

Wood-Pawcatuck Watershed Flood Resiliency Management Plan

Project Steering Committee Meeting

May 21, 2015



Wood-Pawcatuck Watershed Association



Meeting Agenda

- 10:00 – 10:05 Welcome and Opening Remarks
- 10:05 – 10:15 Status Update on Work Completed to Date
- Baseline Assessment
 - Quality Assurance Project Plan
 - Field Work Planning
- 10:15 – 11:45 Field Assessment Methods and Geographic Priorities
- Bridge, Culvert, and Dam Assessment
 - Stream Geomorphic Assessment
 - Natural Resource Assessment
 - Green Infrastructure Assessment
- 11:45 – 12:00 Updated Schedule and Next Steps



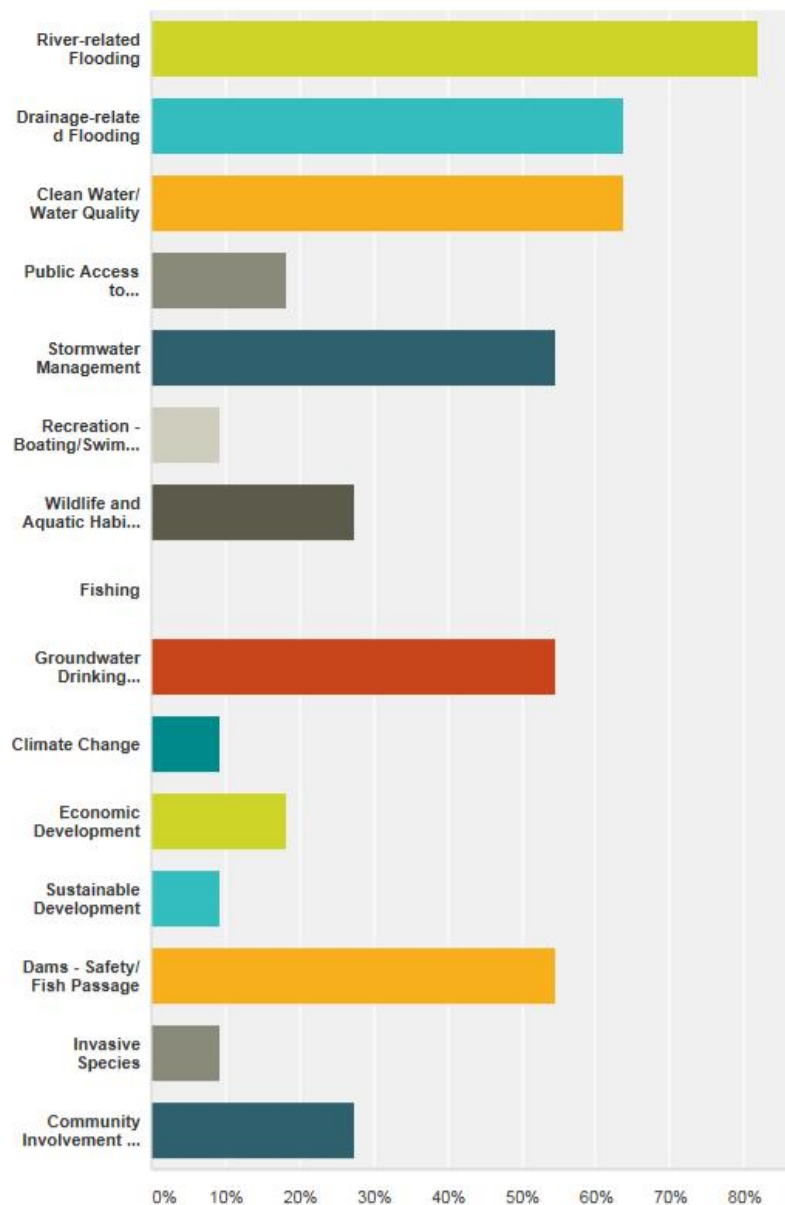
Work Completed – Baseline Assessment

- Compilation and review of existing studies and background documents
- Meetings and coordination with RIDEM and watershed towns
- Watershed resource mapping
- Watershed questionnaire



