

Building town capacity for improving road-stream crossings in Massachusetts

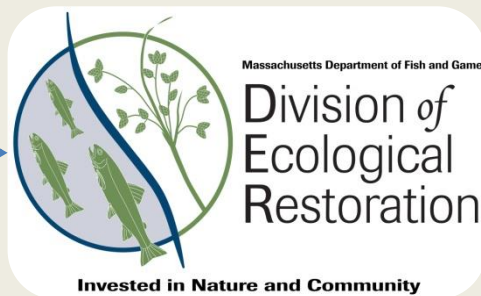
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Stream Continuity Program

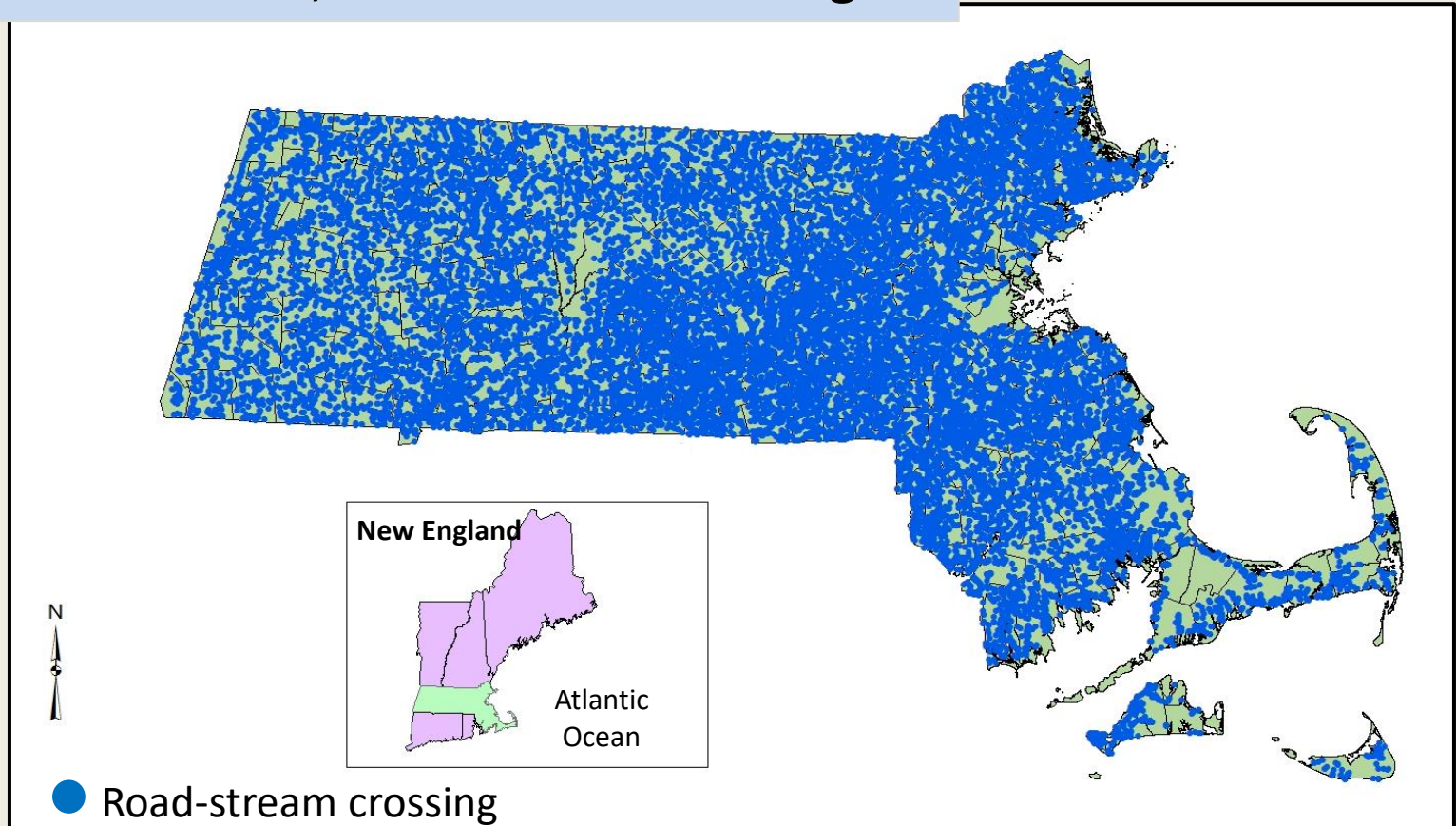
Est. 2014

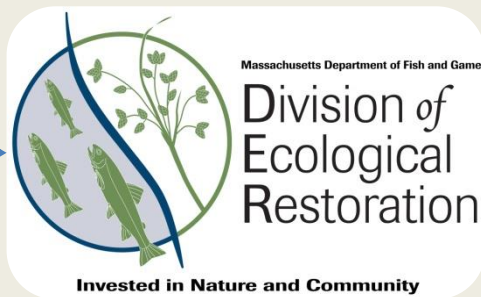


Westfield Brook – Windsor, MA (DER)

Massachusetts Situation

- 351 Municipalities
- 30,000 culverts
- 30,000 miles of roads
- Mostly town owned, maintained & managed.





