

***Designing for Aquatic Organism Passage at Road-Stream Crossings  
Asheville, North Carolina (3 - 7 February 2020)***

**Course Objectives**

Provide engineers, biologists, hydrologists, and other engaged disciplines the necessary skills to design road-stream crossing structures that will accommodate aquatic organism passage, provide for more natural channel function, and maximize the long-term stability of the structure. The primary design approach is stream simulation.

**Monday, 3 February**

8:30	Welcome and Introductions •	TBD
8:40	1. Course structure and objectives	Mark Weinhold
9:00	2. Why ecological continuity at road-stream crossings is important	TBD
9:30	3. History of road-stream crossing design approaches and a simple stream simulation example	Mark Weinhold
10:15	Break	
10:25	4. Fluvial processes and channel characteristics important in stream simulation design	Dan Cenderelli
12:00	Lunch	
1:00	5a. Site assessment: Field measurements and interpretations • Site maps, channel planform characteristics, longitudinal profiles	Dan Cenderelli
2:00	Break	
2:10	5a. Site assessment: Field measurements and interpretations • Site maps, channel planform characteristics, longitudinal profiles (cont.)	Dan Cenderelli
3:00	Break	
3:10	<i>Exercise 5a. Introduction to exercise and data: Schafer Tributary. Interpreting geomorphic site assessment data: Channel planform and longitudinal profile</i>	Dan Cenderelli All instructors
5:30	Adjourn	

***Designing for Aquatic Organism Passage at Road-Stream Crossings  
Asheville, North Carolina (3 - 7 February 2020)***

**Tuesday, 4 February**

8:00	5b. Stream simulation design <ul style="list-style-type: none"><li>• Reference reach concept, project alignment and profile, site suitability for stream simulation</li></ul>	Mark Weinhold
9:10	Break	
9:20	<i>Exercise 5b. Design project profile and alignment</i>	Mark Weinhold All instructors
10:50	Break	
11:00	6a. Site assessment: Field measurements and interpretations <ul style="list-style-type: none"><li>• Channel cross sections and bed material interpretations</li></ul>	Dan Cenderelli
12:10	Lunch	
1:10	<i>Exercise 6a. Interpreting geomorphic site assessment data: Channel cross sections and bed material interpretations</i>	Dan Cenderelli All instructors
2:20	Break	
2:30	6b. Stream simulation design <i>Exercise 6b. Design bed mix, key features, bed/bank margins</i>	Bob Gubernick
3:40	Break	Break
3:50	6b. Stream simulation design (cont.) <i>Exercise 6b. Design bed mix, key features, bed/bank margins (cont.)</i>	Bob Gubernick All instructors
5:00	Adjourn	

**Wednesday, 5 February**

8:00-5:00	Field Trip	All instructors
-----------	------------	-----------------

***Designing for Aquatic Organism Passage at Road-Stream Crossings  
Asheville, North Carolina (3 - 7 February 2020)***

**Thursday, 6 February**

8:00	7. Structure selection and design considerations	Bob Gubernick
9:00	<i>Exercise 7. Structure type selection</i>	Bob Gubernick All instructors
9:50	Break	
10:00	8. Flood hydrology, discharge estimates, and culvert capacity	Dan Cenderelli
10:45	9. Sediment entrainment and bed mobility/stability analysis	Mark Weinhold
12:00	Lunch	
1:00	<i>Exercise 9: Bed mobility/stability analysis</i>	Mark Weinhold All instructors
2:15	Break	
2:25	10. Final design and contract preparation	Bob Gubernick
3:20	<i>Exercise 10. Final design bed material specifications</i>	Bob Gubernick All instructors
3:50	Break	
4:00	11. Construction	Bob Gubernick
5:00	Adjourn	

**Friday, 7 February**

8:00	12. Monitoring	Mark Weinhold
8:30	13. Lessons learned from a few case studies	Mark Weinhold
9:00	Break	
9:15	<i>Schafer Tributary Exercise: Group presentations and discussion</i>	Dan Cenderelli All instructors
12:45	Wrap-up	
1:00	Adjourn	