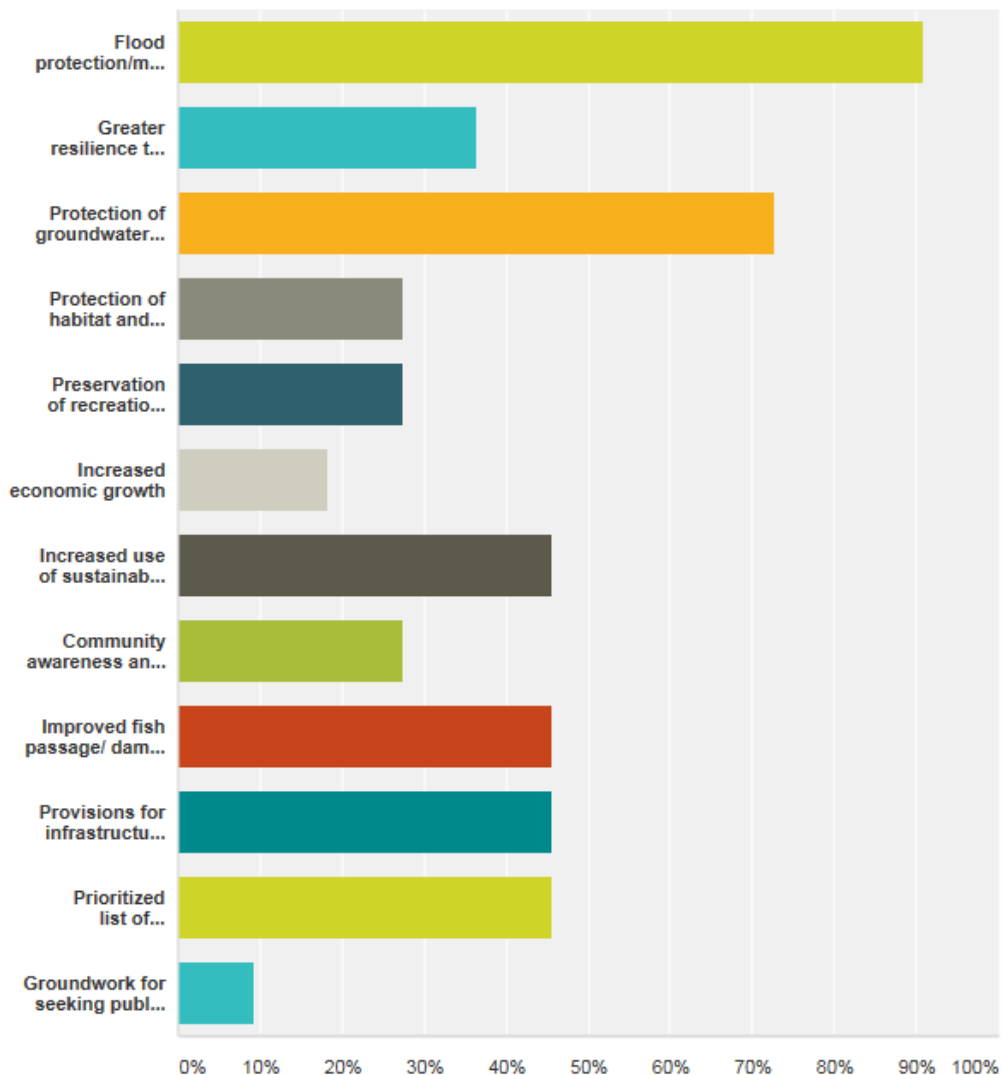
From the list below indicate your top five concerns/issues/priorities regarding the Wood-Pawcatuck Watershed.

Answered: 11 Skipped: 2



What would you most like to see as outcomes of the Wood-Pawcatuck Watershed Flood Resiliency planning effort? Select your top five from the list below.

Answered: 11 Skipped: 2

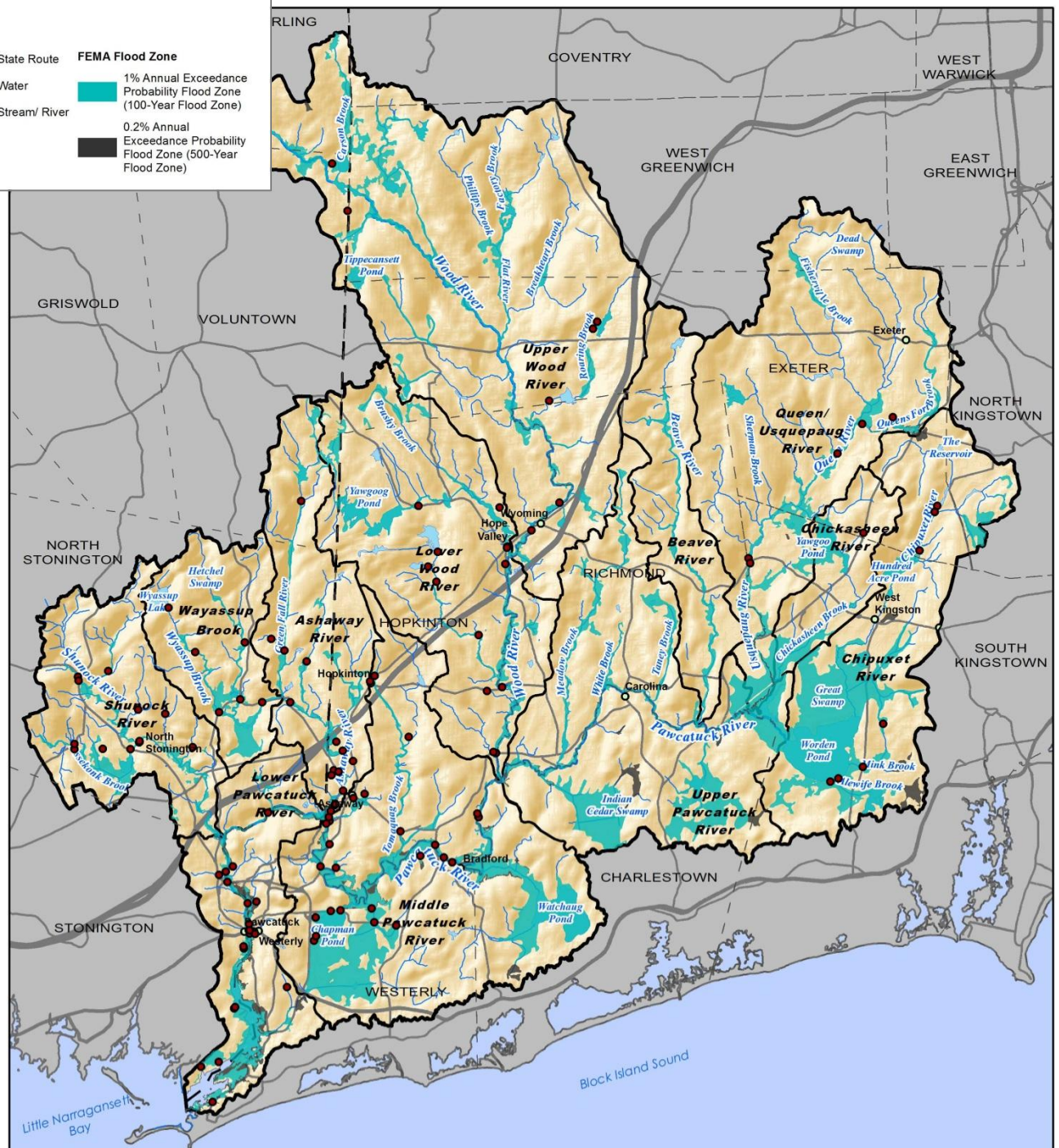
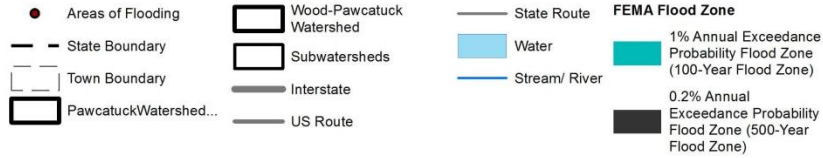


