***Assessing Flooding Adaptation Needs in the City of Charleston, SC*: a climate extension approach to catalyze climate change adaptation planning**

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NOAA in the Carolinas 2012 Meeting
March 15, 2012

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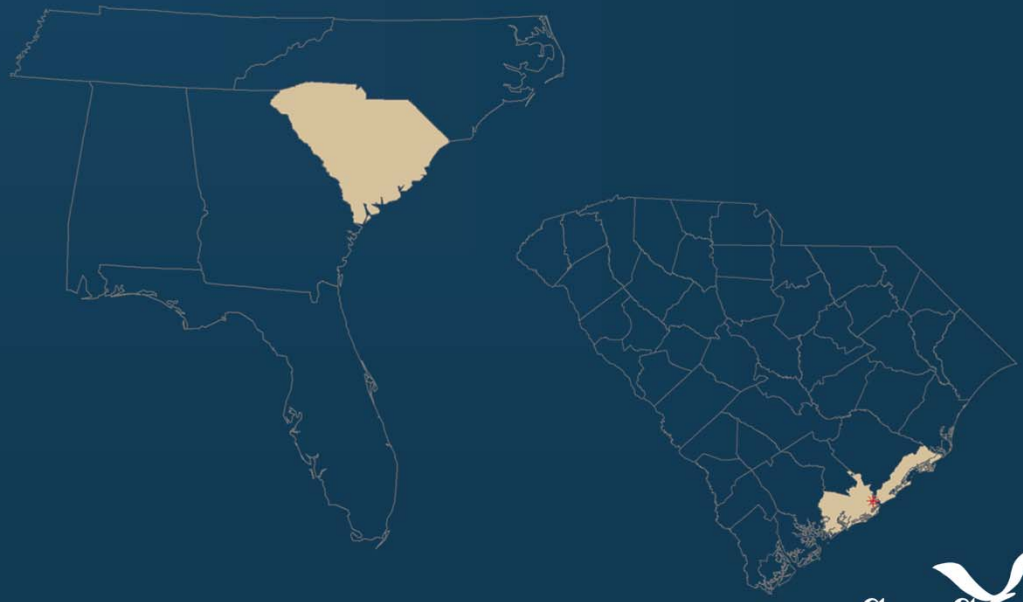
Addressing Sea Level Rise in Charleston, S.C.

- Many decision-makers do not believe climate is changing.
- Climate change - insufficient motivation for adaptation planning
  - Flooding issues - a primary concern