Stream Continuity Program

Est. 2014



Program Goal

**Increase the State-
wide capacity for
culvert replacement**

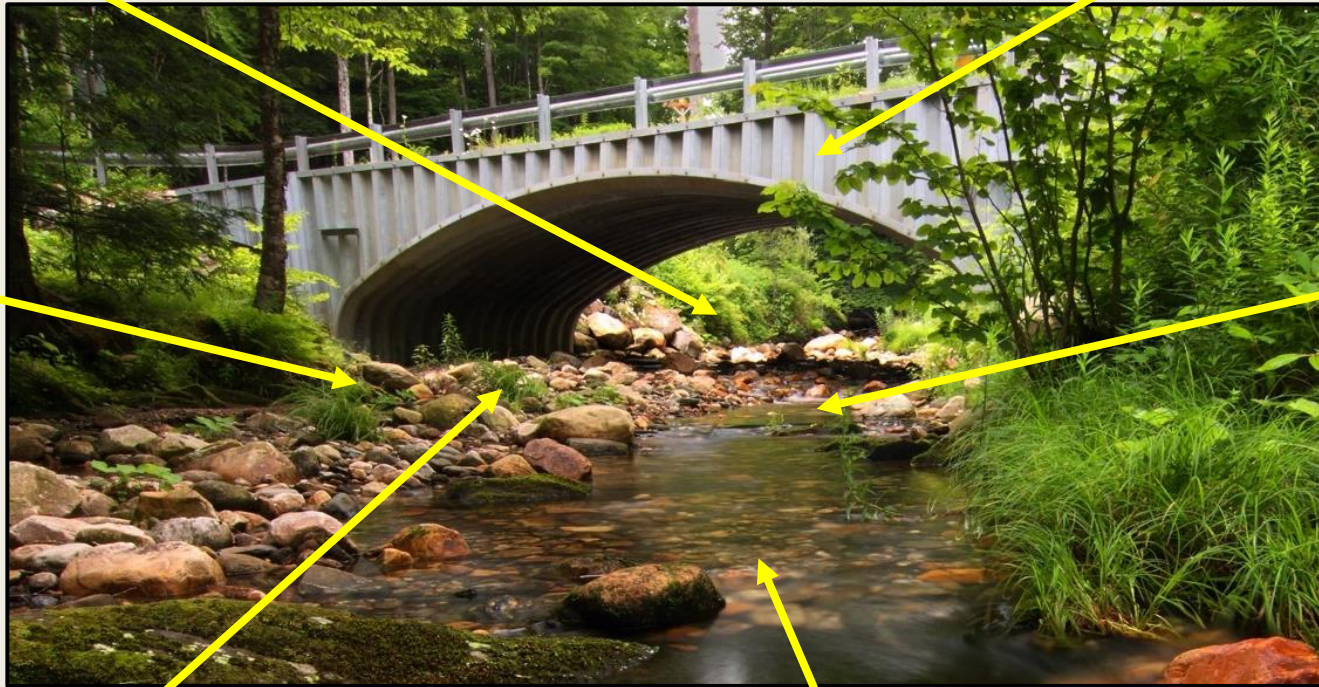
Westfield Brook – Windsor, MA (DER)

Massachusetts Stream Crossing Standards, 2011

0.82 Openness ratio

Large span, 1.2x bankfull width

Open arch



Natural
substrate

Paul Nguyen

Comparable depth and
velocity, up & downstream

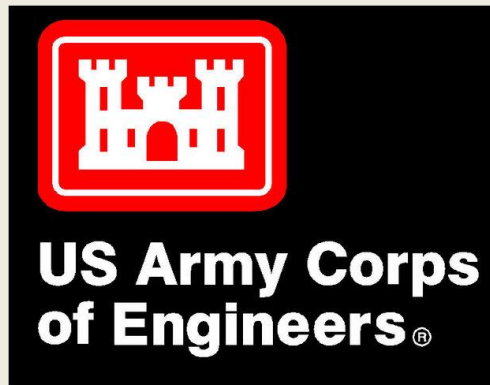
Banks, dry
passage

2 feet
Embedment

Massachusetts Situation

MA Stream Crossing Standards promulgated into regulations

- MA Wetland Protection Act – 2014
- MA Army Corp of Engineers – 2005



Problem

Increased hazard awareness

Regulatory requirements

Impacts to aquatic resources



IMPLEMENTATION



Few culvert projects have been completed that meet MA Standards.

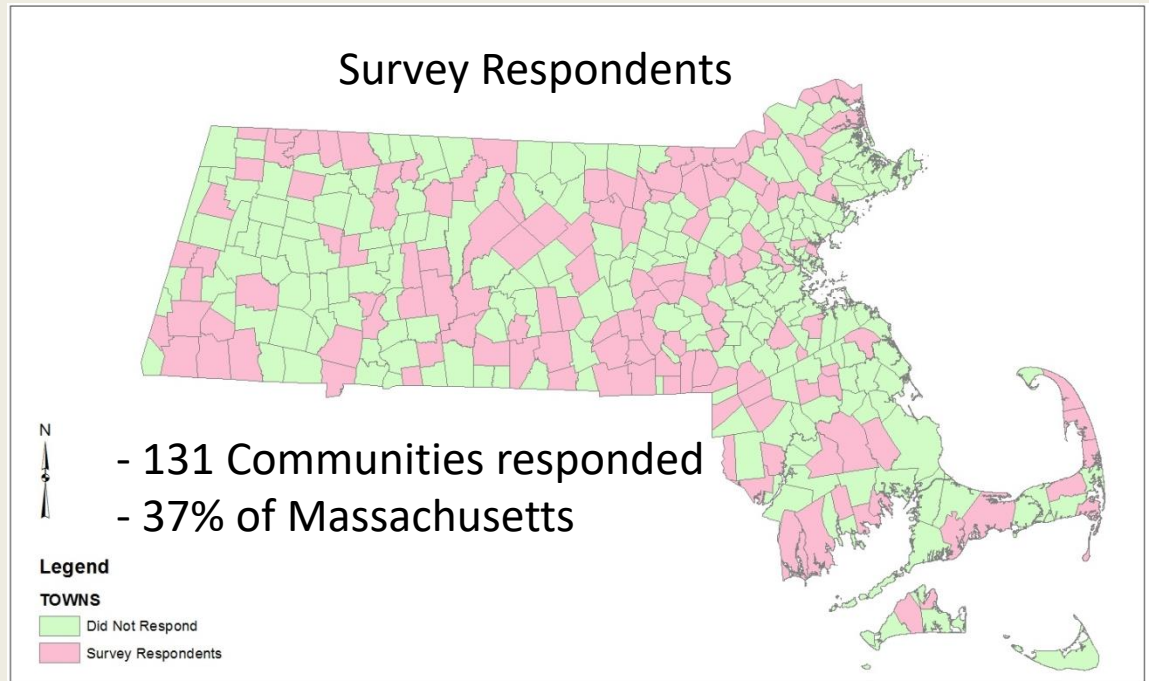
Identify the Barriers

Conducted a state-wide
needs assessment.

Status Quo &
Barriers to Implementation



Statewide Survey



Needs Assessment Summary

Primary Barriers to Implementation

- Cost (Construction and Design)
- State Engineering Review
- Environmental Permitting.