Work Completed – Baseline Assessment

- Identification of known/documented areas of flooding (see handout)
 - Hazard Mitigation Plans (missing Charlestown, RI)
 - Comprehensive Plans
 - FEMA Flood Insurance Studies
 - Watershed Questionnaire
- Please review handout and provide any additional problem areas



Legend



Work Completed – Baseline Assessment

- Baseline Assessment Report outline (see handout)
 - Consistent with “Watershed Plan” outline suggested by RIDEM
 - Comments from Steering Committee members welcome



Work Completed – Field Work Planning

- Quality Assurance Project Plan (QAPP)
- Private Property Notification
- Summer Interns - URI Coastal Program
 - Zack Valerio
 - Nate Lukas
- Field Assessment Methods and Geographic Priorities Technical Memorandum



Wood-Pawcatuck Watershed Association

203 Arcadia Road, Hope Valley, RI 02832; 401-539-9017; info@wpwa.org; www.wpwa.org

April 10, 2015

Dear Landowner:

The Wood-Pawcatuck Watershed Association (WPWA) is developing a flood resiliency management plan for the Pawcatuck and Wood Rivers and their watershed (otherwise known as the "Wood-Pawcatuck Watershed"). The project's objectives are to (1) assess the vulnerability of the watershed to the growing risks from flooding, erosion, and associated storm-related threats and (2) to develop a comprehensive, watershed-based management plan that will protect and enhance the resiliency of the watershed communities to future flood damages and improve river and stream ecosystems.

Your property is in the area where we will be conducting field assessments. This letter is to notify you that the proposed field work will generally be conducted between 8:00 a.m. and 6:00 p.m., Monday through Friday, between May and September 2015. Field crews will conduct as much of the assessments as possible from within the stream corridor, on public property, and within the public right-of-way. Field personnel will make every effort to avoid private property.

The following types of field investigations are planned:

- Stream Geomorphic Assessment – field measurement of stream channel characteristics along the Wood and Pawcatuck Rivers and major tributaries
- Bridge, Culvert and Dam Assessment – field inspection and measurement of selected bridges, culverts, and dams in the watershed
- Natural Resource Assessment – field assessment of selected wetlands throughout the watershed
- Green Infrastructure Assessment – field assessment of developed areas (parking lots, roads, and other impervious surfaces) of the watershed for potential stormwater retrofit opportunities

The results of the field assessments will be described in a Wood-Pawcatuck Watershed Flood Resiliency Management Plan being prepared on behalf of WPWA. The report will be released for public input in 2016. State and town agencies in the watershed will be able to utilize this plan to develop more flood resilient communities.

If you have any questions, please contact me at 401.539.9017 or at denisep@wpwa.org; or Erik Mas, P.E. of Fuss & O'Neill, Inc. at 800.286.2469 or at emas@fando.com.

Thank you for your assistance.

