

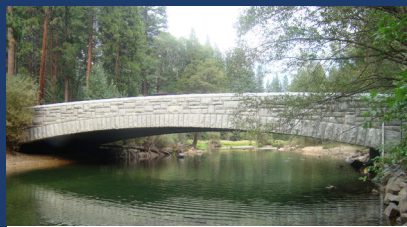


The Federal Highway Administration (FHWA) staff and our consultants regularly provide technical assistance and training to State departments of transportation (DOT). Through these interactions, we have determined that many transportation professionals view natural river functions, such as channel shifting and sediment movement, as important design concepts. However, some practitioners perceive these functions as either niche topics that require specialized expertise or as necessary inputs only with high risk projects or to meet regulatory requirements. Careful assessment and consideration of river processes is paramount for the safe, resilient, and ecologically sensitive design of transportation infrastructure in riverine environments. Many transportation professionals do not currently have the knowledge, tools, and confidence to practically apply these key concepts to their projects.

Our Objectives

The newly branded Rivers and Roads (R&R) Connection Program aims to develop and deploy visually engaging, intuitive, and practical training and tools to a wide spectrum of transportation professionals working on projects within river and stream corridors. The R&R Connection Program's key objectives are to:

- Promote knowledge and understanding of river functions and processes critical to the planning, design, and operation of transportation infrastructure, specifically highway encroachments (e.g., bridge and culvert crossings and roadway embankments) in riverine systems.
- Provide clear tools and steps for performing qualitative and quantitative river process assessments, understanding channel response to changes in dynamic watersheds, analyzing sediment movement rates, and incorporating assessment outcomes in transportation planning, design, construction, operations, and maintenance activities.
- Engage transportation professionals from disparate educational and work backgrounds in a collaborative learning environment to foster partnerships and facilitate understandings of a broad spectrum of viewpoints, issues, concerns, and approaches.



A pristine bridge in the Yosemite Valley of Yosemite National Park.



An example of a bridge with large wood storage and an eroding bank.

All photos source: FHWA.

Our Products

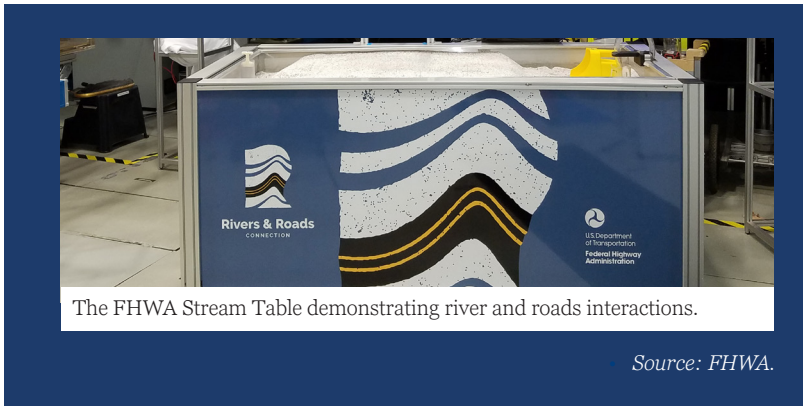
To meet these objectives, the R&R team members are currently developing the following products:

- National Highway Institute (NHI) web-based training course 135096, Roadway Interactions with Rivers and Floodplains: Basic Concepts. This course presents fundamental river terminology and processes.
- NHI 3-day instructor-led training course 135097, Roadway Interactions with Rivers and Floodplains (available Winter 2022). This course targets all transportation professionals and emphasizes interdisciplinary and interagency collaboration.
- Reference manual *Hydraulic Engineering Circular 16 Highways in the River Environment: Roads, Rivers, and Floodplains* (available Winter 2022). This manual discusses practical planning, assessment, design and maintenance concepts, methods, and tools associated with river and road interactions.
- Stream Technology Immersive Learning Experience 1-day workshop (in progress for Summer 2022). This workshop will feature stream table activities and a virtual reality site visit of a major river crossing.
- Field scoping/reconnaissance videos for bridges, river channels, culverts, and roadway drainage features (available from the FHWA Hydraulic Engineering website).
- White paper on the use of riverine nature-based solutions (NBS) in transportation projects (in progress for Spring 2022).
- Education Connect components, including low-cost stream table designs and activities for college and science, technology, engineering, and mathematics curricula (please contact team members for information).
- Activities including workshops, peer exchanges, and case studies showcasing successful project partnerships. The R&R team also plans to develop a riverine NBS implementation guide.

Our Partners

R&R partners working at various levels of engagement on these efforts include representatives from:

- FHWA:
 - Turner-Fairbank Highway Research Center (TFHRC).
 - Office of Bridges and Structures (HIBS).
 - Resource Center (RC).
 - Office of the Natural Environment.
 - NHI.
 - Federal Lands Highway Division.
 - Vermont Division Office
- National Park Service.
- U.S. Bureau of Reclamation.
- Vermont Department of Environmental Conservation.
- Multiple State DOTs: Colorado, Vermont, and Washington.
- City of Fort Collins, CO.
- Multiple consulting firms.



Our Outcomes

Through R&R, we intend to:

- Demonstrate the importance of riverine concepts for transportation projects to a national audience of Federal, State, and local transportation and partner agency professionals.
- Emphasize the importance of clear communication and collaboration among DOT, regulatory, and resource agency staff working on transportation project teams.
- Increase interest and excitement in natural sciences and engineering at all levels of education.

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