

The Development of a Drinking Water Vulnerability Assessment and Resiliency Plan for Connecticut: Private Well Assessment & Recommendations

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Introduction

Extreme weather and expected climate changes pose a great risk to Connecticut's public utility infrastructure. In 2011 Tropical Storm Irene resulted in power loss to 800,000 customers and left many without reliable communications, water supplies and heat.

The damage and results of this storm, and others past, could be considered marginal compared to the destruction a major hurricane could cause. Lessons learned from previous extreme weather events should be utilized to improve resiliency and better prepare infrastructure emergency response plans.

By reviewing current practices, emergency plans and condition of drinking water systems, vulnerability can be assessed and recommendations can be made to improve resiliency.

Objective

The overall objective for this project is to assess vulnerabilities and risk to Connecticut's public drinking water infrastructure due to expected changes in our climate. The specific goal of the private well assessment and recommendations task is to use current data for Geographical Information Systems (GIS) and information provided by local health directors (LHD) to:

- Identify where private wells are primarily located using current public drinking water service area data and LHD comments
- Include local health directors in the finalization of private well maps
- Perform spatial analyses using current and future flood mapping to assess private well vulnerabilities
- Make recommendations to improve resiliency based on a review of Connecticut's current state of practice and other best practices



Flooded homes on Flood Bridge Road during Hurricane Irene

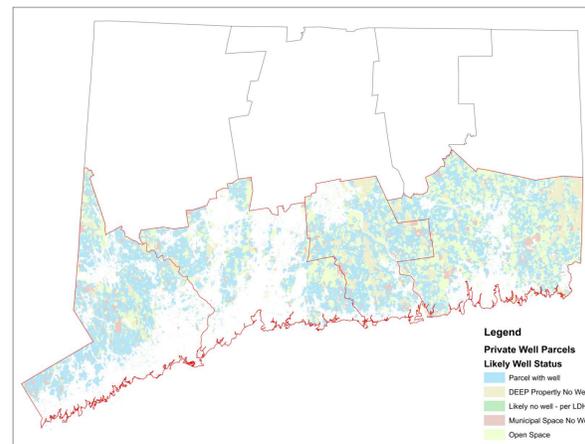
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Methods

Identification

Utilize current public drinking water service area data, along with open space data, to identify property parcels that do *not* receive water from drinking water companies and parcels that are likely not residential.

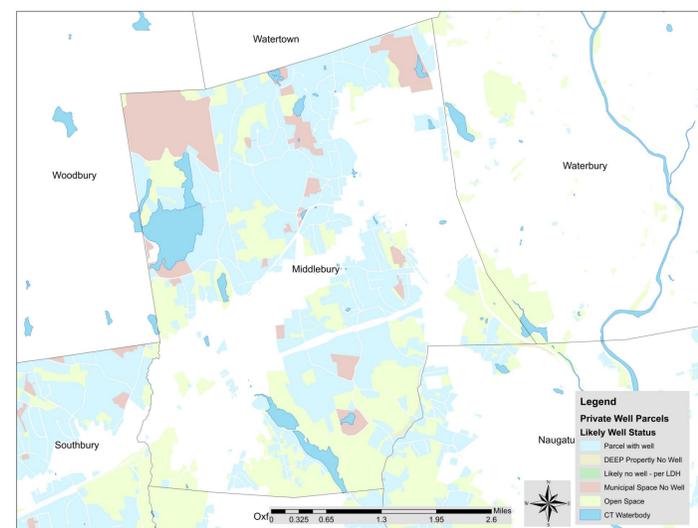


Vulnerability

Overlay various current and future flood mapping scenarios, along with other data such as land use, for spatial analyses. Also conduct a concentrated assessment for shoreline towns that may be vulnerable to sea level rise along with storm surge.

Results

Parcel data for all towns within the four coastal counties has been obtained and assumed private well parcels have been identified. Open space data was used to identify those parcels that were likely not residential, and town zoning maps were used to identify residential areas versus commercial or industrial.



Estimated 192,743 private well parcels

Vulnerability Assessment

The private well vulnerability assessment included current and future flood mapping to identify those parcels that may become inundated under various storm conditions and projected sea levels. By utilizing flood maps and also looking at areas of repetitive loss properties, 13 vulnerable neighborhoods throughout the four counties were identified. The vulnerability assessment also included a more concentrated assessment on the three coastal towns of Guilford, Old Lyme and Stonington.



Resiliency Recommendations

Working collaboratively, CIRCA and Milone & MacBroom will consult with the Connecticut Department of Public Health to create fact sheets that will provide information on resiliency techniques for private wells. These options include:

- Drainage Project
- New Public Water System
- Property Acquisition
- Water Main Extension
- Well Protection
- Smart Development

Resilient Wells

Connecticut is a coastal state. It is not possible to take advantage of natural mitigation efforts in order to protect private wells. There are, however, steps that can be taken to bolster the defenses of the well itself, in order to protect against flooding and subsequent contamination. The following are several examples of techniques that can be used to isolate the well from external forces.

Location

Flooding Issues

Well Protection

Resiliency Project

Result

FEMA recommended & other protective efforts

- Staked well casing
- Seal exposed portions of well
- Mounded earth to protect existing well or newly implemented extension
- Install backflow valve
- Floor gravel between casing and the bore hole
- Installation of a sanitary cap

Well Protection

Extending well casing above flood level helps mitigate flooding.

Partners: CIRCA, DPH, MILONE & MACBROOM