Needs Assessment Summary

Primary Barriers to Implementation

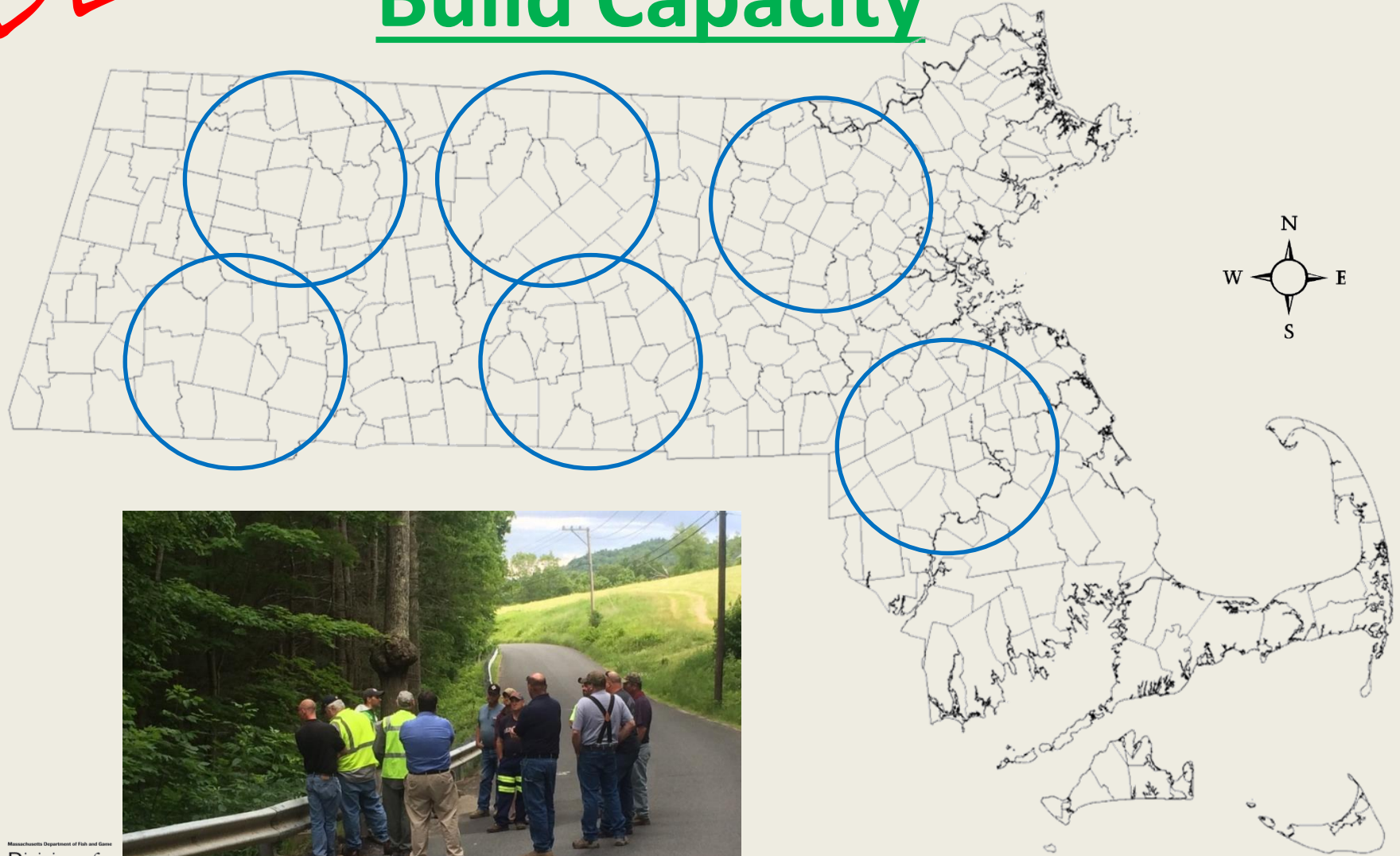
- Cost (Construction and Design)
- State Engineering Review
- Environmental Permitting



PROCESS

IDEA

Use Training Sites to Build Capacity

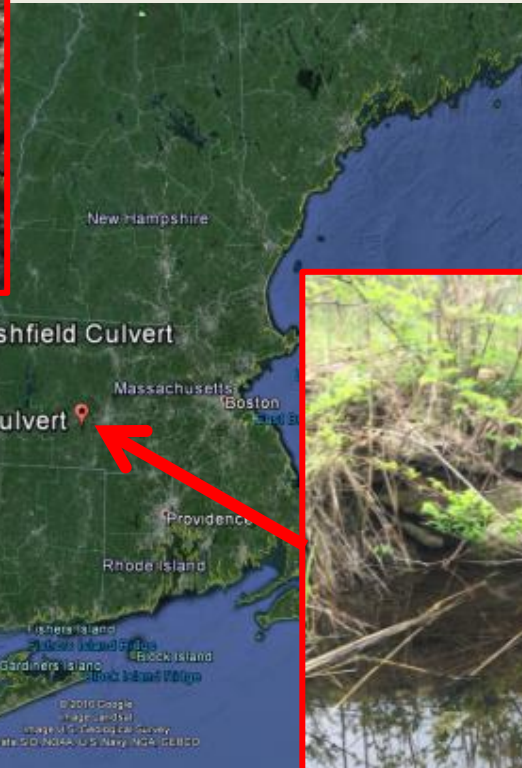


IDEA

Use Training Sites to Build Capacity



Ashfield



Spencer



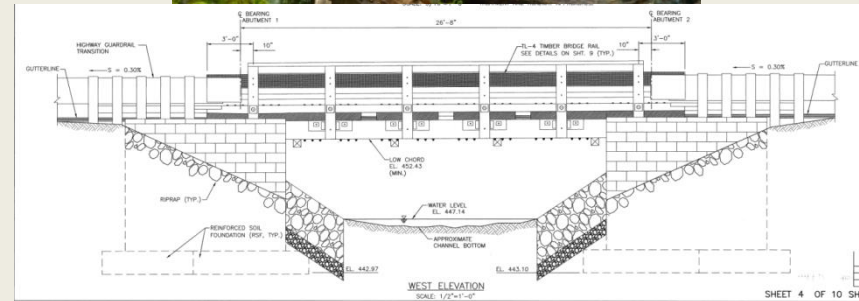
Use Training Sites to Build Capacity

3 Phases of The Project Process

1) Site/River Assessment



2) Design & Permitting



3) Construction



Phase 1 Training Site/River Assessment



Phase 1 Training:

