

Training Workshop

The Stream Simulation Design Approach for Providing Aquatic Organism Passage at Road-Stream Crossings

Dates

3 - 7 February 2020 (4.5 days)

Location

Asheville, North Carolina

Tuition

None, participants pay travel and per diem

Workshop Sponsors

USDA Forest Service: National Stream and Aquatic Ecology Center; Southern Region; National Forests in North Carolina

Target Audience

Civil Engineers, Geotechnical Engineers, Hydrologists, Geomorphologists, Ecologists, Biologists, Geologists

Contact for Additional Information

Bruce Prudhomme, bruce.prudhomme@usda.gov

Workshop Description

This 4.5 day workshop will present the USDA Forest Service's stream simulation method, an ecosystem-based approach for designing and constructing a channel through the road-stream crossing structure that reestablishes physical and ecological continuity along the stream corridor. The premise of stream simulation is that if the design channel simulates the dimensions and characteristics of the adjacent natural channel, fish and other aquatic organisms should experience no greater difficulty moving through the structure than if there were no crossing. Water depths, flow velocities, and flow paths in the channel through the road-stream crossing are designed to be as complex and diverse as those encountered in the adjacent natural channel.

Stream simulation integrates fluvial geomorphology with engineering principles to design a road-stream crossing that contains a natural and dynamic channel through the structure. This approach requires measurements of site specific channel characteristics in the adjacent natural channel to ensure that an appropriate reference reach can be identified. Identifying a reference reach is a key concept and component of stream simulation as it provides the natural template for designing a channel through the crossing and determining the size and embedment depth of the replacement structure.

This workshop will teach participants the necessary skills to design road-stream crossing structures that provide unimpeded fish and other aquatic organism passage through the structure, restore natural channel characteristics and fluvial processes through the structure, and maximize the long-term stability of the structure. Participants will systematically go through the stream simulation methodology of collecting and interpreting channel data at road-stream crossing sites, applying and integrating these data to develop engineering-based stream simulation design channels and road-stream crossing structures, and effectively constructing stream simulation designs by using numerous examples and class-based exercises. Participants work in interdisciplinary teams throughout the workshop to resolve road-stream crossing scenarios at different stages of the stream simulation site assessment, design, and construction process. An all-day field trip will occur mid-week. The field trip to multiple road-stream crossing sites will complement and reinforce concepts presented in the classroom as participants will identify, assess, and discuss various ecological, geomorphic/hydrologic, and engineering issues at those sites.