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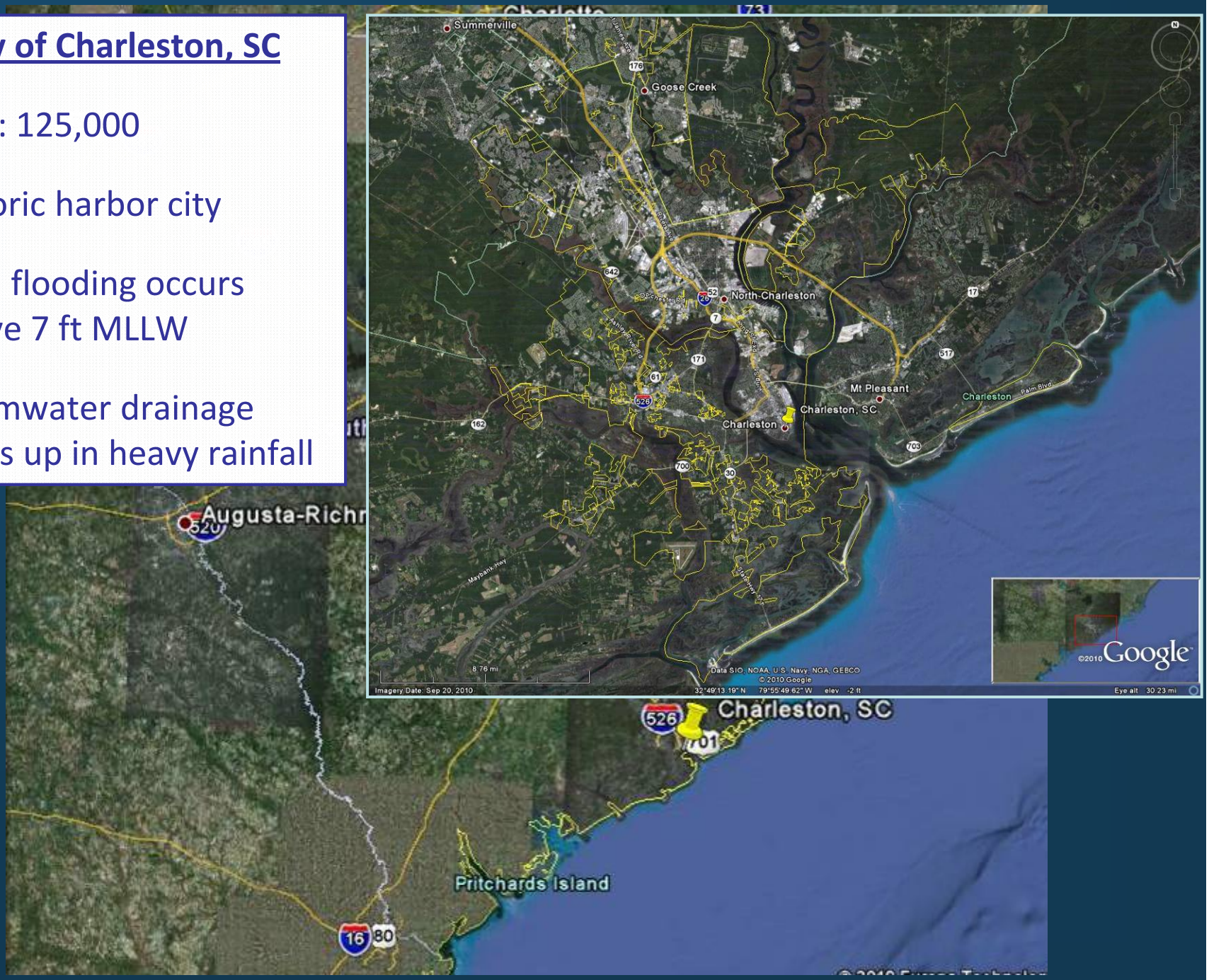
City of Charleston, SC

- Pop.: 125,000
- Historic harbor city
- Tidal flooding occurs above 7 ft MLLW
- Stormwater drainage backs up in heavy rainfall



Partners

- City of Charleston
- NOAA Coastal Services Center
- College of Charleston

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Climate Extension Strategies

- Focus on science and risk, not politics
- Relate climate to management concerns
- Take advantage of existing planning structures
- Encourage flexibility

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Previous CSC Charleston tidal flooding map

Today: ***2 days a year***

0.5m SLR: ***289 days a year***

(http://www.csc.noaa.gov/digitalcoast/action/hazards/chsflood.html)

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Tailored Methodology for Sea Level Rise

- Multiple partner meetings
- Focus group with city staff on tidal flooding
  - Planning, Public Works, Engineering Consultants
  - Questions
  - Evaluate CSC Fact Sheet
- Simple inundation mapping using LIDAR DEM

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Charleston Focus Group Results

- Understand flooding changes over time
- Could account for flooding in decision-making
  - Increase awareness of repetitive flooding damage
  - Use range of available no/low regrets options
  - Modify standards/processes to extent possible
- Need more than simple SLR inundation maps
  - Account for "one-two punch" of rainfall/tides
  - Include stormwater drainage infrastructure
- Make outreach materials less technical!

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Revised CSC Fact Sheet

TODAY'S FLOOD IS TOMORROW'S HIGH TIDE

Sea level rise will turn occasional coastal flooding into a regular event.