Site/River Assessment



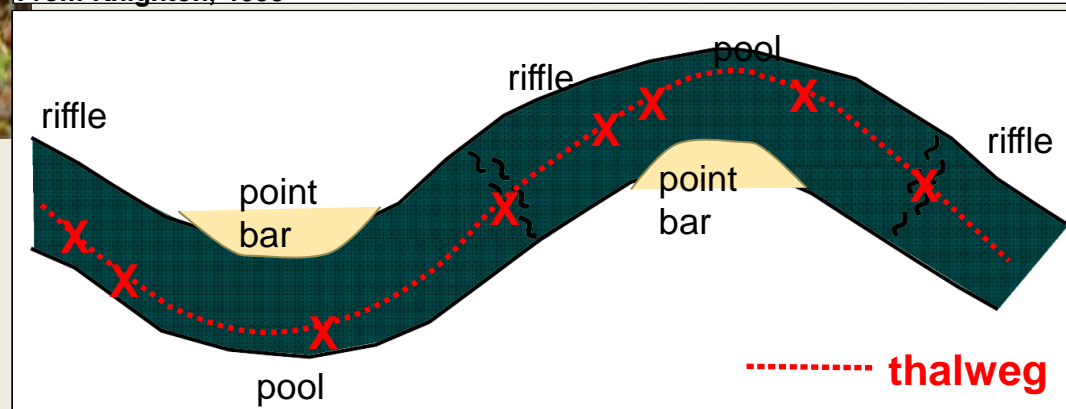
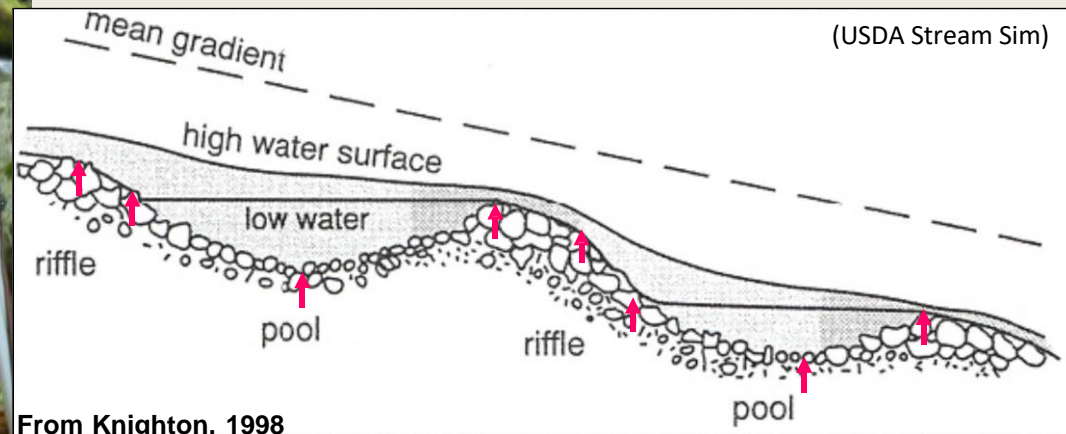
TEST BORING LOG							SHEET 2																
Soil Exploration Corp. Geotechnical Drilling Groundwater Monitor Well 148 Pioneer Drive Leominster, MA 01453 978 840-0391				Comprehensive Environmental Site: Culvert Clark Road Spencer, MA		BORING B-2 PROJECT NO. 16-0508 DATE: May 6, 2016																	
Ground Elevation: Date Started: May 5, 2016 Date Finished: May 5, 2016 Driller: GG				GROUNDWATER OBSERVATIONS <table border="1"> <thead> <tr> <th>DATE</th> <th>DEPTH</th> <th>CASING</th> <th>STABILIZATION</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table>				DATE	DEPTH	CASING	STABILIZATION												
DATE	DEPTH	CASING	STABILIZATION																				
Soil Engineer/Geologist:				Visual Identification of Soil and / or Rock Sample																			
Depth Ft.	Casing In/ft	No.	Profile	Sample Depth	Blows/6"	Strata																	
1		1	13"	6"-2'6"	6-10-12-14	6"	Asphalt.																
5		2	3" 10"	5'0"-5'6" 5'6"-7'0"	4 5-6-6	4'0" 5'6"	Medium dense, dry, fine to coarse sand and gravel, trace silt.																
10		3	10"	10'0"-12'0"	7-18-18-18	9'0"	Soft, wet organics, peat																
15		4	13"	15'0"-17'0"	9-34-17-17		Medium dense, wet, fine to medium sand and silt.																
20		5	13"	20'0"-21'4"	40-55-60/4"		Dense to very dense, wet, fine to coarse sand and gravel, cobbles, some inorganic silt.																
25		6	0	22'0"-22'1"	50/1"	22'6"	End of boring at 22'6". Refusal with augers. Water encountered at 4'0" upon completion.																
30																							
35																							
39																							
Notes: Hollow Stem Auger Size - 4 1/4"																							
Cohesionless: 0 - 4 V. Loose, 4 - 10 Loose, 10 - 30 M Dense, 30 - 50 Dense, 50+ V Dense. Cohesive: 0 - 2 V Soft, 2 - 4 Soft, 4 - 8 M Stiff, 8 - 15 Stiff, 15 - 30 V. Stiff, 30+ Hard.					Trace 0 to 10% Little 10 to 20% Some 20 to 35% And 35% to 50%		ID SIZE (IN) HAMMER WGT (LB) HAMMER FALL (IN)																
							CASING	SAMPLE															
								SS															
								140 lb.															
								30"															
							CORE TYPE																

Phase 1 Training: Site/River Assessment



(Photo - Dave Nyman)

