

Portsmouth

The City of Portsmouth is within the waters of N'dakinna, the homelands and waterways of the, Cowasuck Abenaki, Pennacook and other related Wabanaki Peoples past and present. I would like to acknowledge and honor with gratitude the land itself and the people who have stewarded it throughout the generations.





PORTSMOUTH'S HISTORIC DISTRICT AND SEA LEVEL RISE

Keeping History Above Water Portsmouth May 7-9 2023



BACKGROUND



City of Portsmouth, New Hampshire

COASTAL RESILIENCE INITIATIVE

Climate Change Vulnerability Assessment and Adaptation Plan

April 2, 2013





Preparing Portsmouth's Historic District for Sea Level Rise

Portsmouth, New Hampshire

GEI Consultants, Inc.
5 Milk Street
Portland, ME 04101
207-797-8901

August 28, 2018
Project 1702439

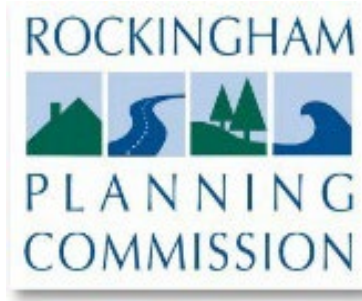
Samuel E. Merrill, Ph.D.
Senior Practice Leader

Project Partners:

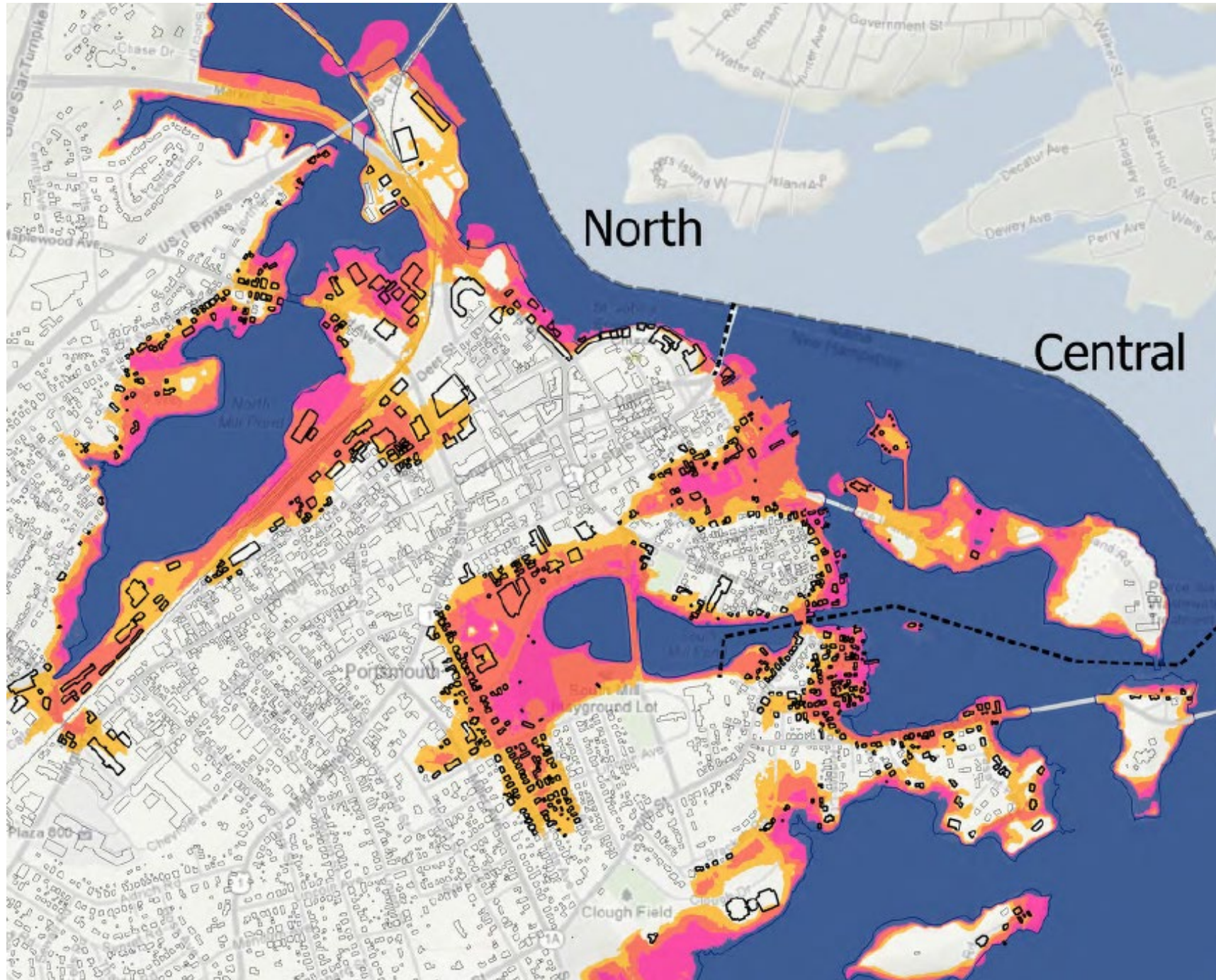


Alexander Gray
Adaptation Specialist





Portsmouth's Historic District and Sea Level Rise



13.5' Flooded Building Layer

Local Adaptation Committee

Assembled by City staff with >10 members from

- Historic District Commission
- Strawberry Banke
- Interested local businesses and residents
- City Departments

Five meetings through 2017

- Review project progress
- Evaluate results and how to use them
- Contribute to draft recommendations



