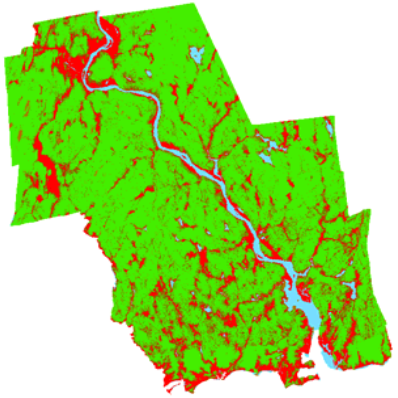

USING A NOVEL METHOD TO MAP FLOOD SUSCEPTIBILITY OF THE LOWER CONNECTICUT RIVER REGION

CONNECTICUT
Association of Flood Managers

5TH ANNUAL CONFERENCE
BRIDGEPORT, CT
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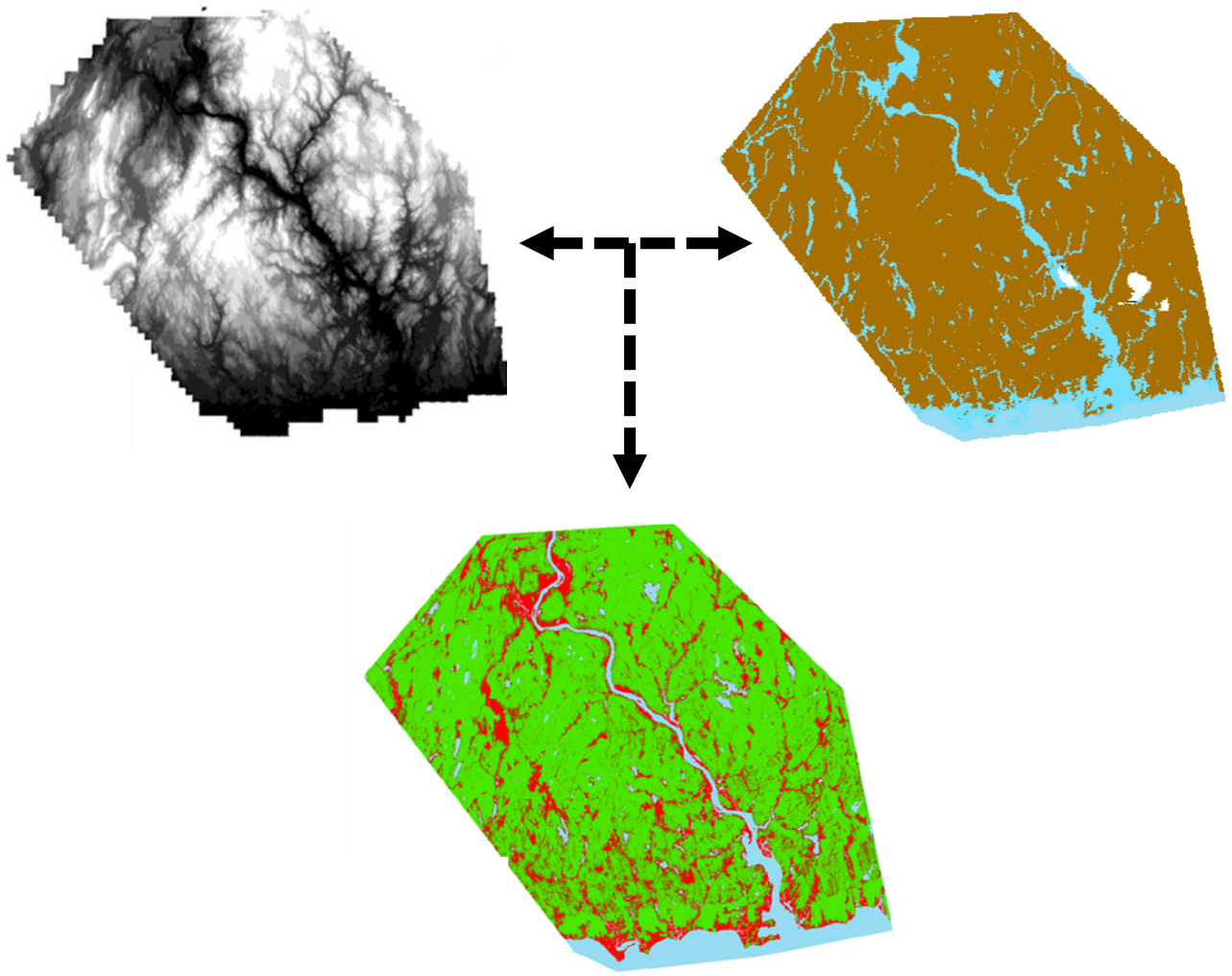