Where to Survey

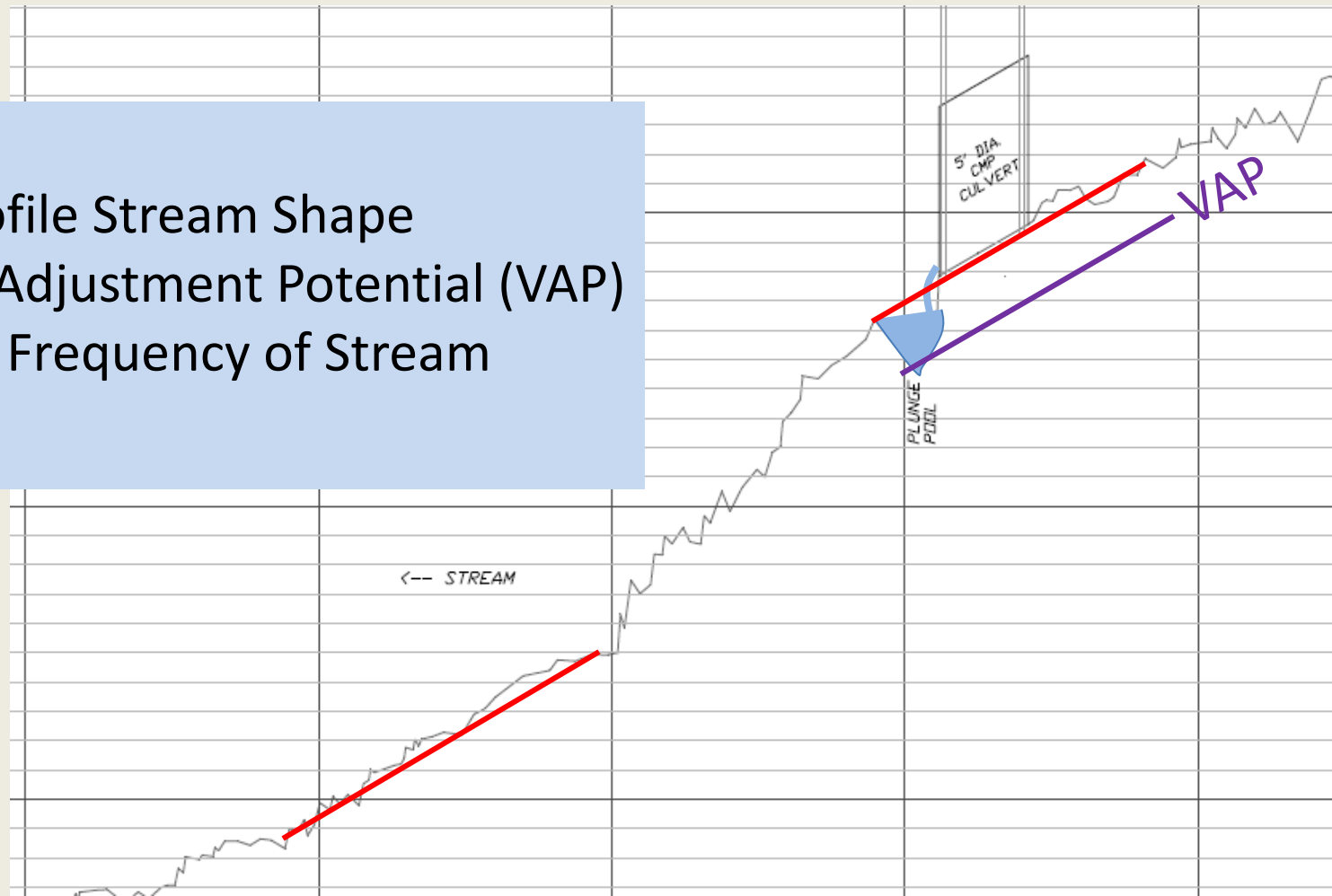


Phase 1 Training: Site/River Assessment

Long Profile and What its used for.

- Importance

- Long Profile Stream Shape
- Vertical Adjustment Potential (VAP)
- Size and Frequency of Stream Features



Phase 1 Training: Site/River Assessment



(Photo - Dave Nyman)

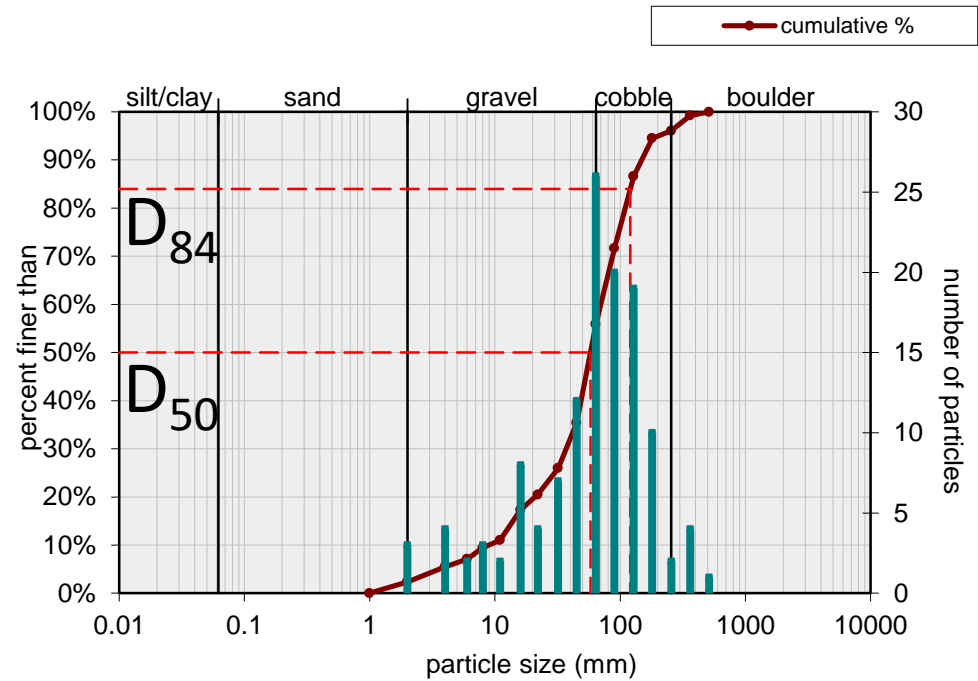
OSU Streamvebs
Student Stewardship Network
PEBBLE COUNT

Name: _____
School: _____
Date: _____
Stream/Trill Name: _____
Visitor: _____

Pebble counts are an important component of analyzing stream characteristics. The distribution of sediment material on the streambed can inform you about a variety of different stream functions and hydrologic conditions, including erosion potential, woody debris, and aquatic species habitat.

