



Extension



CAPE: Climate Adaptation Plan for Exeter (2015)

Summary:

The CAPE project modeled potential future flooding impacts for various storm events (10-, 25-, and 100-year), with and without storm surge along our freshwater and saltwater rivers. Modeled flood events also show resulting impacts on road flooding, storm drain network performance, economic impact on infrastructure and loss of wetland and salt marsh habitat.

Keywords:

- Sea-level rise
- Storm surge
- Flood models
- Road flooding
- Stormwater capacity
- Historic structure impacts
- Critical facilities
- Climate outreach
- Habitat vulnerability

Key Points:

- Maps indicate fresh and saltwater flooding extent and depth under various scenarios, including with Great Dam present and removed (beginning on Appendix p. 51).
- Critical roadways become flooded today during larger storm events and the number of roads flooded and depth of flooding will increase (Appendix p. 61).
- Storm drain networks become overwhelmed when outfall is overtopped, causing deeper and longer duration flooding. This will occur in more locations in town and last longer than it does today.
- Tan Lane sewershed, the largest in town (drains downtown) and Linden street will see the greatest impact from climate change as many stormwater structures are at or close to capacity for current day storm events (Appendix p. 91).
- Tidal marshes will be unable to migrate landward due to barriers along Swasey Parkway, Route 85 north of the Parkway, along the Wastewater Treatment Plan and the berm surrounding Clemson Pond. Marsh loss will negatively affect fish and wetland-dependent birds, and leave banks more susceptible to erosion.
- The project also included an outreach event that demonstrated predicted water levels for flood scenarios at Swasey Parkway.



How to Use CAPE:

- Flood maps can identify vulnerable structures and inform critical infrastructure siting or land conservation opportunities
- Outreach examples could be repeated to broaden public awareness
- Road flooding can aid in emergency planning
- Road and stormwater infrastructure vulnerability information can help prioritize CIP projects
- All models can inform new construction planning

** NOTE: The document remains in draft form because modeling scenarios required more budget and time than allotted. Though recommendations were never finalized, the information and data still remains useful for planning purposes.*

[Link to Exeter Climate Resources Page with CAPE Report and Appendices](#)

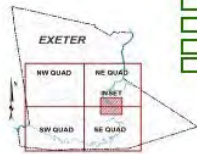
Example Maps:

CAPE Project DEPTH OF FLOODING DOWNTOWN INSET

2070 HIGH
100-YEAR PRECIPITATION
Dam Out with Storm Surge
Date: 3/30/2015

LEGEND

- Above Ground Storage Tank
 - ▲ Sewer Pump Station
 - ▼ Water Pump Station
 - Proposed Well
 - Existing Well
 - ▭ Flood Model Limits (HEC-RAS)
- Reference Flood Extents**
- ▭ 2010 Dam-in 100-Year Mean High High Water
- Flood Depths**
- 2070 Dam-Out 100-Year MHHW with Storm Surge
- 0 - 3 feet
 - 3 - 6 feet
 - 6 - 9 feet
 - 9 - 12 feet
 - 12 - 15 feet
 - 15 - 18 feet
- Reference Locations**
- RL-1 Bandstand
 - RL-2 Congregational Church
 - RL-6 First Unitarian Church
 - RL-8 PEA Day Care School (Infant-K)
 - RL-9 Phillips Exeter Academy Campus
 - RL-11 Public Safety Fire/Police
 - RL-12 Recreation Building
 - RL-14 Senior Center
 - RL-15 Senior Housing 277 Water St
 - RL-16 Clemson Pond
 - RL-17 Swazey Park
 - RL-18 Town Hall
 - RL-19 Town Library
 - RL-20 Town Offices
 - RL-21 Substation West Bank
 - RL-23 Substation East Bank
- Critical Travelways**
- RD-3 String Bridge
 - RD-4 Great Bridge
 - RD-7 Swazey Parkway
 - RD-8 Water Street
- Recreational**
- RC-8 Founders Park
 - RC-8 Lagoon Trail
 - RC-10 PEA Athletics & Park
 - RC-13 Stewart Waterfront Park
 - RC-14 Swazey Park
 - RC-15 Town House
- These maps have been created as part of a study to compare existing and future potential climate change estimates. Flooding extents and depths shown are approximate and intended for planning purposes only for the UNH Climate Adaptation Planning for Exeter (CAPE) project funded by US NOAA. See final project report for model limitation details.
- Sources: 2014 CAPE HEC-HMS and HEC-RAS hydrologic & hydraulic models; Town of Exeter; GRANIT GIS; NH DES GIS