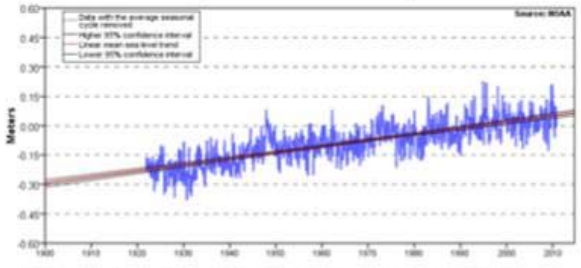
During a tidal flooding event on October 8, 2010, high tide reached 7.66 feet. Wind was from the northeast at less than 10 mph. There was no rain. Had rain accompanied the high tide, flood conditions would have been more extreme.

Tidal Flooding

Charleston, South Carolina. Lowcountry residents are all too familiar with the periodic flooding that occurs during extreme high tides. During these events, salt water backs up through storm drains and can cause hazardous road conditions. Traffic patterns are disrupted, and motorists are forced to take alternate routes. Rain and onshore winds can push the tides even further inland. When this happens, roads and businesses are sometimes forced to close. Damage to buildings from repeated saltwater intrusion is a near certainty.

Water level data measured since the early 1920s in Charleston Harbor indicate a slow increase in sea level. Five flood-producing tides (defined as seven feet or more) were predicted for 2010. These types of predictions don't take into account the increased extent of the flooding made likely when rainfall and winds are added. Data records indicate that water levels reached seven feet or higher 19 times in 2010. As sea level continues to rise, tides will be higher. Eventually today's occasional coastal floods will become regular events.

Water Level Data for Charleston, South Carolina



While some may debate why sea levels are rising, the facts are irrefutable: In Charleston, sea level has risen the equivalent of 1 foot in 100 years.

NOAA Coastal Services Center | South Carolina Sea Grant Consortium | City of Charleston

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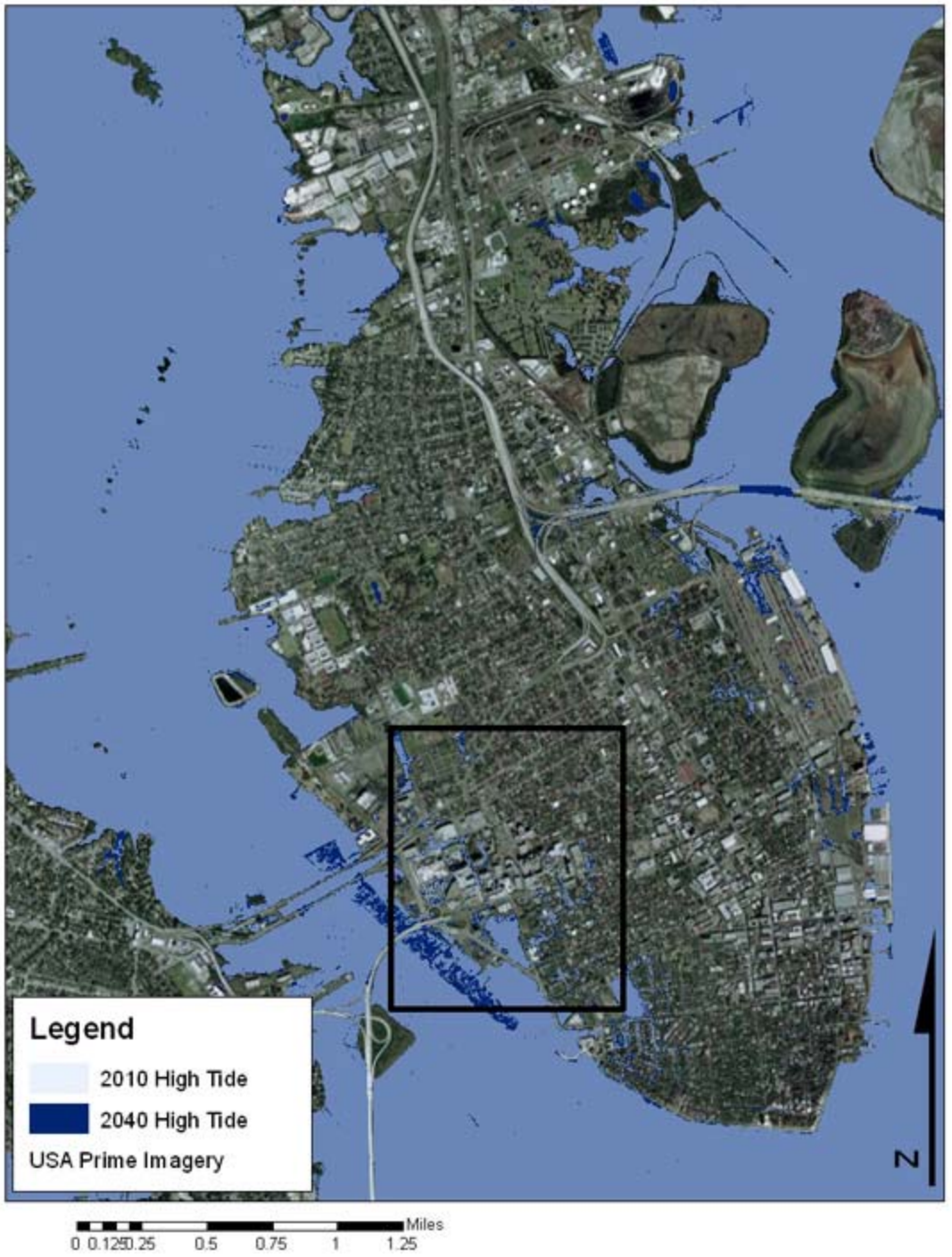
CofC Tidal DEM