Material	Size (mm)	Count
all fines	< 0.075	
clay	0.002 - 0.004	
very fine sand	0.062 - 0.125	
fine sand	0.125 - 0.25	
medium sand	0.25 - 0.5	
coarse sand	0.5 - 1	
very coarse sand	1 - 2	
very fine gravel	2 - 4	
fine gravel	4 - 6	
medium gravel	6 - 11	
coarse gravel	11 - 16	
very coarse gravel	16 - 25	
small cobble	25 - 37	
medium cobble	37 - 63	
large cobble	63 - 125	
very large cobble	125 - 250	
small boulder	250 - 360	
medium boulder	360 - 610	
large boulder	610 - 1024	

Surface Pebble Count, Trib to Bear Creek- Ashfield, MA



Phase 1 Training

Site/River Assessment

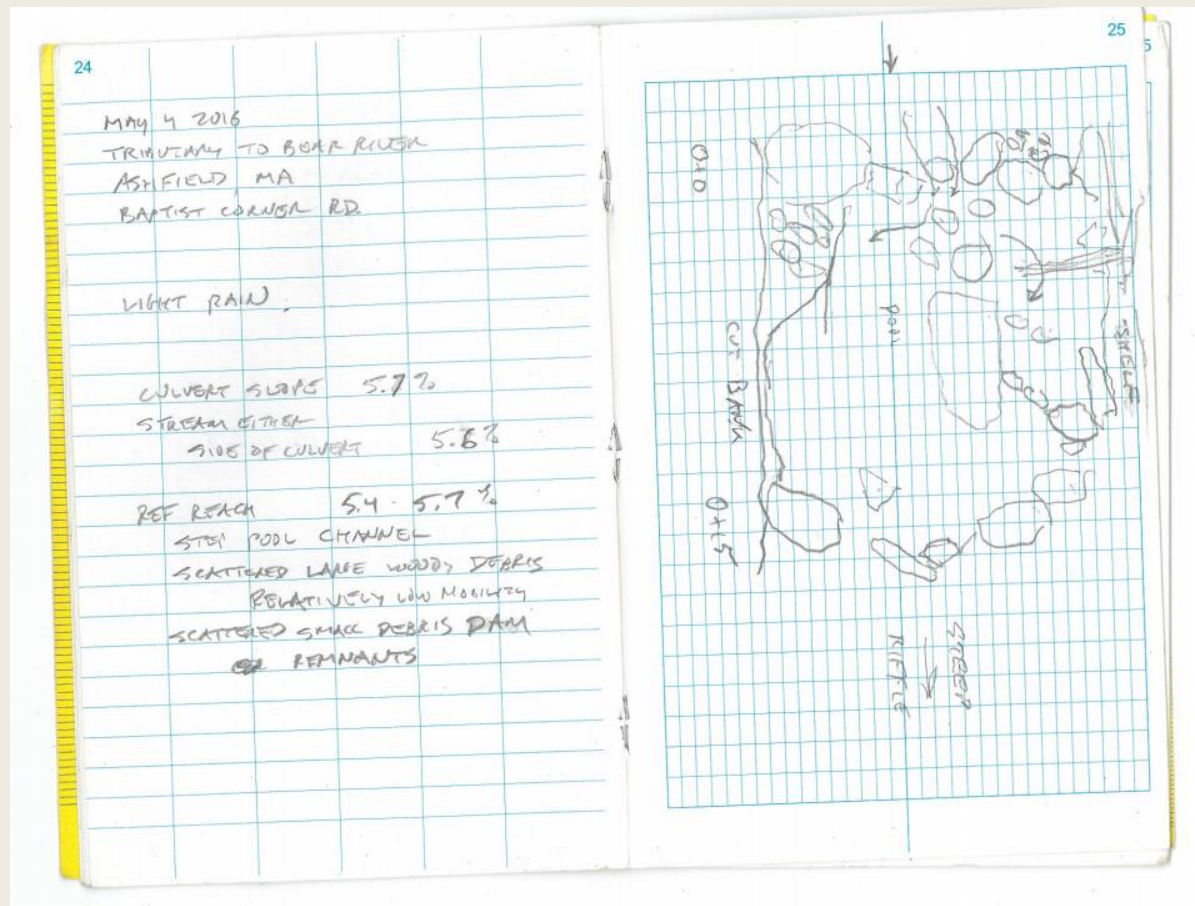
(USDA Stream Sim)

(USDA Stream Sim)



Phase 1 Training: Site/River Assessment

Good field notes

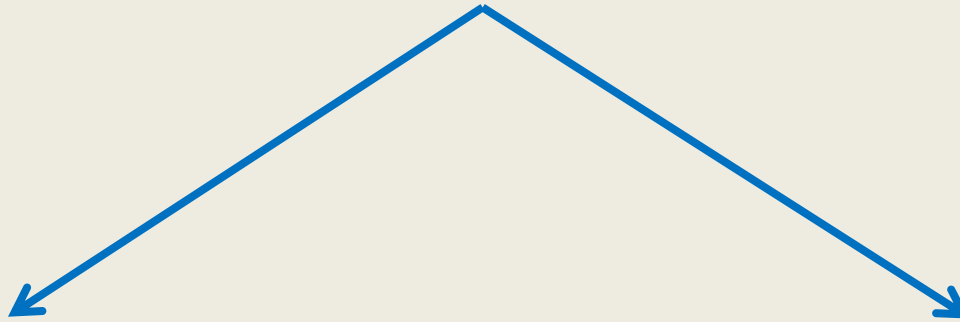


Phase 1 Training: Site/River Assessment

Getting into the River



Phase 1 –Site/River Assessment Tools



Examples and
Templates

Structure
Selection
Evaluation

Phase 1 - Site/River Assessment

1) Examples and Templates

Bid Request

[Click here to enter Project Name](#)

[Click here to enter your town, **MA**](#)

TO: [Click to enter Bidder's name](#)

FROM: [Click here to enter name.](#)

RE: Culvert Replacement Site Assessment Request for Proposals

DATE: [***Click here to enter a date.***](#)

The [Enter Department and Town](#) is requesting bids for technical services as described below under section III, Project Specifications for [Enter project name](#) in [Enter town name](#), MA.

