project conclusion. Successful floodplain reconnection projects along rail lines represent an opportunity to achieve flood resiliency benefits and potentially reductions in pollutant discharges from impervious surfaces under VTrans' Phosphorus Control Plan.

Acknowledgments

Our team will be supported by collaborators Staci Pomeroy, VTDEC Rivers Program, and Jeff Ramsey, VTrans Environmental Specialist Supervisor.

References

- Kline, M., & Cahoon, B. (2010). Protecting River Corridors in Vermont. *Journal of the American Water Resources Association*, 1(10). doi: 10.1111/j.1752-1688.2010.00417.x
- Schiff, R., Clark, J. and Cahoon, B., 2008, "The Lamoille River and Black Creek Floodplain Restoration Project", conference paper and presentation to the 2008 AWRA Summer Specialty Conference Riparian Ecosystems and Buffers, Virginia Beach, VA.