Sincerely,

Denise Poyer
Program Director
Wood-Pawcatuck Watershed Association

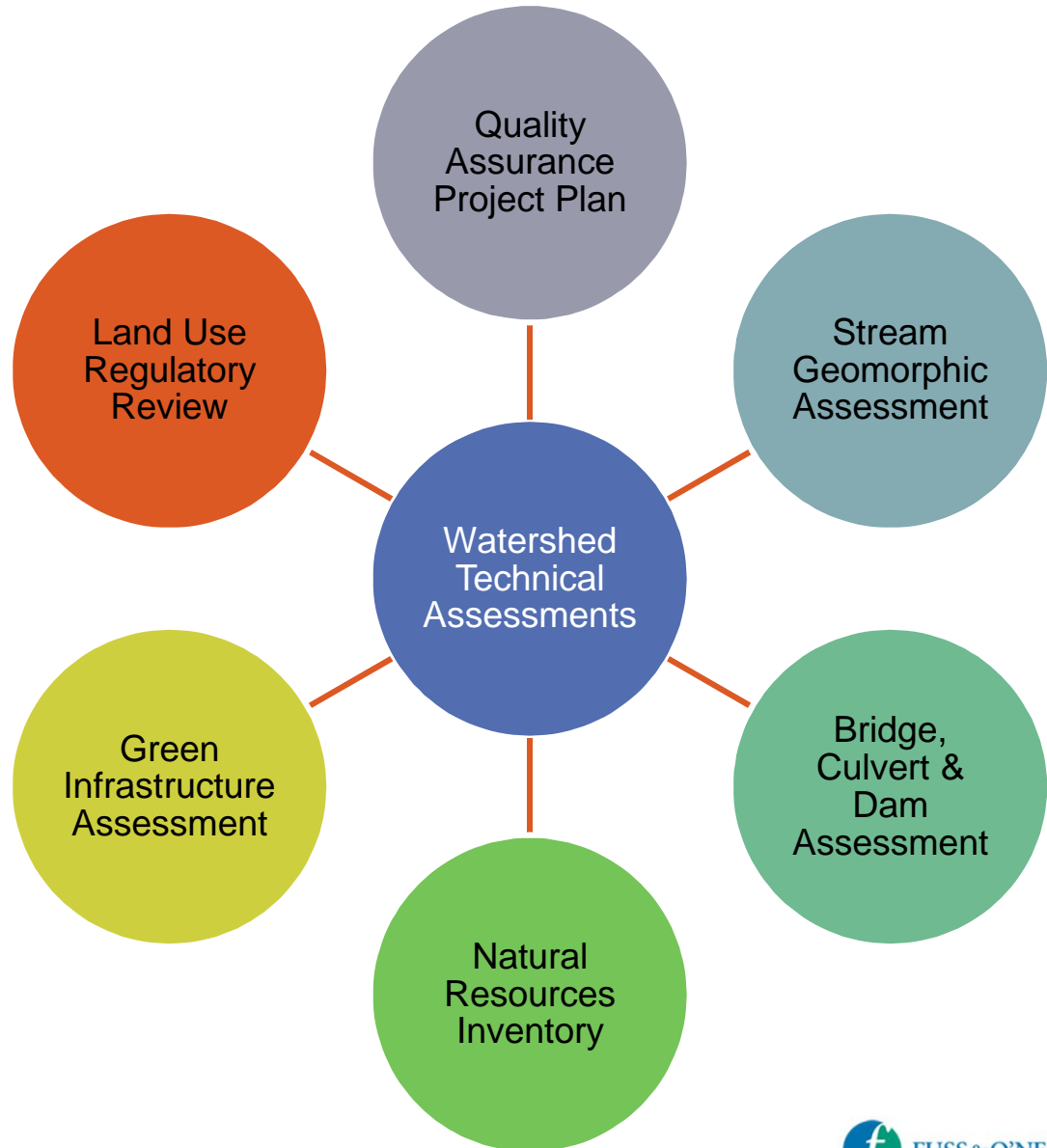
"To preserve and protect the lands and waters of the Wood-Pawcatuck watershed for natural and human communities"



Watershed Technical Assessments

Purpose:

Evaluate current conditions and opportunities for restoration and protection projects that will enhance flood resiliency



Assessment Methods & Priorities

- Technical Memorandum Dated May 7, 2015
Distributed to Steering Committee by WPWA
- Outlines assessment methods and data sources
 - Desktop and Field Evaluations
- Proposed geographic priorities
 - Bridge, Culvert, and Dam Assessment
 - Stream Geomorphic Assessment



Bridge, Culvert & Dam Assessment

- Assessment of hydraulic structures in the watershed
- Bridges and Culverts
 - Conveyance capacity and flooding/erosion potential
 - Aquatic connectivity
 - Build on work by USGS, FEMA, USACE, and RI RC&D
- Dams
 - Flood/erosion damage potential due to breach or failure
 - Dam removal and fish passage feasibility