This Bid Request presents a general proposed sequence of work with an expectation that responding firms will express their own project approaches. Bidders will be evaluated based upon their demonstrated experience with scientific river assessments and data collection and engineering culvert replacements that meet the MA River and Stream Crossing Standards, project examples, technical and management approach to this project, timeline for completed work, and cost effectiveness.

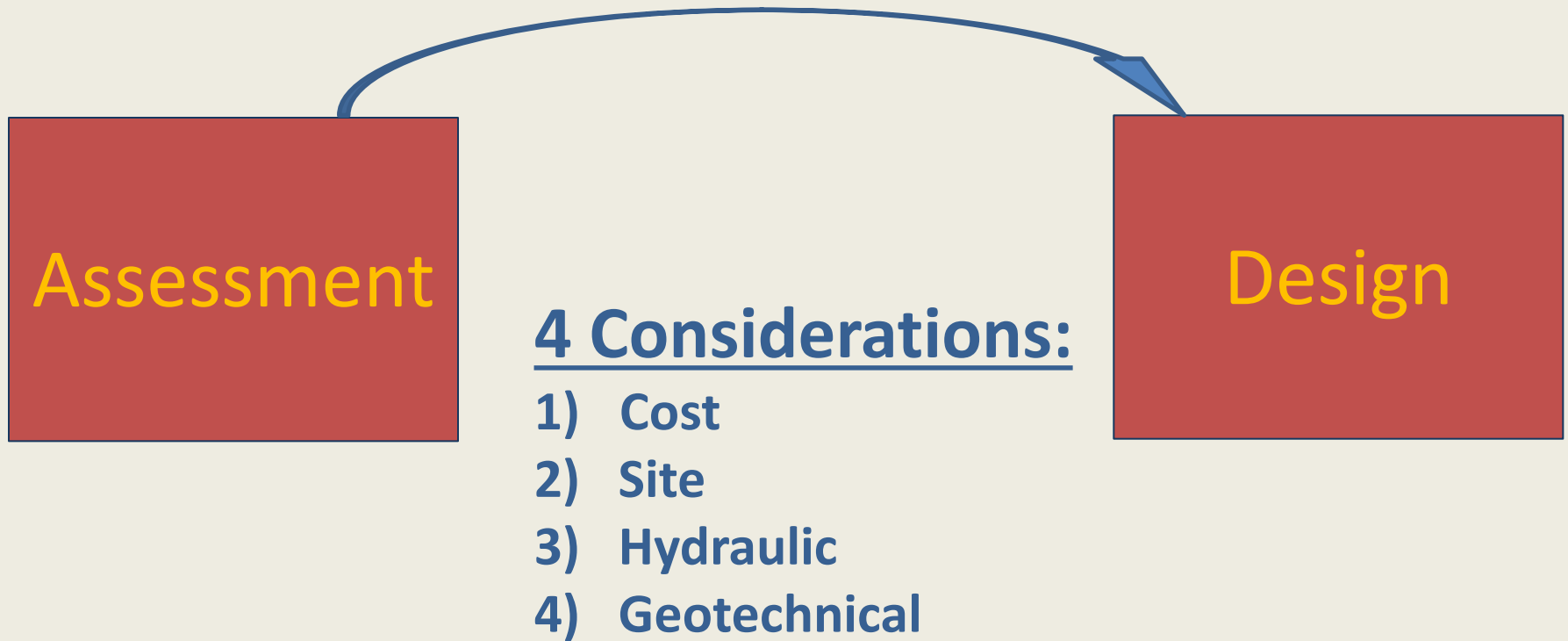
[Enter town name](#) anticipates execution of a contract in [Enter Month](#) of [Enter year](#) for services through [Enter end of contract date](#).

I. PROJECT LOCATION

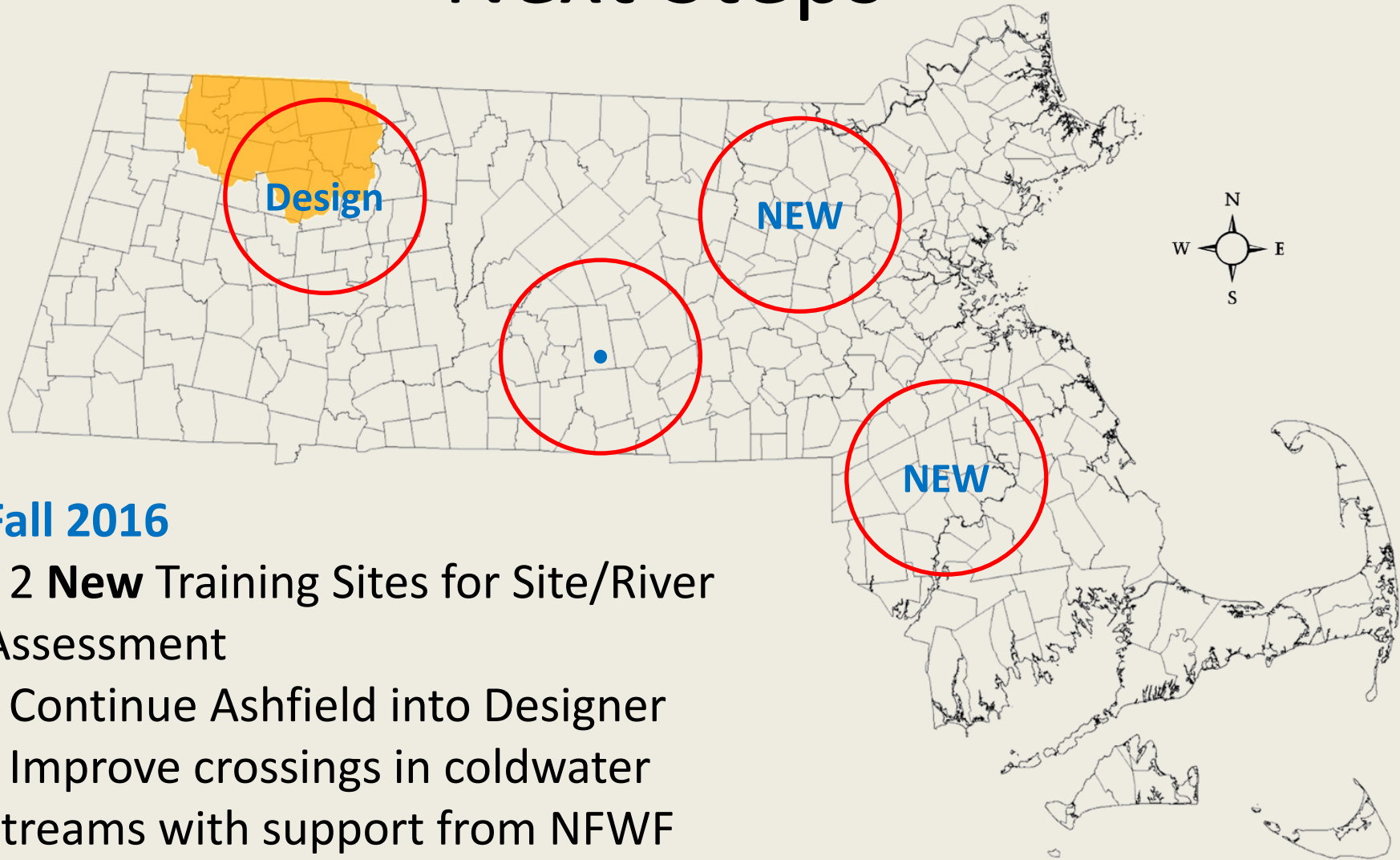
Site #	Location	Type of site	GPS Coordinate	Desired technical
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Phase 1 - Site/River Assessment