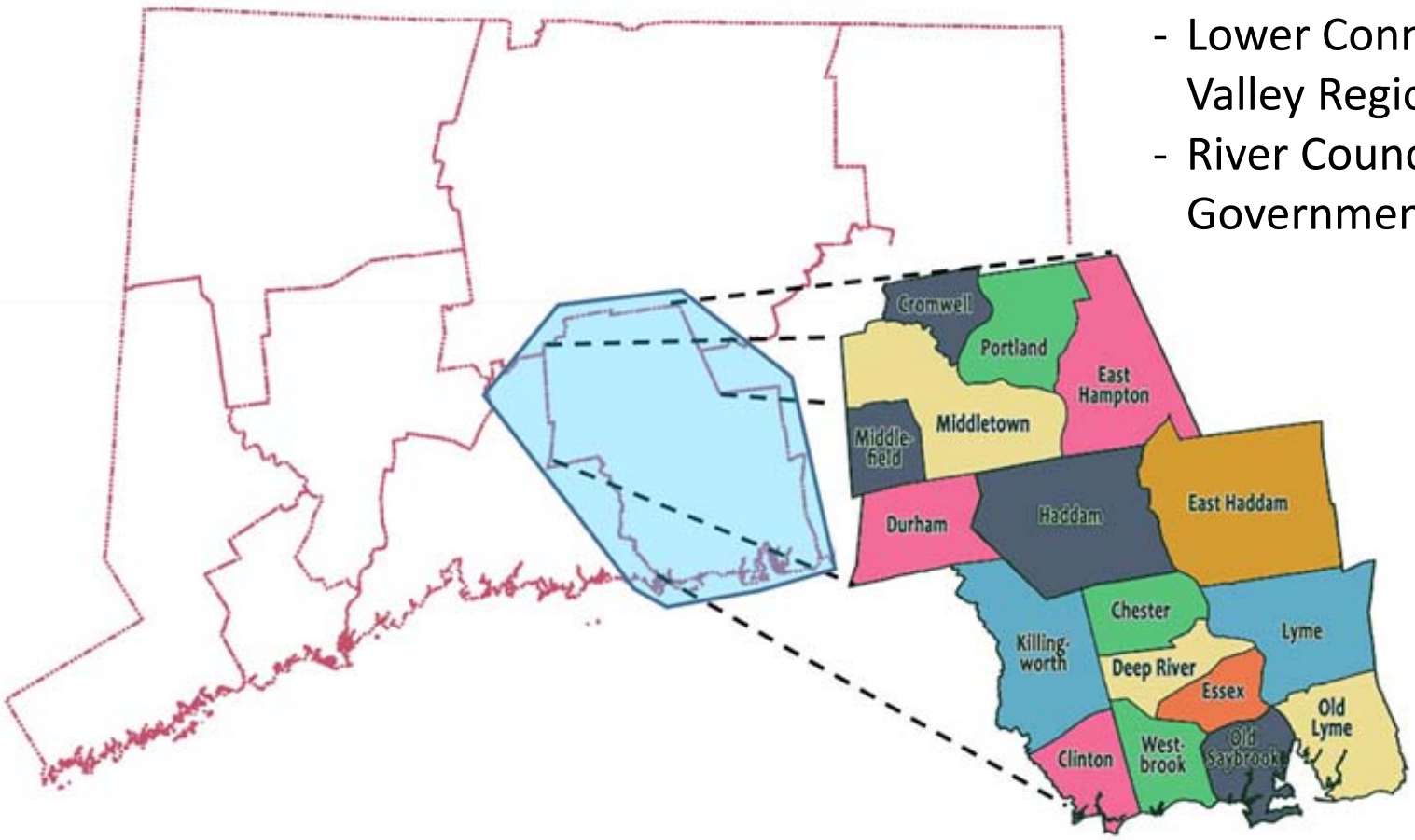
Introduction

1. Identify flood risk factors that apply to the region of interest.
2. Correlate these flood risk factors to flood inundation during a particular event.
3. Use resulting relationships to produce a flood susceptibility map.