- LIDAR base DEM for downtown peninsula
- Current SLR rate through 2040
- Water table height on dry land
- Overlaid building footprints, road infrastructure



Courtesy of NOAA CSC


Department of
Veterans
Affairs

Critical Infrastructure:

VA Hospital

Medical University of SC

Roper Hospital

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VA Hospital

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Roper Hospital

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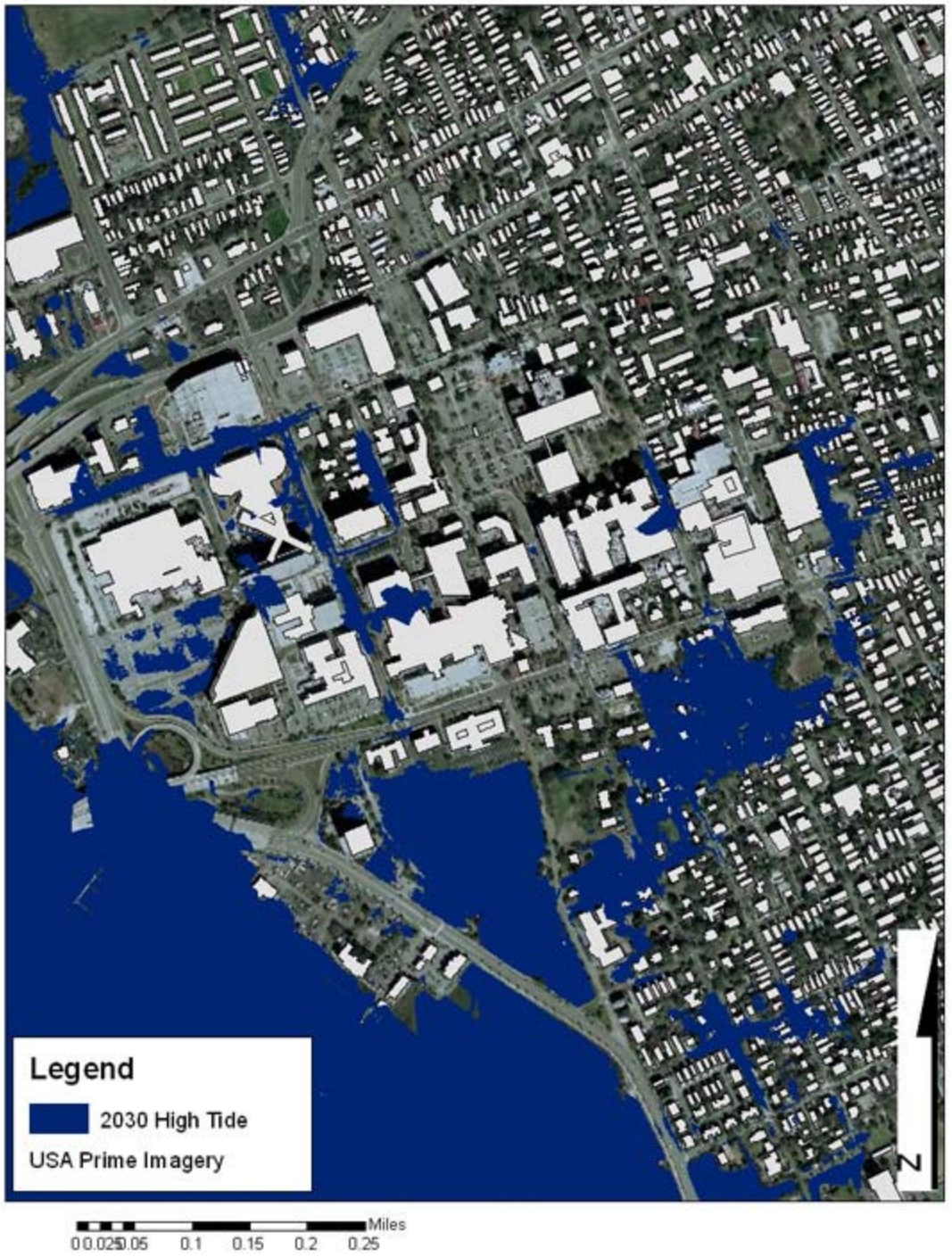