2) Structure Selection Evaluation



Next Steps



Fall 2016

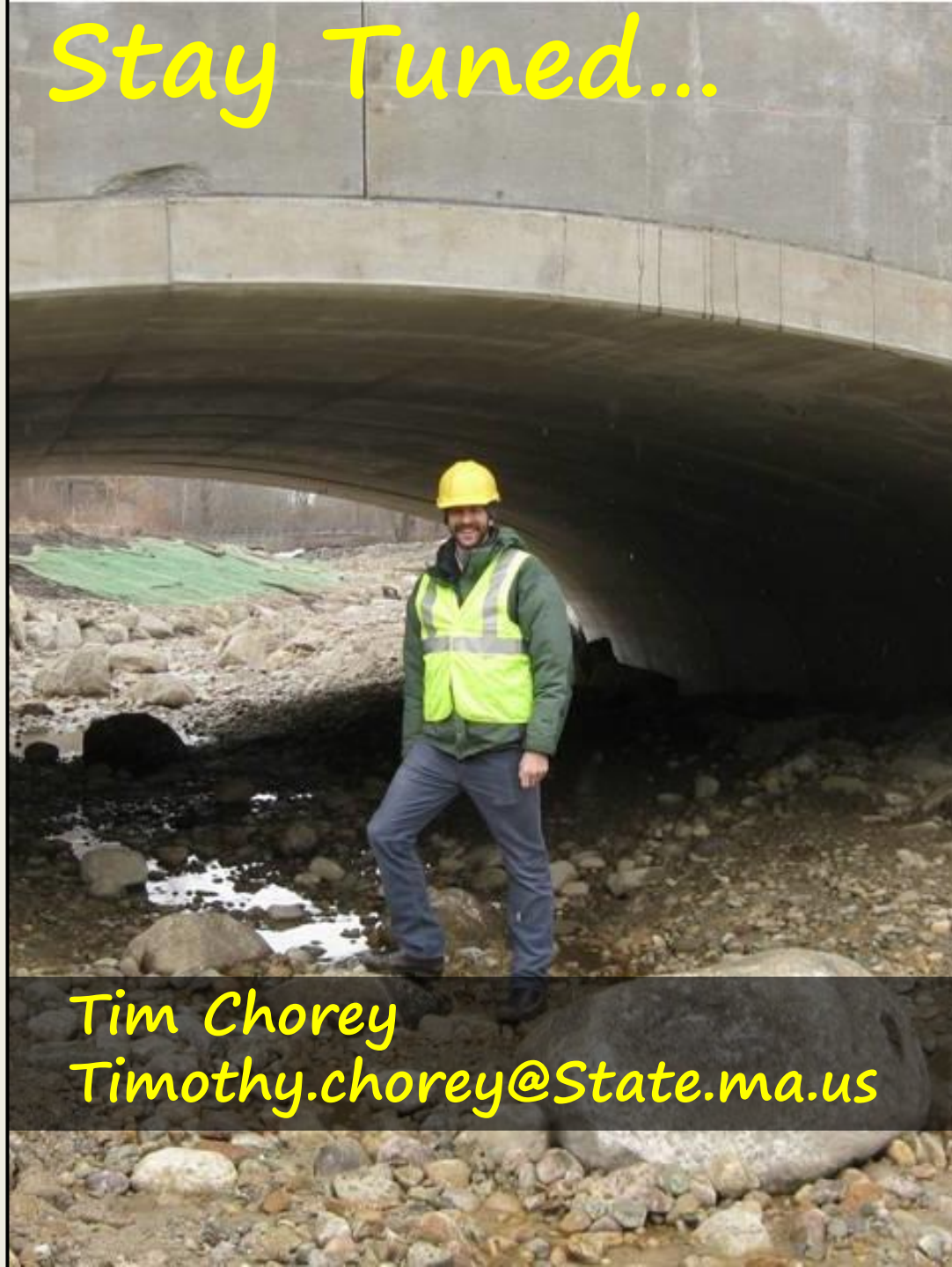
- 2 **New** Training Sites for Site/River Assessment
- Continue Ashfield into Designer
- Improve crossings in coldwater streams with support from NFWF

Lessons Learned

- **More Trainings are needed**
 - Local Highway Directors
- **Work Closely Surveyors**
- **Expect Stormwater Improvements**



Stay Tuned...



Tim Chorey
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