Flood Susceptibility Mapping for the Lower Connecticut River Valley Long Term Recovery and Land Use Resiliency Lower Connecticut **Through Community Flood Resilience Study. Council of Governments**



Dewberry

The Lower Connecticut River Valley Council of Governments (RiverCOG) is a public agency formed in 2012 through the merger of existing agencies to provide a basis for intergovernmental cooperation in dealing with a wide range of issues facing the lower River region and coast. Its predecessor agencies, the Connecticut River Estuary Regional Planning Agency (CRERPA) was created in 1967, and Midstate Regional Planning Agency was created in 1962. RiverCOG's membership includes the 17 municipalities located along the lower portion of the Connecticut River south from Cromwell and Portland to the Sound including Westbrook and Clinton along the shore and our non coastal or riverine towns of Killingworth, Durham, and East Hampton.

RiverCOG has prepared Natural Hazard Mitigation Plans for its member municipalities. The most recent plans were completed in 2014. The next updates are due in 2019 and we believe this study will enhance and contribute to the region's current FEMA community flood studies and contribute to our communities' abilities to plan for a resilient future.

Background

- The study was conducted to help bridge the flood hazard data gap in municipalities without detailed flood studies and to investigate less expensive / cost effective models for predicting areas susceptible to flooding.
- The project was funded by the United States Dept. of Housing and Urban Development (HUD) **Community Development Block Grant – Disaster Recovery, administered by the State of Connecticut** Dept. of Housing #6202. Federal Grant Number B-13-DS-09-0001. Supported by a sub-award agreement from the Connecticut Institute for Resilience and Climate Adaptation (CIRCA), UCONN with funds provided by Grant No. PO#43280, PS#2014-14249 from CT Dept. of Energy and Environmental Protection.

RiverCOG selected Dewberry Engineers, Inc. from New Haven, Connecticut as project consultant.

Project Scope

This study focuses on inland flooding, which was identified as an area of limited research in the RiverCOG region. The study also provides an example of work in which other communities can engage. Such awareness comes from an understanding of a combination of not only regional climatic factors, but also of non-climate factors that relate to natural, physical, and developed characteristics. The current study estimates flood susceptibility not due to climate change, while also looking at the climatic mechanisms that correlate with rainfall throughout the region and at projected trends in rainfall in the future.

Several quantitative and qualitative methods were considered to estimate flood susceptibility; the final selected method involves performing a logistic regression, which is a statistical method for analyzing a dataset in which there are one or more independent variables that determine a binary (yes or no) outcome, using several flood risk factors that could potentially affect the region and for which sufficient data were available. Flood risk factors considered include elevation, slope, land curvature (concave, convex, or flat), distance to water body, land cover, vegetative density, surficial materials, soil drainage class, and percent impervious surface.

The objective was to link each of the flood risk factors to the occurrence of flooding for a flood event having a recurrence interval of at least 100 years. Satellite images of spatial flood inundation over the region were obtained for a significant flood event that occurred in April of 2011; areas inundated by this event were observed outside of the FEMA 100-year floodplain. Due to the fact that the overall quality of these satellite images was not sufficient for the flood risk factor analysis, it was alternatively decided to use the 100-year FEMA floodplain.

Cromwell Deep River Durham East Hampton Essex Haddam East Haddam Killingworth Lyme Middlefield Middletown Old Lyme Old Saybrook Portland Westbrook

Process for Conducting a Flood Susceptibility Assessment

Map of the LCRVR along with a zoomed-in area showing the distribution of sampling points used to train the logistic model. Green points represent locations where flooding is not expected to occur during a 100 year storm, while red points represent locations where flooding is expected to occur during a hundred year storm. Areas shaded in blue, green, and red, represent urban (U), rural (R), and coastal (C) subregions, respectively.



Flood susceptibility map for the LCRVR for the FEMA 100-year flood event. Levels represent probabilities of flooding: Very Low: 0 – 20%; Low: 20 – 40%; Medium: 40 – 60%; High: 60 – 80%; Very High: 80 – 100%.