Introduction: Case Study



- Lower Connecticut River Valley Region (LCRVR)
- River Council of Governments (River COG)

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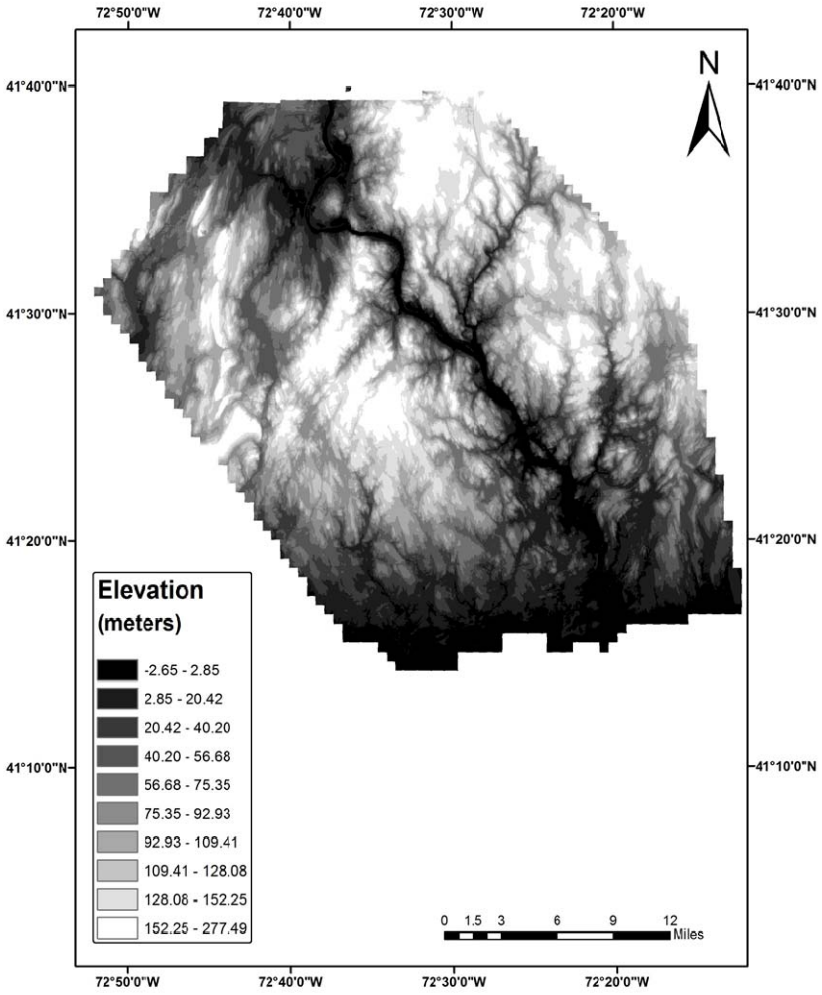
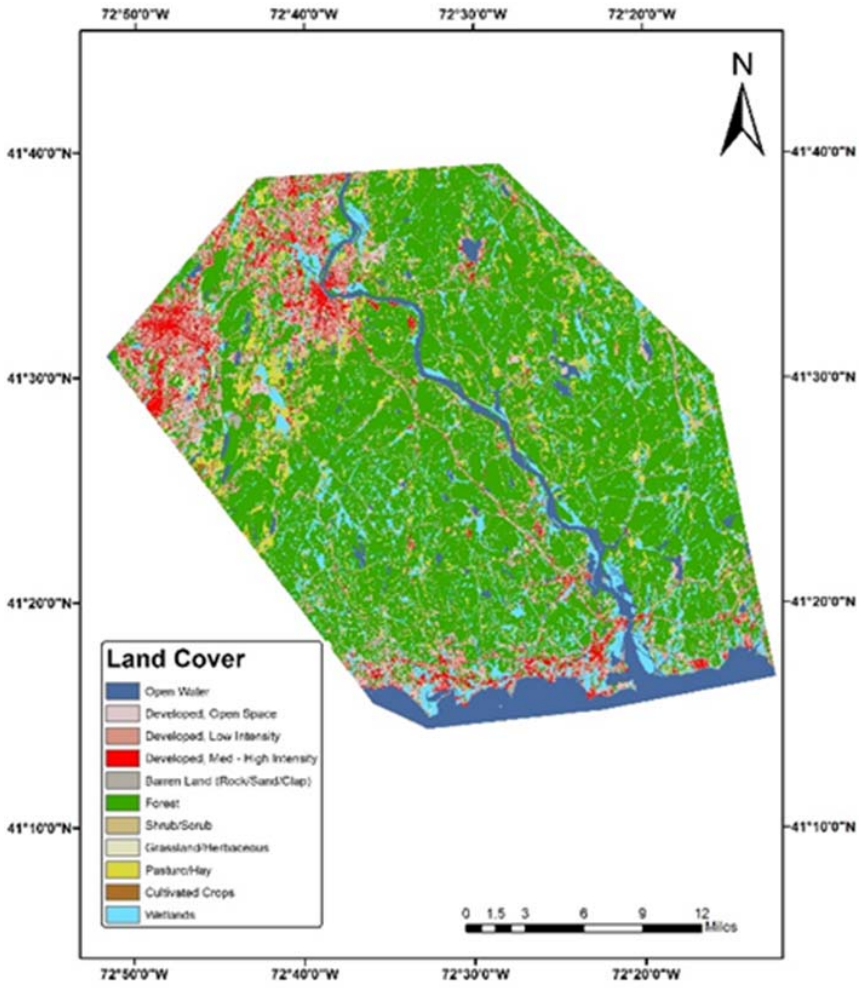
Flood Risk Factors