Arcadia Road Bridge, Wood River, March 2010



Blue Pond Dam Breach, Rockville, RI, March 2010



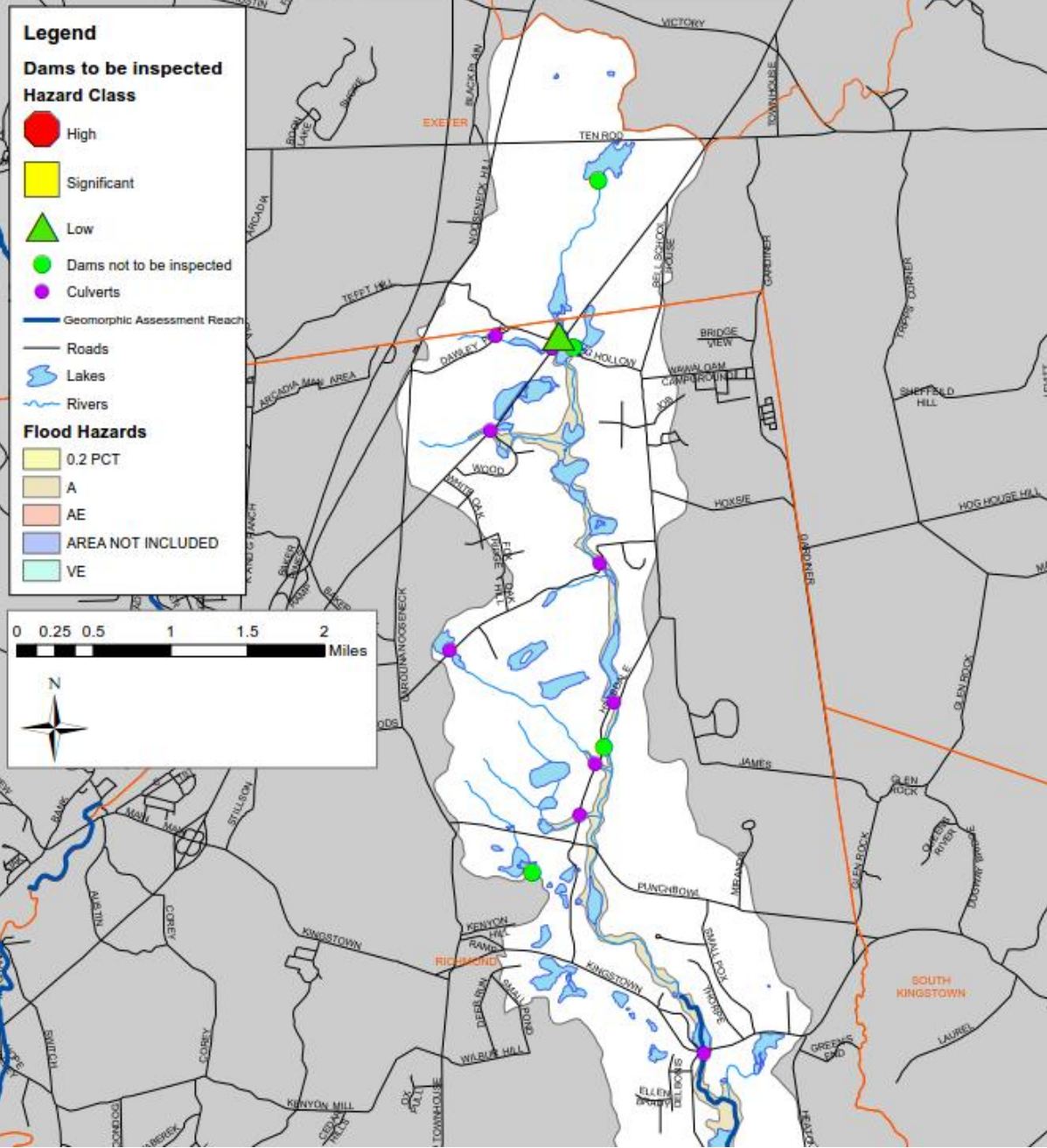
Bridge, Culvert & Dam Assessment

Bridges and Culverts

- Locations initially identified
 - Intersected roads, rails, and trails with mapped streams
 - Integrated RI Stream Continuity Project data
 - Approximately 550 structures in the watershed
- Goal is to inspect/assess all 550 structures (see map handouts)
- Structures will be prioritized by stream size and flood risk
 - Inspect high-priority structures before low-priority structures



Figure 2: Beaver River Watershed



Bridge, Culvert & Dam Assessment

Bridges and Culverts

■ Field inspections

- Site characteristics (e.g. aerial sketch, photos, GPS location, street name, road configuration, etc.)
- Deficiencies and condition of the structure
- Dimensions and slope of the structure to assess approximate hydraulic capacity
- Upstream and downstream geomorphic conditions

Appendix 2 Field data collection form, p. 3 of 5

Crossing Dimensions

1. Open Bottom Arch
2. Bridge with Abutments
3. Bridge with Side Slopes
4. Bridge w/ Side Slopes & Abutments
5. Round Culvert
6. Elliptical Culvert
7. Box Culvert
8. Embedded Round Culvert
9. Embedded Elliptical Culvert

