

Integrated Watershed and River Modeling Study of the Pawtuxet River, Rhode Island

A record-breaking flood event (about 500-yr return period) that occurred in March 2010 in Rhode Island initiated several studies to understand and develop mitigation strategies to address flooding impacts along the Pawtuxet River. The University of Rhode Island Ocean Engineering program has developed a spatially distributed hydrological/hydraulic modeling system for the entire Pawtuxet River watershed using state of the art GIS-based numerical models and the most recent watershed and river data.

Objectives of the Pawtuxet River project

- Developing a web/GIS-Based watershed/river model for the Pawtuxet watershed to predict flooding along the river flood plains.
- Assessment of watershed issues using the model: impact of the Scituate Reservoir on flooding; effect of historical dams on flooding; dam removals; debris; and levee heights.
- Paving the way for a real-time forecasting system for the Pawtuxet River and other rivers in RI.

The Pawtuxet River modeling study was completed in August 2017. The project was funded through a \$175,000 federal HUD CDBG Disaster Recovery grant that was endorsed and supported by the RI Executive Climate Change Coordination Council

Some key final report findings:

1. Model simulation of the Scituate Reservoir shows that downstream flood damage can be mitigated by modifying the reservoir elevation. Adjusting the reservoir water level to 4 feet below the spillway crest or above it by adding gates can reduce downstream peak discharge by about 60% in a 500-year return period event. Regulating discharge of water from this reservoir is the most effective way to control downstream flooding.
2. Model simulation shows that the newly constructed levees at the Warwick Sewer Authority wastewater treatment facility will prevent flooding of the facility during a 500-year flood event.
3. Projected sea level rise can lead to increased inland flooding in the Pawtuxet River, particularly near the Providence River during concurrent coastal and inland floods. This is an additional risk associated with hurricanes that contain considerable rain (i.e., wet hurricanes).

Project website: <http://web.uri.edu/hashemioceanmodeling/projects/pawtuxet-river-flood-assessment/pawtuxet-river/>

Watershed online ArcGIS web viewer in STORMTOOLS platform:

<http://edc.maps.arcgis.com/home/webmap/viewer.html?webmap=d025e9fc58ae440a88b5ce590ddfa4cd>

Final project report:

<https://drive.google.com/file/d/0B8R4ypixddoTaHFtTkpaTXh2YXM/view?usp=sharing>