Pawcatuck River Watershed
Flood Resiliency Management Plan

Rhode Island League of Cities and
Towns Annual Convention

January 29, 2015
What is Flood Resilience or Resiliency?

A community’s ability to plan for, respond to, and recover from floods.
Flooding Along Pawcatuck & Wood Rivers

Pawcatuck River, Ashaway, April 2010

Pawcatuck River, Westerly, April 2010

Wood River, Hopkinton, April 2010

Photos: Wood-Pawcatuck Watershed Association
More Frequent Extreme Storms

- Rhode Island Flood of 2010
- Tropical Storm Irene 2011
- Hurricane Sandy 2012
- Severe Winter Storm 2013
- 2015 Blizzard

- **300 square miles in RI and CT**
- **Portions of 15 municipalities and Narragansett Tribe**
- **380 stream miles**
  - Pawcatuck R.
  - Wood R.
  - Beaver R.
  - Queen R.
  - Chipuxet R.
Factors Related to Increased Flooding

- Floodplain development
- Channel encroachment (dams, bridges, culverts)
- Watershed impervious cover
- Climate change: more frequent and intense storms
High Quality Natural Resources

- Habitat and species diversity
- Intact forest “Borderlands”
- Large wetlands (“Great Swamp”)
- High quality surface water except in urbanized lower watershed
- Sole Source Aquifer
- Under Study for Wild & Scenic Designation
Hurricane Sandy Coastal Resiliency Grant

- U.S. DOI & National Fish and Wildlife Foundation (NFWF) competitive grant program
  - Help communities affected by Hurricane Sandy become more resilient to the impacts of coastal and inland flooding
  - Focus on strengthening natural ecosystems that also benefit fish and wildlife

- NFWF Grant awarded to Wood-Pawcatuck Watershed Association in June 2014
  - $720K grant award and $200K matching funds
  - Develop a “Flood and Storm Damage Resiliency Management Plan” for the Pawcatuck River watershed
Project Goals

- Assess the vulnerability of the Pawcatuck River watershed to floods and storm-related damage

- Develop a *watershed-based* management plan to enhance flood resilience and strengthen natural ecosystems (water quality, species, habitat)
Watershed Approach to Flood Resilience

- **River Corridors:** Conserve land and discourage development along river corridors (floodplains and wetlands)

- **Vulnerable Settlements:** Protect people, buildings, and facilities to reduce future flooding risk

- **Safer Areas:** Plan for and encourage new development in areas that are less vulnerable to floods

- **The Whole Watershed:** Implement stormwater management to slow, spread, and infiltrate runoff

Source: Vermont Agency of Commerce and Community Development
Project Elements

1. Baseline Assessment
2. Watershed Technical Evaluations
3. Management Plan Development
4. Stakeholder and Community Involvement
Baseline Watershed Assessment

- Document existing watershed conditions
- Don’t reinvent the wheel - integrate and build upon extensive previous and ongoing work in the Pawcatuck River watershed

  - RiskMAP Project (USGS and FEMA)
  - Pawcatuck River Flood Risk Feasibility Study (USACE)
  - RI River & Stream Continuity Project (RI RC&D)
  - Pawcatuck Dam Removals (NOAA, NRCS, TNC, USFWS)
  - Wild & Scenic Reconnaissance Survey (NPS)
  - Water Quality Basin Planning (RIDEM)
Watershed Technical Evaluations

- Quality Assurance Project Plan
- Stream Geomorphic Assessment
- Bridge, Culvert & Dam Assessment
- Natural Resources Inventory
- Green Infrastructure Assessment
- Land Use Regulatory Review
Stream Geomorphic Assessment

- Assessment of 38 miles 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?

Source: VT DEC
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 (over 100 in watershed)**
  - 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
Green Infrastructure Assessment

- **Identify Opportunities for Green Infrastructure**
  - Enhance resiliency
  - Provide water quality and ecosystem benefits

- **Types of Green Infrastructure**
  - Stormwater management/LID
  - Wetland and floodplain restoration

- **Retrofit Inventory and Concept Designs**
Watershed Plan Development

- Collaborative Process Led by WPWA and Project Steering Committee
- Identify and Evaluate Alternative Management Strategies
- Workshop Meetings
- Project Website
- Municipal Training and Outreach

Potential Management Alternatives
- Land use regulatory controls
- Active restoration
  - Elevating and flood proofing structures
  - Dam removal
  - Aquatic connectivity obstruction removal
  - Bridge and culvert retrofits and replacements
- Passive restoration
  - Riparian buffer restoration and protection
  - Stream bank stabilization
  - Corridor easements
- Reach-scale river restoration
- Green infrastructure stormwater management
- Repurposing dams for flood storage and other objectives
- Wetland and habitat restoration
- Related water quality mitigation
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Questions?

Contact Information

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

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

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