Flood Risk Factors	Source (year)	Resolution/Scale	URL for Data Access
Land Cover (LAND)	USGS (2011)	30 meters	https://www.mrlc.gov/
Elevation (ELEV); Slope (SLOPE); Curvature (CURV)	USGS (2014; 2011)	30 meters	https://earthexplorer.usgs.gov/
Distance from Water (DIST)	DEEP (2005)	1:24,000	http://www.ct.gov/deep/cwp/view.asp?a=2698&q=322898&deepNav_GID=1707
Soil Drainage (SOIL)	USDA-NRCS (current)	varies	https://sdmdataaccess.nrcs.usda.gov/
Vegetation density (VEG)	USGS (2011)	30 meters	https://www.mrlc.gov/
Impervious Surface (IMP)	USGS (2011)	30 meters	https://www.mrlc.gov/
Surface Geology (GEO)	DEEP (2005)	1:24,000	http://www.ct.gov/deep/cwp/view.asp?a=2698&q=322898&deepNav_GID=1707
FEMA 100-year Hazard Area	DHS/FEMA (2016)	1:12,000	https://catalog.data.gov/dataset/national-flood-hazard-layer-nfhl

Flood Risk Factors (e.g. elevation, land use)





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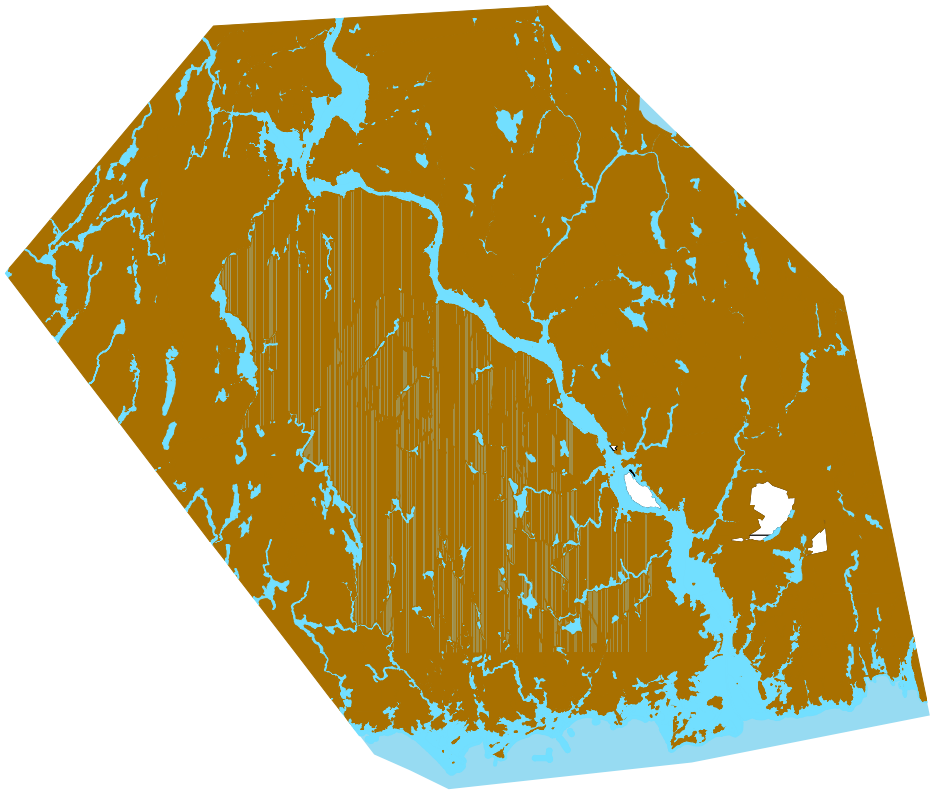
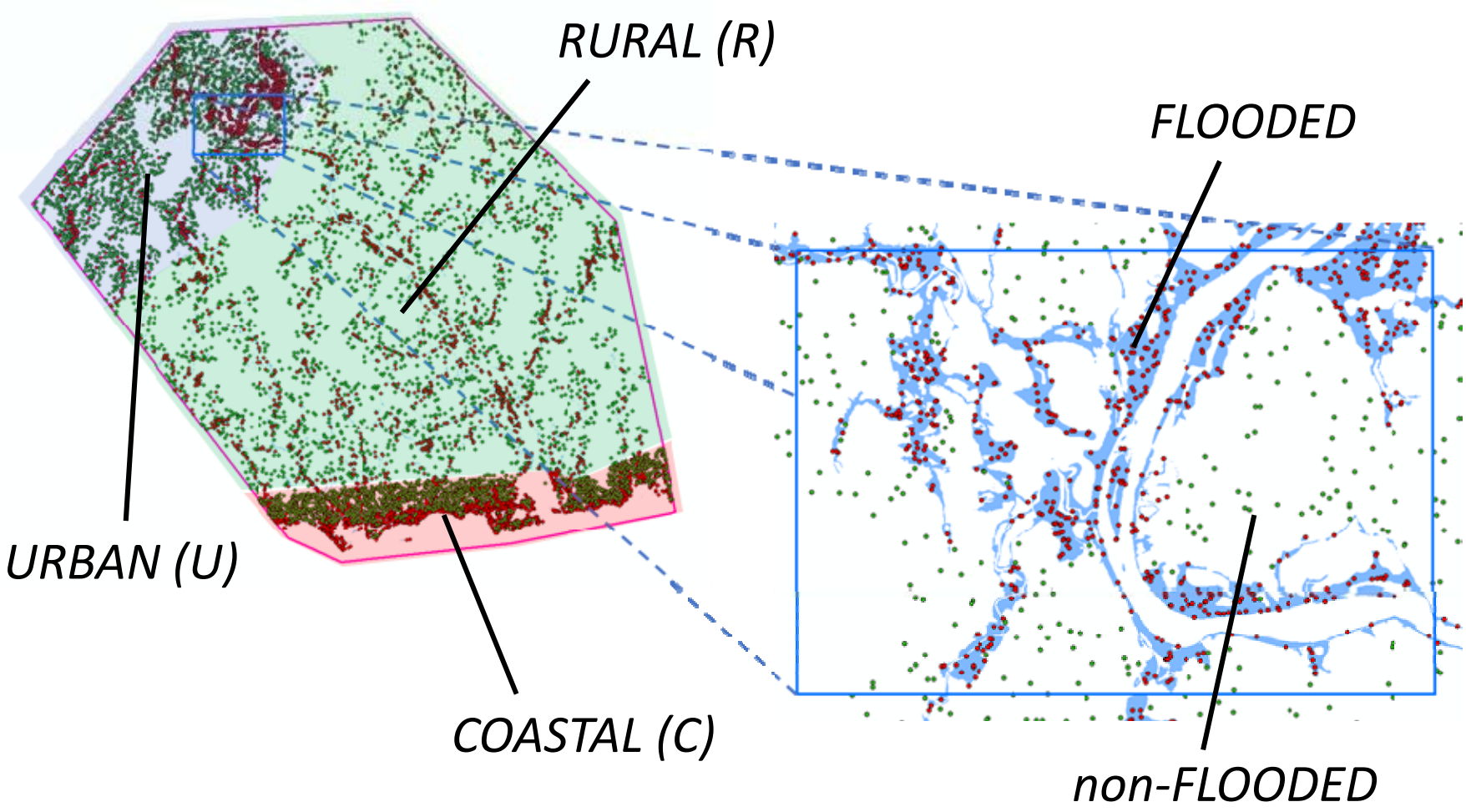
Select Flood Event(s)

- Satellite images could not be used:
  - Very poor quality over a 5 to 10 year period
  - Only available for events with < 25-year recurrence
- FEMA 100-year floodplain used
- Correlation between flood risk factors and flooding is what we want to obtain.
- Ideally 2 to 3 events would provide ability to interpolate.