Crossing Type (from above): ☐ 1. ☐ 2. ☐ 3. ☐ 4. ☐ 5. ☐ 6. ☐ 7. ☐ 8. ☐ 9. ☐ Ford

Upstream Dimensions (ft.): A) _____ B) _____ C) _____ D) _____

Downstream Dimensions (ft.): A) _____ B) _____ C) _____ D) _____

Length of stream through crossing (ft.): _____ Crossing slope (%) _____



Bridge, Culvert & Dam Assessment

Bridges and Culverts

- Flow conveyance capacity – field measurements and FHWA/DOT culvert analysis methods
- Flood flows – USGS StreamStats regression equations and similar hydrologic analysis techniques
 - Flood magnification factors to account for future climate change and urbanization
- Under-sized culverts will be identified and prioritized
 - Potential for upstream or downstream damage
 - Importance to the community's transportation system
 - Degree to which a culvert is vulnerable to becoming undersized



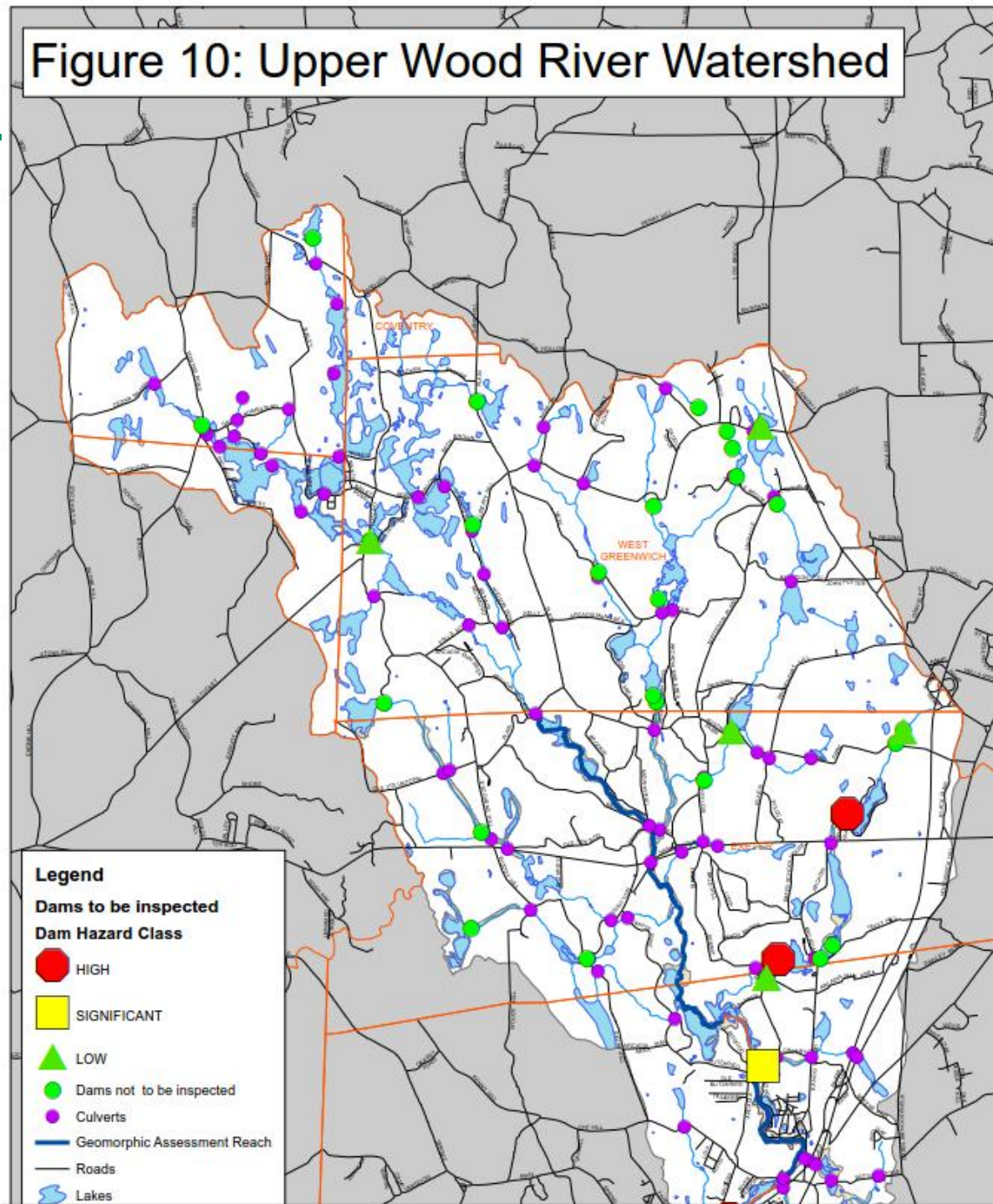
Bridge, Culvert & Dam Assessment

Dams

- Potential removal, repair or modification to reduce flood risk due to dam failure, potential re-purposing to increase flood storage, and to enhance fish passage and aquatic habitat
- Approximately 150 dams in the watershed
- Approximately 70 of highest priority dams will be visually inspected (see map handouts)
 - Hazard classification
 - Potential for downstream flood damage (humans, infrastructure, and the environment)
 - Current condition assigned by RIDEM and CTDEEP



Figure 10: Upper Wood River Watershed



Bridge, Culvert & Dam Assessment

Dams

- Dam inspection protocols developed by the Massachusetts Office of Dam Safety (Phase 1 Formal Dam Safety Inspection Checklist)
 - Classification information (current size, classification, condition, name, location, purpose, etc.)
 - Deficiencies and condition of each part of the structure (embankment, dikes, upstream face, downstream face, appurtenances, walls, concrete structures, masonry structures, spillways, etc.)
 - General published hydrologic information (drainage area, impoundment area, discharge capacity, etc.)



