

RIVERBANKS MANAGEMENT PROJECTS Cuyahoga Valley National Park, Cuyahoga & Summit Counties

Date Completed: 2010

Description: 1000 linear feet of the Cuyahoga River was restored and relocated to its original 1960 location. The relocation, restoration and use of flow diversion structures have resulted in a sustainable solution to a critical infrastructure problem. The project allowed for the stabilization of a 100 foot high severely eroding slope that threatened dual transmission power lines.



Project Size: Each riverbank stabilization project covers between 200 feet and 400 feet of riverbank, approximately 4,000 feet total.

*Below: Cuyahoga Valley National Park & Scenic Railroad
(photo: National Park Service /Tim Fenner)*



Project Experience

Cuyahoga Valley National Park IDIQ Contract

Riverbank Management

Brecksville, Ohio

Client:

National Park Service

Janet Popielski, P.E.
 440.546-5979

Cost:

\$1.34 Million (* projects)

Completion Date:

2010

Project Highlights:

- Hydrologic, hydraulic and geomorphologic analysis
- Riprap design
- Bioengineering features
- Vegetation Reinforced Soils System
- NEPA Environmental Assessment
- Riverbank stabilization

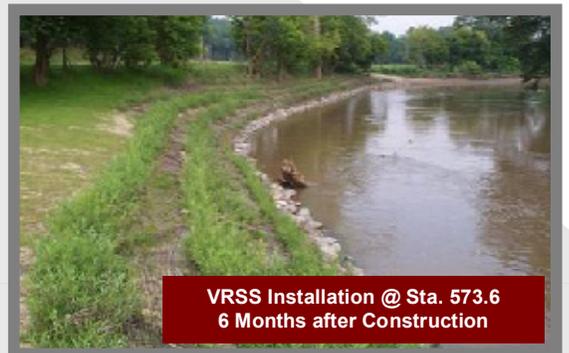
Description:

The Ohio and Erie Canal Towpath Trail and Valley Railway run parallel to and typically on opposite sides of the Cuyahoga River for a distance of approximately 25 river miles within the Park. These historic, cultural and recreational resources are threatened in approximately 40 specific locations by streambank erosion. The primary mechanisms contributing to streambank erosion include erosion at the toe of the riverbank, caused by shear stresses acting on fine-grained alluvial soils, combined with translational failures of the upper banks.

Typical services performed include: hydrologic, hydraulic, sediment, and geomorphologic analyses to determine flood flows, the dominant discharge, mean discharge and low flow discharges and corresponding water surface profiles and velocities. Designed riprap revetment, including allowance for anticipated toe scour, construction staging and access plans, soil/erosion control features, and assisted with preparation of environmental permits.

Towpath Trail Sta. 515*, 530*, 573*, 940*, 1100 and 1380*, Valley Railway MP 52.4, 55.3, 62.4, 64.3, Everett Covered Bridge*

Performed evaluation, design and contract documents for 11 riverbank stabilization sites on the Cuyahoga River and tributaries utilizing a combination of riprap and bioengineering measures (Vegetation Reinforced Soil System (VRSS), live fascines, brush layering, timber vanes, and log weirs, dormant live stakes and posts, encouraging meander cut-offs, engineered log jams, and channel rip rap).



Project Experience

Contractor Training in Bioengineering

Provided classroom and field training to CVNP's 8(A) contractor on the installation of bioengineering features (Vegetation Reinforced Soil System (VRSS), brush layering), the selection, transport and care of dormant live cuttings, and construction operations to facilitate riverbank construction.

Prepared Programmatic Environmental Assessment for Riverbank Management, in corroboration with NPS staff, to develop a more holistic and pro-active approach to managing the threat of riverbank erosion on the Towpath Trail and Valley Railway. The document was prepared in accordance with the Director's Order 12 Handbook, the NPS guidebook for NEPA compliance.

Specific tasks included participation on the Interdisciplinary Team for internal scoping, development of a letter for external scoping, purpose and need, issue identification, development of alternatives, description of affected environment, impact evaluation methodology, and impact analysis; publishing the Draft and Final EA; public reviews; and preparing the FONSI.

