Watershed Scale Crossing Assessment to Promote Community Restoration Priorities

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ARSCAP Team

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Presentation Overview

- Modeling AOP, Geomorphic Compatibility & Hydraulics Results
- Community Workshops
- ➤ Next Steps

Why Here?

NH WIId Brook Trout Distribution (1983-2016)
Wild Brook Trout Documented (n=1994)
Wild Brook Trout Not Found (n=2958)

Completed Assessments

o Eastern Brook Trout Joint Venture
o Natural Resource Inventories
o Clean Water Healthy Trout

- Designated River-NHDES
- High need (N=781)and logical next step
- Many partners

Ammonoosuc Watershed



16 Towns 741 Stream Crossings

Stream Crossing Assessments



- Worked with state agencies More focused restoration efforts
- Data Collection AOP, Geomorphic Compatibility, Hydraulic Capacity
- Fish and other aquatics are good for road integrity—<u>Transportation for All</u>





Aquatic Organism Passage







www.factzoo.com





Wildlife Action Plan

~50% Greatest Conservation Need fish spp. utilize river/stream corridors

- Alewife
- American Brook Lamprey
- American Eel
- American Shad
- Blueback Herring
- Brook Trout
- Rainbow Smelt
- Sea Lamprey



High Quality Habitat

Water Quality

Large Wood

Riparian Vegetation

Thermal Refuge

Deep Pools

Structure Diversity

Spawning Grounds

Gravel Substrate

In-Stream Vegetation

Water Velocity



Features of a Good Stream Crossing

- Natural streambed composition
- No change in flow rate and depth (US=DS)
- Properly sized to handle most flows





- Lower short term maintenance, lower community cost
- Increased public safety
- Increased streambank stability and spp sustainability





Ammonoosuc River Watershed Aquatic Organism Passage Results



Thank you PSU student Andrea Lamper March 2017





PSU student Andrea Lamper March 2017



Infrastructure Vulnerability

Stream Works – TU Culvert Model V. 1

Uses crossing characteristics and flow estimates to predict the resilience of a crossing at 2, 10, 25, 50, and 100-year flow events

B_CUBK_03MB_CUB

L06 BPR_02 M MB_MB_MBPR_08 MB_N MB_MBPR_12 Culvert condition For a 10, 25, 50 and 100-year storm events

- Middle Branch
 Culvert location
- Guiventiocation

Hydraulic Model Results:

Ammonoosuc River Watershed 2-Year Flood Impact

Ammonoosuc River Watershed 100-Year Flood Impact



Community Engagement

- Community Champions = 350+ hours!
- Youth Service Learning (64 students)
- Stewardship Ethic
- Successful, Stable Infrastructure and Healthy Habitat





From Data to Action

	GEOMORPHIC_COMPATIBILITY	AOP_STATUS	2 YR	10 YR	25 YR	50 YR	100				
Ì	Mostly Compatible	Reduced AOP	Р	F	F	F	F	A. A. COMPLEX	Printer Color	NAME	
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1	Partially Compatible	No AOP including adult salmonids	Т	F	F	F	F 2000 ///				
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j	Fully Compatible	Reduced AOP	Р	Р	Т	F	F	and the state			
3	No GC Screen for bridges/arches	No AOP score for bridges/arches	Р	Р	Р	Р	P				
)	Mostly Incompatible	Reduced AOP	Р	F	F	F	F				
5	Fully Compatible	No AOP including adult salmonids	Р	Р	Т	Т	F			-	
3	Fully Compatible	No AOP including adult salmonids	Р	Р	Р	Р	P	1. 32	N.		
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Community Workshops



Challenges

- * Limited capacity
- Long process
- Competing needs
- * Misperceptions
- Long-term investment
- Need more champion recruits
- Systems thinking

Design

- Participatory
- Interpret data
- Identify actions and individuals
- Demystify process
- Foster collective action
- * Connect with resources



Opportunities

- Lessons learned are transferable
- * Replicable
- * Build on momentum
- Resources are available
- * Collaboration

Community Workshops

Ge

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Data Interpretation:

- Basic stream and river function
- Results from 2016 Ammonoosuc River Stream Crossing Assessment Project Report
- Prioritize and identify potential restoration sites

The focus will be to enable participants to understand model variables and results of the assessment, evaluate vulnerable town infrastructure, and prioritize to initiate restoration projects.

eomorphic	AOP	Other					
mber of culverts	Culvert outlet invert type	Crossing type					
ostream dimensions	Outlet drop (ft)	Material					
stream bankfull width	Downstream pool present	Condition					
gle of stream flow approaching	Downstream pool	Water depth					
	entrance depth						
llvert slope compared with	Water depth in culvert at	Upstream					
annel slope	outlet (ft)	waterbody					
stream bed deposition	Number of culverts at	Dan					
	crossing						
stream deposits taller than 0.5 👘	Structure	er ap					
nkfull height	pa ammonoosuc Riv	oject (ARSCAL)					
eeper Segment within 1/3 mile	SC Anna Assessment						
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wnstream bank heights are							
nificantly taller than upstream							
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ostream bank erosion	Marte						
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Long-Term Restoration Strategy

Stream Crossing Assessment Project

Embrace a Stream

UPPER CONNECTICUT RIVER

HON CAN VE THE P YOU? I WHAT WE HE UP TO

REEN INFRASTRUCTURE PROJECTS

ITIGATION AND ENHANCEMENT Connectivity of Streams & Wetland





Develop strategies that avoid Upper Connecticut Mitigation and Enhancement unnecessary expenses

 Benefits w/ pre-planning and proactive restorations

Project financing, grants and mitigation

Develop "working groups"

Presentations from engineers, state permit agents, and potential funding agencies

Outcome:

Slide Brook Culvert Restoration ~ May 2010



Pre-replacement – looking upstream ~ 2006

Post-replacement – looking upstream ~ 2010

Working with towns to prioritize road crossings that are important for all users.

A Balanced "Ecosystem" Reduces Vulnerability!

- Increase habitat connectivity
- Improve habitat quality and flood resilience
- Support species diversity & productivity













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