Stream Geomorphic Assessment

- Geomorphic assessment of rivers and streams
- Protocols adapted from Vermont
- Fluvial Erosion Hazard Mapping
- River corridor planning recommendations and design concepts

Geomorphic Assessments

- What are the physical processes and features that characterize a stream and its watershed?
- How do human activities influence these processes?
- Which of these processes and features present high erosion and flood hazard risks to human investments?



Stream Geomorphic Assessment

Phase 1 Assessment

- Map and aerial photo interpretation
 - Topographic mapping
 - Aerial photos
 - Land use
- Reach delineation
 - Subdivide the Wood-Pawcatuck into distinct reaches
 - Within a given reach, river is likely to respond similarly to changing watershed conditions
 - Reach breakpoints defined by:
 - Large tributary confluences (or sites of major stormwater inputs)
 - Grade controls (e.g., ledge across the channel, culverts)
 - Abrupt changes in channel slope or valley confinement
 - Significant human impacts (e.g., dams)



Stream Geomorphic Assessment

Phase 1 Assessment

- Reaches delineated along a total of 111 river miles

River	Number of Reaches Identified
Pawcatuck River	29
Wood River	27
Shunock River	13
Ashaway-Green Fall River	18
Beaver River	12
Usquepaug-Queen River	24
Chipuxet River	10



Stream Geomorphic Assessment

Phase 1 Assessment

- Prioritization of geomorphic reaches for Phase 2 field assessment (due to limited budget)
 - Impounded reaches upstream of dams were removed (not dominated by normal riverine processes)
 - Priority given to reaches with known flooding and erosion problems
 - Priority given to reaches upstream of valley constrictions
 - Priority given to reaches with stream crossings or other infrastructure near the river's edge
 - Assessment results are most valuable when several contiguous reaches are assessed together



Stream Geomorphic Assessment

Phase 1 Assessment

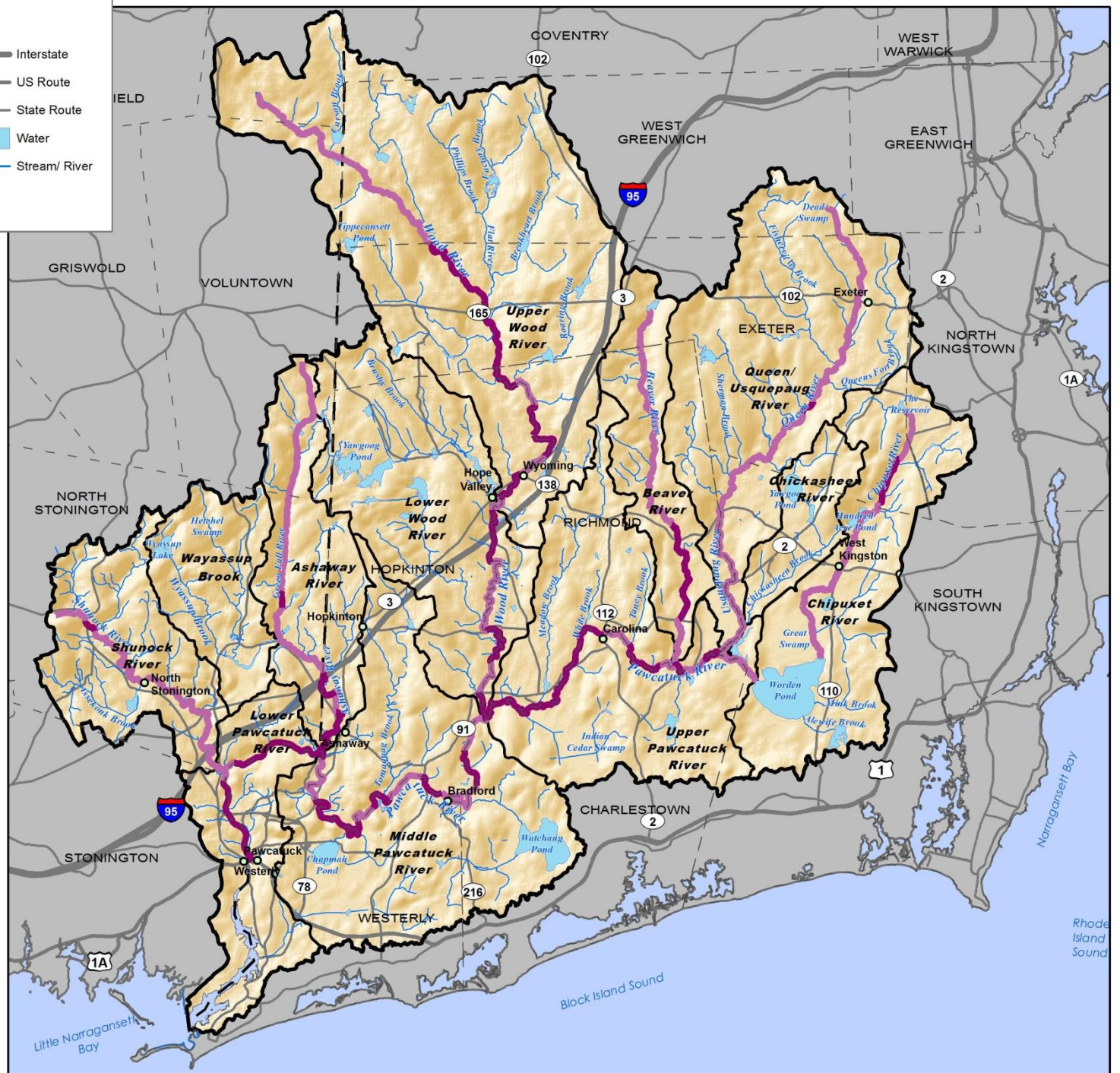
- 41 reaches extending over 38.7 miles were prioritized for field assessment (see map handouts)