Bergmann Associates provided discussion of the affected environment, developed impact evaluation methodology and performed impact analyses for these impact topics: water quality, wetlands, floodplains, National Rivers Inventory, aquatic habitat, geologic (fluvial) processes, cultural landscapes, health and human safety, and visitor use/experience.

The recommended alternative includes expansion of the existing riverbank monitoring program to include the use of: historic and recent aerial photographs referenced with multiple regression relationships to predict changes to GIS; GPS survey to track reaches of active bank recession; cross sections at certain locations to assess potential for or occurrence of bank failure

To facilitate the implementation of the recommended alternative at 40 specific sites of concern, Bergmann Associates prepared a joint Floodplains/Wetlands Statement of Findings (SOF) to assure compliance with Executive Orders 11988 and 11980. For wetlands, the SOF included a conceptual wetlands mitigation plan.

Worked with CVNP Staff and Consultant Team to prepare and present the paper "Developing a Program to Protect Natural and Historic Resources in Conflict Through the EA Process" at 2005 NAEP Conference.



Developer/Client/Owner:

National Park Service
15610 Vaughn Rd.
Brecksville, OH 44141
www.nps.gov/cuva

Designer/Consultant:

Bergmann Associates
4512 Dressler Rd.; NW
Canton, Ohio 44718
www.bergmannpc.com

Location: Twelve locations along 25 miles of the Ohio & Erie Towpath Trail and along the Cuyahoga Valley Scenic Railroad, including: Towpath Trail Stations 515*, 530*, 573*, 940*, 1100, and 1380*; Valley Railway MP 52.4, 55.3, 62.4, 64.3, Everett Road Covered Bridge*, and YellowCreek just upstream of the Scenic Valley RR.

Key Features:

Riprap toe and bioengineering measures including:

- Vegetation Reinforced Soil Systems (VRSS)
- Live fascines¹
- Brush layering²
- Timber vanes
- Log weirs³
- Dormant live stakes and posts⁴
- Encouragement of meander cutoffs
- Engineered log jams

Project Cost: \$1.34 million for construction on the 6 sites with asterisks listed in the locations above.

Maintenance Cost: unknown

Funding Sources / Incentives: National Park Service Capital Budget

1 fascine: a long bundle of sticks of wood bound together and used for such purposes as filling ditches and making revetments for riverbanks. www.merriam-webster.com

2 brush layering: a revegetation technique, which combines layers of dormant or rooted cuttings with soil to revegetate and stabilize both streambanks and slopes. www.adfg.alaska.gov/static/lands/habitatrestoration/streambankprotection/pdfs/csbs_brushlayer.pdf

3 log weir: sills consisting of logs laced across a channel and anchored to the channel bank and/or bed. Log weirs are primarily used to collect and retain gravel for spawning habitat, or to create jump pools to facilitate fish passage. They may also serve to control bed gradients on degrading streams. www.pmcl.com/mmdl/MM_Description.asp?ID=32

4 dormant live stakes and posts: dormant live woody cuttings of a species with the branches trimmed off. www.ernstseed.com/products/bioengineering/live-stakes-and-whips/

Applicable Zoning Regulations: A Programmatic Environmental Assessment to address National Park Service National Environmental Policy Act (NEPA) requirements. It developed a holistic and pro-active approach to managing the threat of riverbank erosion on the Towpath Trail and Valley Railway. It performed impact analyses for the following impact topics: water quality, wetlands, floodplains, National Rivers Inventory, aquatic habitat, geologic (fluvial) processes, cultural landscapes, health and human safety, and visitor use/experience. It also included a joint Floodplains/Wetlands Statement of Findings (SOF) to assure compliance with Executive Orders 11988 and 11980. For wetlands, the SOF included a conceptual wetlands mitigation plan.

Additional Comments: The projects were the result of an ongoing Riverbank Monitoring Program of 40 locations using historic and recent aerial photographs referenced with multiple regression relationships in GIS to predict changes and GPS surveys to track reaches of active bank recession.

*Below: CVNP Riverbank Stabilization Near Red Lock 4
(photo: National Park Service / Arrye Rosser)*