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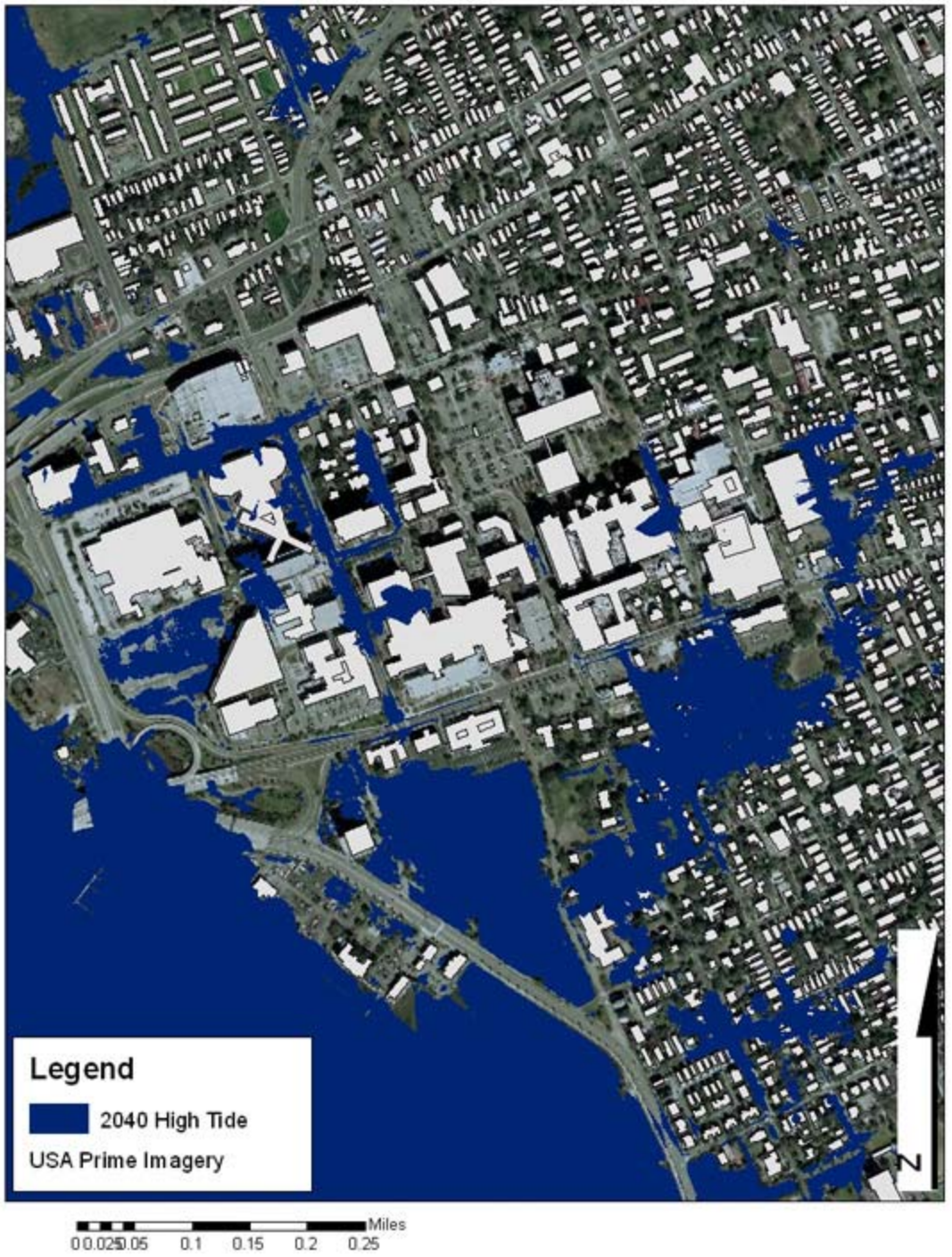

Possible Next Steps

- Distribute revised CSC fact sheet on flooding
- Create report for City of Charleston
- Seek funding for inundation mapping including drainage modifications
- Work with City on decision inventory?

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Lessons Learned

- Timing matters!
- Prepare for different interpretations.
- Manage expectations.
- Learn iteratively!
- Adaptation needs to become part of sustainability.

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- For more information contact:

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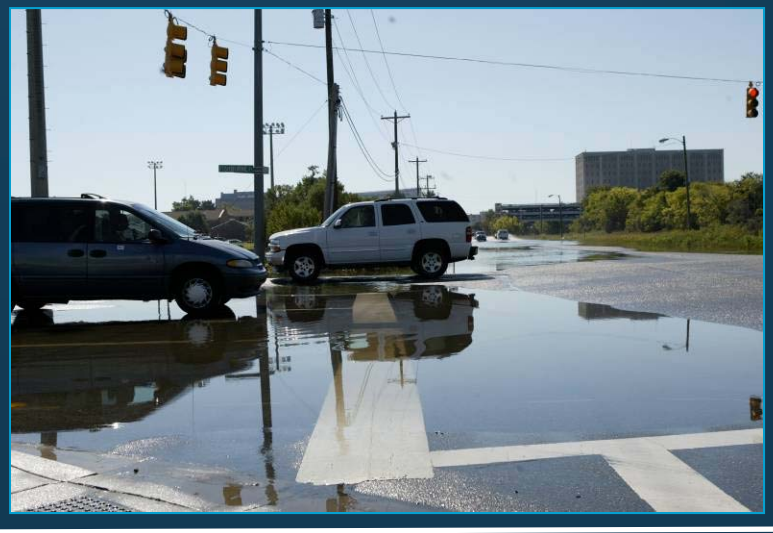

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