CAPE Project DEPTH OF ROADWAY FLOODING

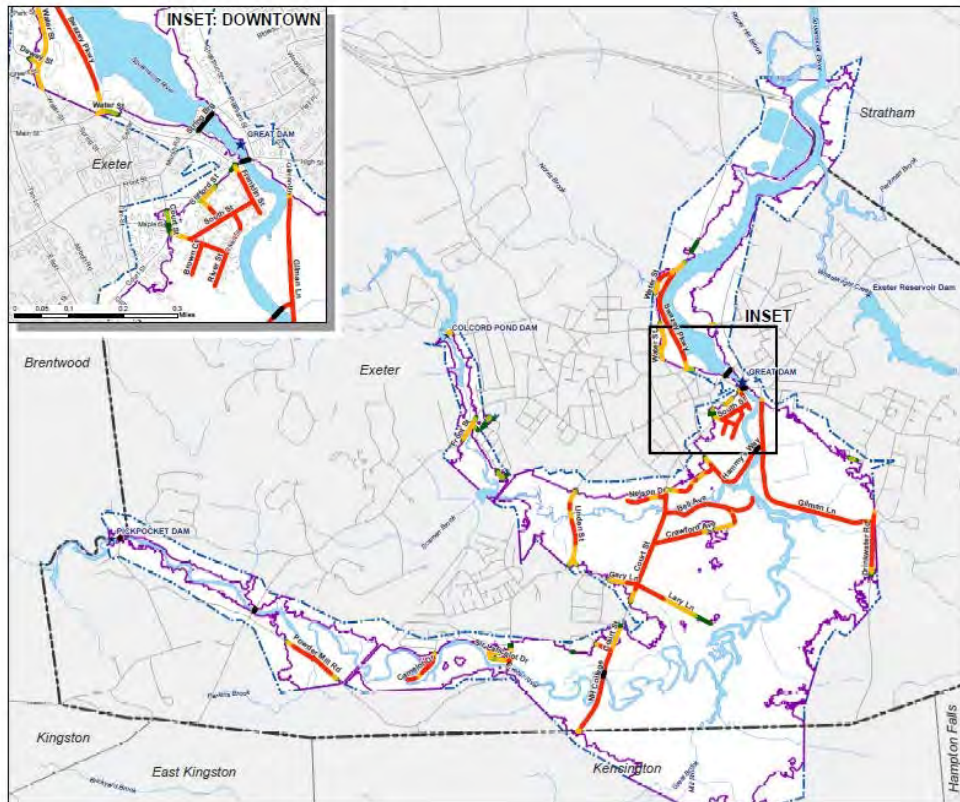
2070 HIGH
100-YEAR PRECIPITATION
Dam Out with Storm Surge

Date: 4/21/2015

LEGEND

- ▭ Exeter Townline
 - ▭ Flood Model Limits (HEC-RAS)
- Flooding Extents**
- ▭ 2070 Dam Out 100-Year with Surge
- Depth of Roadway Flooding**
- 0 to 1 foot
 - 1 to 2 feet
 - 2 to 5 feet
 - 5+ feet
- BRIDGE**
- For clarity of mapping, bridges (bridge decks) do not show modeled overtopping or overtopped depths. See final project report for detailed information regarding potential flooding over bridge decks.
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- Sources: 2014 CAPE HEC-HMS and HEC-RAS hydrologic & hydraulic models; Town of Exeter; GRANIT GIS; NH DES GIS

0 0.125 0.25 0.5 0.75 1 Miles



Report Authors: University of New Hampshire and others
Photo Credit: Jonas Procton; Don Clement

The development of this factsheet was made possible, in part, by funding from NOAA's Office for Coastal Management under the Coastal Zone Management Act in conjunction with the NH Department of Environmental Services Coastal Program.