Regionalization and Sampling Points



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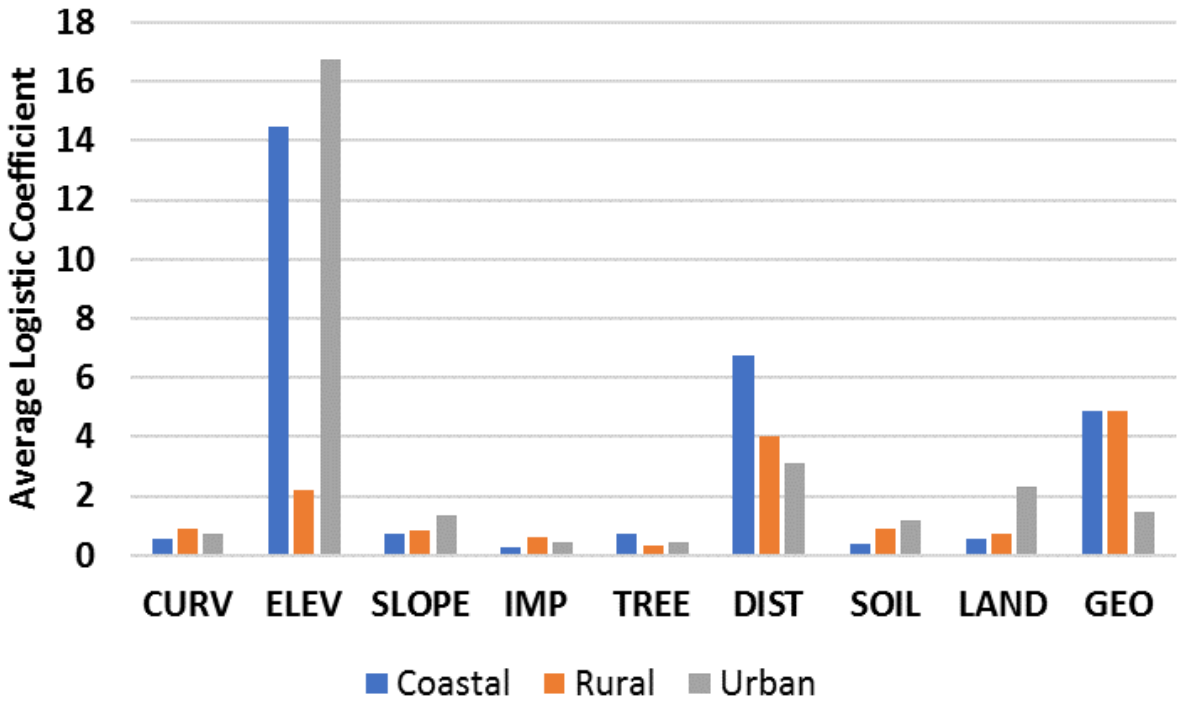
Relative Contribution of each Factor

- Average magnitude of model coefficients for each sub-region.
- **Elevation** & **distance to water** contribute most in coastal & urban sub-regions. **Land Cover** is a close third in the more urban sub-region.
- **Surficial materials** & **distance to water** contribute most in rural sub-region



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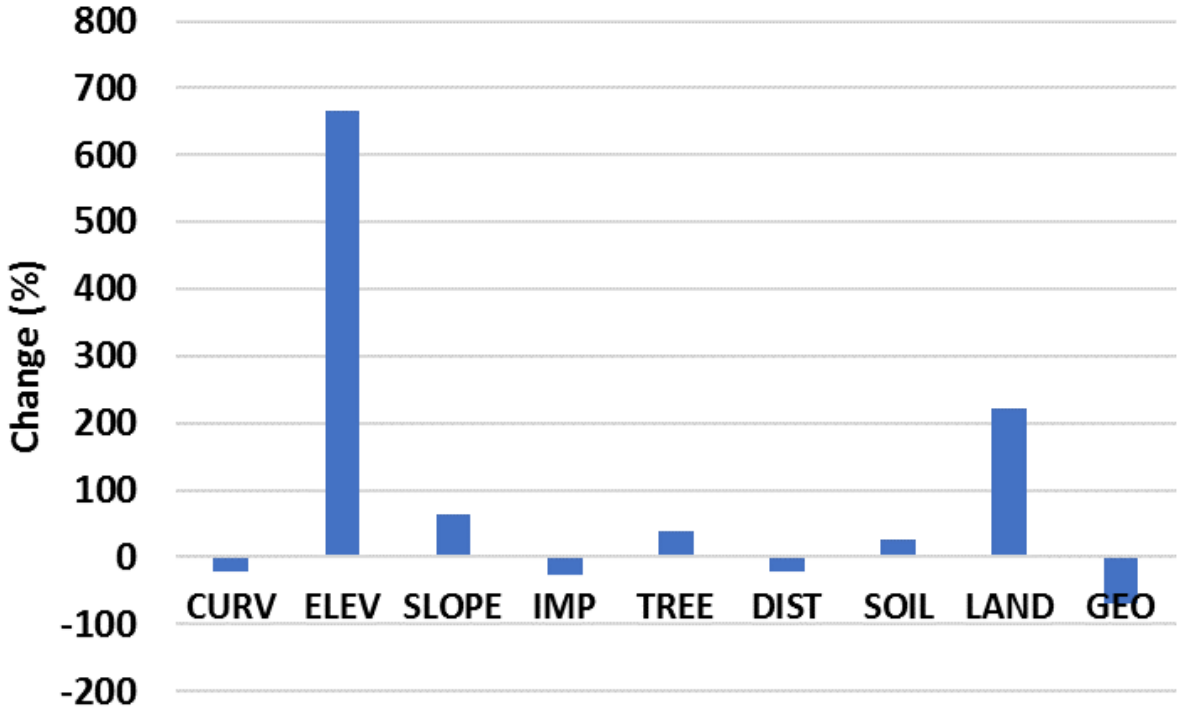
Changes between Rural and Urban