River	Number of Reaches Proposed for Field Assessment
Pawcatuck River	19
Wood River	12
Other Tributaries	10



Legend

- Selected Reaches
- Assessed Reaches
- State Boundary
- Town Boundary
- Wood-Pawcatuck Watershed
- Subwatersheds
- Interstate
- US Route
- State Route
- Water
- Stream/ River



Rhode Island Sound

Narragansett Bay

Block Island Sound

Little Narragansett Bay



Stream Geomorphic Assessment

Phase 2 Assessment

- Mapping of channel features
 - Identify locations of channel instability and sensitivity
 - Characterize physical habitat conditions
 - Document the impacts of past human activities on channel morphology and evolution (e.g., channel straightening, culverts)
- Topographic surveying
 - At least one cross section in each reach
 - Additional cross sections where channel morphology varies due to human impacts
 - Disturbed and reference reaches
 - Data used to establish bankfull parameters
- Substrate particle size analysis (habitat and geomorphic features)



Natural Resource Assessment

- Riparian Corridor and Floodplain Wetlands
 - Restoration and preservation opportunities for flood mitigation, water quality, and habitat
- Desktop Screening Evaluation
 - Identify wetlands that provide flood protection function
 - RIDEM and NHDES Methods
- Field Evaluation of Selected Wetlands (15 locations)
 - Assess principal functions of wetlands
 - Identify site-specific restoration/preservation opportunities



Desktop Analysis Screening Criteria

- Watershed size, slope, topography, vegetation, and impervious cover
- Wetland storage volume and outflow rate
- Wetland class
- Proximity to bridges, dams, roads
- Area of wetland within floodplain
- Downstream floodplain development



Green Infrastructure Assessment

- Identify Opportunities for Green Infrastructure Retrofits
 - Enhance resiliency
 - Provide water quality and ecosystem benefits
- Types of Green Infrastructure
 - Stormwater management/LID
 - Wetland and floodplain restoration



Green Infrastructure Assessment

- Desktop screening
 - Use existing geospatial information and GIS mapping
 - Focus on sites on public land and along public rights-of-way
- Field inventories of higher-priority sites
 - Field inventory forms adapted from Center for Watershed Protection
 - Data collection to support feasibility determination and concept designs for up to 30 sites

Desktop Analysis Screening Criteria

- Parcel ownership
- Parcel size and contributing drainage area
- Soils, infiltration capacity and depth to groundwater
- Slope
- Proximity to targeted subwatersheds
- Surface water quality impairments
- Proximity to environmentally sensitive or protected areas
- Impervious area (site and drainage area)
- Percent impervious
- Proximity to storm drainage networks
- Proximity to parks and schools



Input Needed from Steering Committee

- Provide comments/feedback on:
 1. Field methods and geographic priorities Technical Memorandum
 2. Baseline Watershed Assessment outline
 3. Table and map of known areas of flooding (additions, deletions, etc.)



Updated Project Schedule

Project Kickoff	February 2015
Steering Committee Formation	March 2015
Steering Committee Meetings (tentative):	
Project Initiation Meeting	March 2015
Progress Meeting #1	May 2015
Progress Meeting #2	November 2015
Progress Meeting #3	April 2016
Field Work Start-up	Early June 2015
Baseline and Technical Assessments	March – December 2015
Plan Development	January – October 2016
Community Meetings	Winter 2015/2016
Municipal Training	Fall 2016



Project Contacts

Contact Information

Erik Mas, P.E.
Fuss & O'Neill, Inc.
800-286-2469
emas@fando.com

Denise Poyer
Program Director
Wood-Pawcatuck Watershed Association
401.539.9017
denisep@wpwa.org

Christopher J. Fox
Executive Director
Wood-Pawcatuck Watershed Association
401.539.9017
chris@wpwa.org

