Stream and Wetland Buffers Webinar Series
Part 2: Education
Agenda

• Welcome and Introductions (10 min.)
• Vermont Rivers and Roads Lecture (30 min.)
• Vermont Rivers and Roads Video (10 min.)
• Q&A (10 min.)
• Wrap-Up
Webinar Moderator

Kimberly Roth
Environmental Analyst
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Todd presents the Vermont’s Rivers and Roads training program and provides technical assistance on the topics of river mechanics and the interaction of rivers and transportation infrastructure. Todd has also contributed to the authorization of Vermont Stream Alteration Permits in response to damaging flood events of Tropical Storm Irene in 2011 and flood events in subsequent years, and has provided technical assistance for in-channel activities for the State and Local road crews, consultants, contractors, private and public landowners. His technical assistance includes assessing the stability of Vermont’s rivers, overseeing the design and construction phases of river related projects and river restoration projects to improve flood resiliency in Vermont communities.
Medway Road
New Bridge
Rebuilt wider and higher after Irene
Vermont Route 4 Repaired Again Just Five Years After Irene
NEIWPCC 2017 webinar series for Stream & Wetland Buffers Workgroup

Vermont Rivers and Roads Training Program

Presented by: Todd Menees, P.E.
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Vermont’s Rivers and Roads Training

What’s in it for me?
Figure 5.2-3: Placed riprap wall typical detail. (Source: Dubois & King and Milone & MacBroom, Inc., 5/1/2014)
How did we get here?

Vermont’s Rivers and Roads Training
Irene 2\textsuperscript{nd} most costly and third large scale flood since 1973.

In 84 years since 1927 Flood a frequency of once every 14 years.

25 disastrous floods on this Vermont map from 1973-2011.

Irene Flood disaster areas of greatest damage has nearly equaled, equaled, or exceeded previous damages.
How did we get here?

2010 Law - Act 110 was a Big Deal!

1. Changed jurisdiction from 10 S.M. down to all perennial streams and Stream Alteration General Permit.

2. Established in statute state policy to manage rivers toward equilibrium (river corridor and equilibrium definitions added to statute.)
3/4 assessed reaches unstable 1/4 stable

DON’T DO THIS TO RIVERS AND ROADS!
How then did we get here?

3 More Laws After Irene

2012 - Act 138 - SRMPP, EPM, R&R Training.

2013 - Act 16 - Flood Resilience in Town Plans for inundation and erosion hazards.

2014 - Act 64 – FHARC includes state authority to regulate river corridors.
Rivers and Roads Training Program

Tier 1: Awareness
Tier 2: Develop Understanding and Skills
Tier 3: Design & Construction Oversight
Rivers and Roads Tier 2 Training

Classroom - River Flume Table - Field Trip

PowerPoint - Day Two - Stable and Exercises - Disaster Fix - Unstable
Rivers and Roads Tier 2 Training

1. The Program promotes community flood resiliency from “Irene Lessons Learned”.

2. Intended for a wide range of state, municipal and private sector transportation staff.

3. Gain knowledge and skills to distinguish between stable and unstable rivers, types of river instability, forecast a rivers response to alternative structural elements and design and build those treatments for more robust repairs to our roadway infrastructure.
Tier 2: Developing Understanding and Skills

Stable versus unstable rivers

Importance of aquatic habitat

Public safety, roads, money
DAY 1 General Topics

- Fluvial Morphology and River Equilibrium
- Channel Evolution Model and Adjustments
- Fish Habitat and Aquatic Organism Passage

Lab and Field exercises on How These Relate to our flood recovery efforts and my job?
DAY 2 General Topics

- Standard River Principles and Practices
- Understanding Flood Recovery Efforts
- Working Outside of Road/Highway R.O.W.

Lab and Field exercises on How These Relate to our flood recovery efforts and my job?
River Equilibrium

Much of our river instability is a result of our historic flood responses!
A Step-Wise Procedure for Building River Stability into Road Repair and Construction Projects

It is critical to understand the scale and type of river instability that caused the site damages that you see. Whether confronted with acute flood damages or chronic river and road instability, use the following steps to understand the instability of the river and how to rebuild the road in a manner that maximizes river and road stability.

1. Determine the expected river morphology using available information including:
   - Valley and River Types (use topographic maps)
   - Hydrologic and Sediment Regime Impacts (use online aerial photography)
   - Drainage Area (use USGS Stream Stats)
   - Channel Dimensions (use VT Channel Dimensions Table)

2. Determine the existing morphology: Make the following observations and measurements.
   - Observations
     - Bed Morphology
     - Planform and Deposition Patterns
     - Bed Erosion
     - Bank Erosion
     - Stabilizing Features
   - Measurements
     - Bankfull Stage
     - Bankfull Dimensions
     - Entrenchment
     - Incision

3. Understand the instability: Compare the existing morphology to the expected morphology to determine the type, scale and cause of channel adjustments.

4. Design the restoration: Use your understanding of the expected condition, channel evolution and standard river management practices to restore infrastructure while returning the river to a configuration that is as close to the equilibrium condition as possible.
Biological Consequences of Stream Crossings

- Loss of aquatic habitat
- Altered habitat above and below
- Barrier to movement
Box Culvert Embedment for AOP

- Open Hydraulic Waterway
- Excavated Stream Bed Sediments
- Concrete Sediment Retention Sills
- Sediment Retention Bins Below Sills
Box Culvert Embedment for AOP

- Open Hydraulic Waterway
- Excavated Stream Bed Sediments
- Concrete Sediment Retention Sills
- Rip-Rap Retention Bins Below Sills
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Rock Weir Construction Upstream
Rock Weir Construction Downstream
WHY DO I CARE?

Riparian Vegetation

Channel Dimensions

Nature Looks Messy

I Love Streams & Rivers!
Tell me and I’ll forget -

Show me and I’ll remember the River!

Vermont’s Rivers and Roads Training
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Video

Vermont PBS Outdoor Journal
Rivers and Roads

Please make sure your computer audio is on
Questions?

Contact Todd: Todd.Menees@Vermont.gov
Thank you

Next Webinar

September 15, 2017
Featuring John Echeverria, Vermont Law School
How takings complaints can effect buffer jurisdiction and the potential pushback from a legal perspective

Missed an episode?
Visit: neiwpcc.org/wetlands/webinars

Questions and Comments?
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