- We are interested in how contribution changes due to urbanization.
- Difference between urban and rural contributions provides this info.
- **Elevation** and **Land Cover** experience the greatest change.



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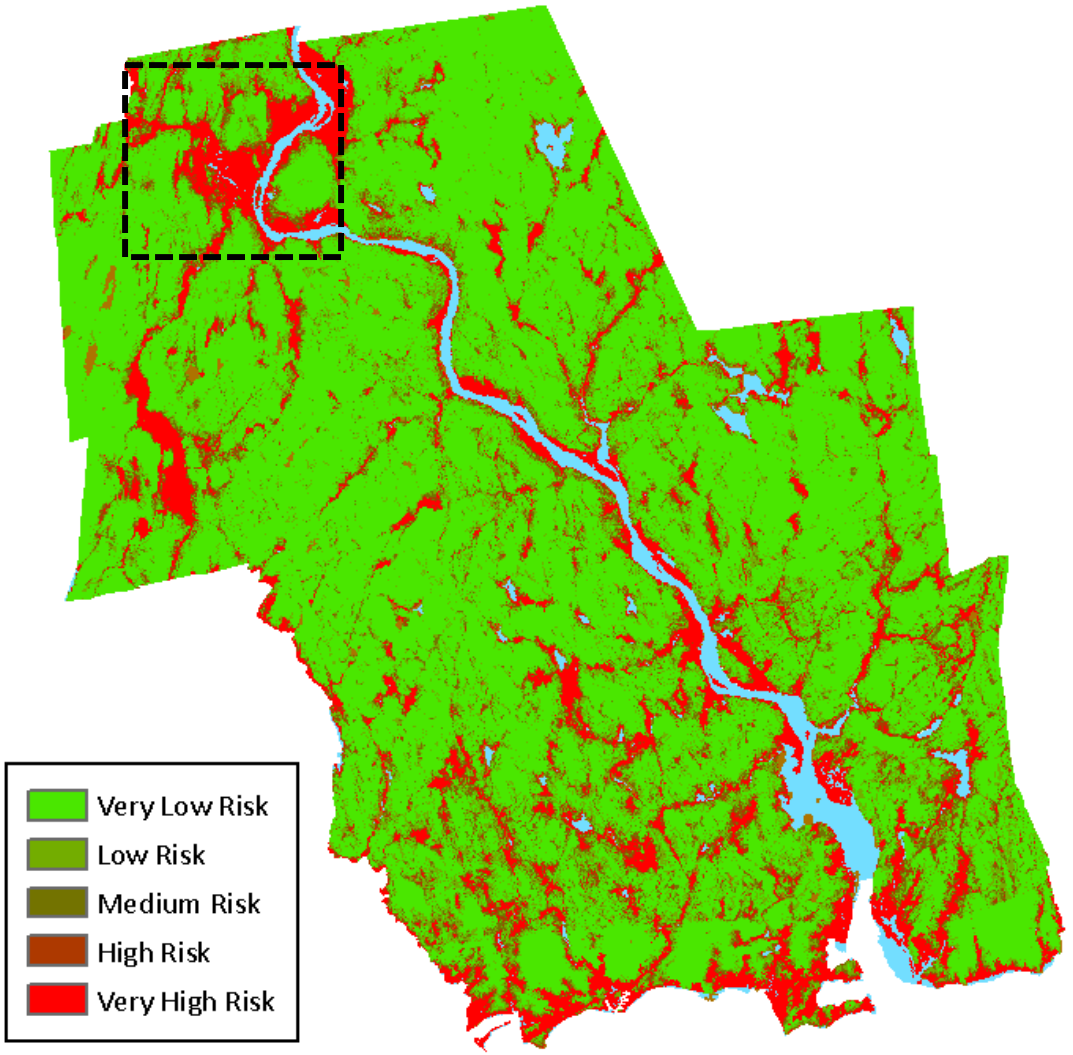
Flood Susceptibility Map

- Using logistic regression, the probability of inundation is obtained for every point in the “Area of Influence”, values are categorized according to the following:
  - **Very Low Risk**: 0 – 20%
  - **Low Risk**: 20 – 40%
  - **Medium Risk**: 40 – 60%
  - **High Risk**: 60 – 80%
  - **Very High Risk**: 80 – 100%



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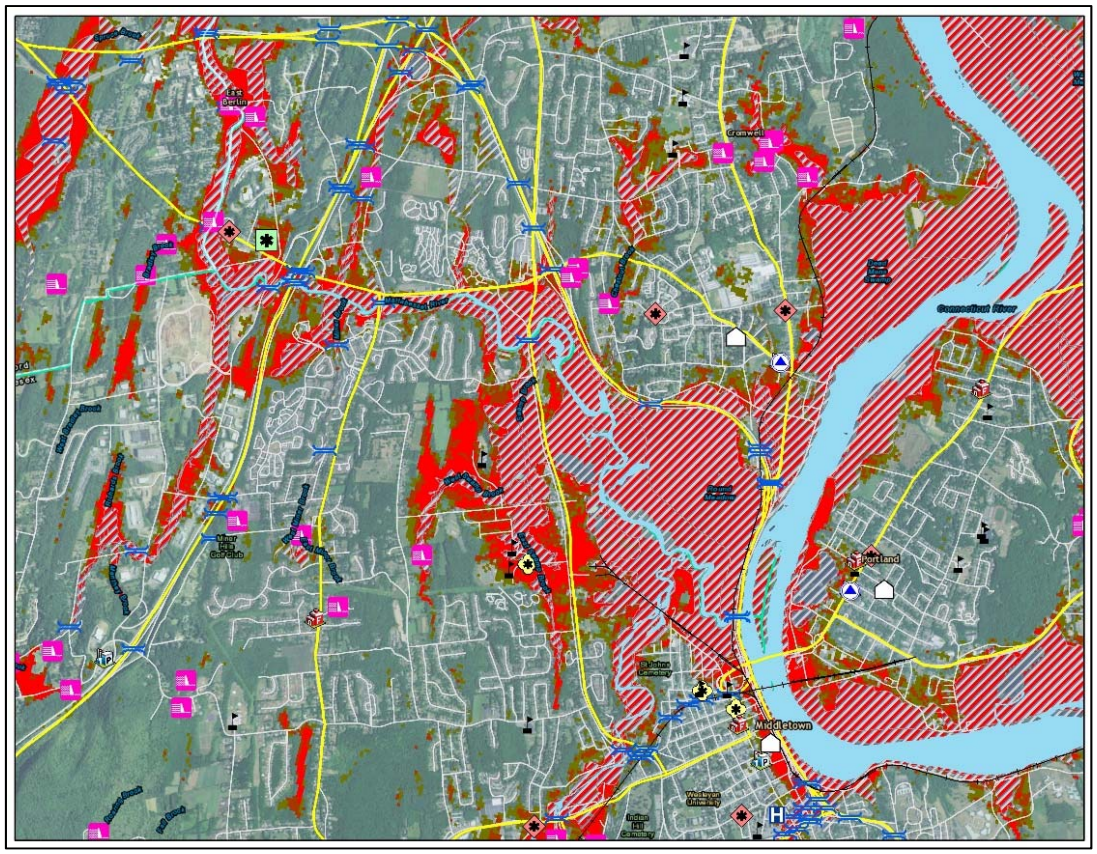
Comparison to FEMA Map (Urban)

- Large areas of susceptibility are not included in the FEMA map.
- **It should be noted that the susceptibility map <u>should not be used for regulatory or insurance purposes</u> in place of the FEMA map, but is only a tool that can be used for planning purposes.**



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Summary

- Correlated several non-climatic flood risk factors to 100-year FEMA flood hazard area.
- Logistic regression showed that “Elevation” and “Distance to Water” contribute most to flood susceptibility in urban and coastal sub-regions.
- “Surficial Materials” and “Distance to Water” contribute most in rural sub-region.
- “Elevation” and “Land Use” show greatest increase between rural and urban sub-regions.
- Flood susceptibility map showed a wider area susceptible to flooding than FEMA flood map (though FEMA map should still be used for insurance purposes)