Methods

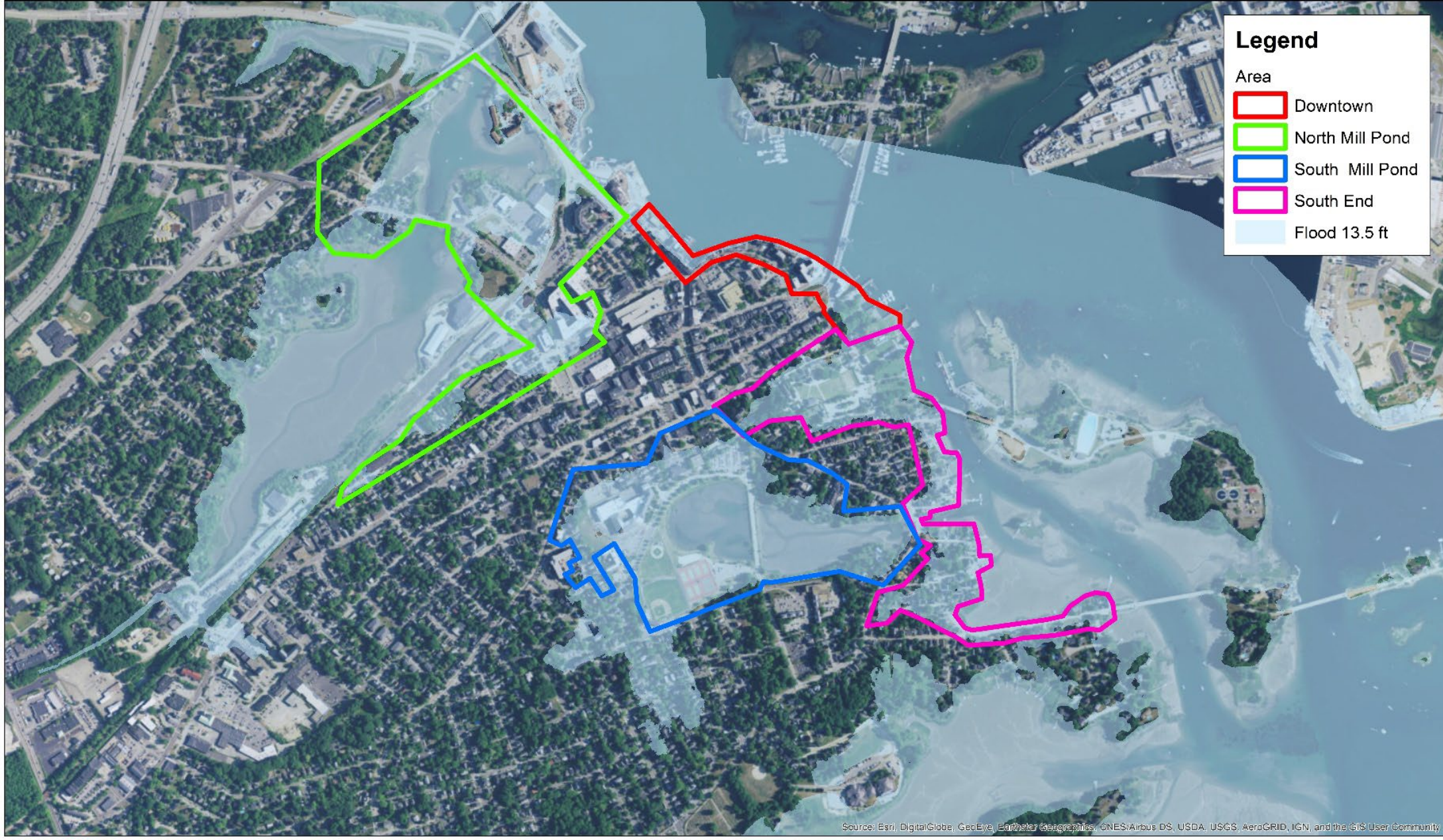
1. Identify four strategy areas
2. Survey parcels for their **historic value** scores
3. Determine **cultural resource value** scores
4. Calculate **tax value** scores
5. Calculate historic/cultural/tax Composite score
6. Calculate **risk** scores

7. Calculate **composite risk and value score**

Methods

1. Identify four strategy areas

Portsmouth's Historic District and Sea Level Rise

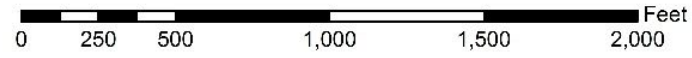


Legend

Area

- Downtown
- North Mill Pond
- South Mill Pond
- South End
- Flood 13.5 ft

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



Strategy Areas Map



Methods

1. Identify four strategy areas
2. Survey parcels for their **historic value** scores
 - Location
 - Design
 - Setting
 - Materials
 - Workmanship
 - Feeling
 - Association

For 503 parcels



Historic Valuation in the NRHP District



- Valuation Score 5
 - Retains all aspects of integrity
 - Very little or no alterations or modern materials
 - Historically sensitive restoration and/or renovation

Historic Valuation in the NRHP District



- Valuation Score 4
 - Retains nearly all aspects of integrity
 - Very few alterations
 - Only minor use of modern building materials
 - Historically sensitive restoration and/or renovation

Historic Valuation in the NRHP District



- Valuation Score 3
 - Retains some aspects of integrity
 - Large or significant alterations
 - Additions
 - Use of modern building materials and/or partial loss of original materials
 - Still retains some historic characteristics

Historic Valuation in the NRHP District

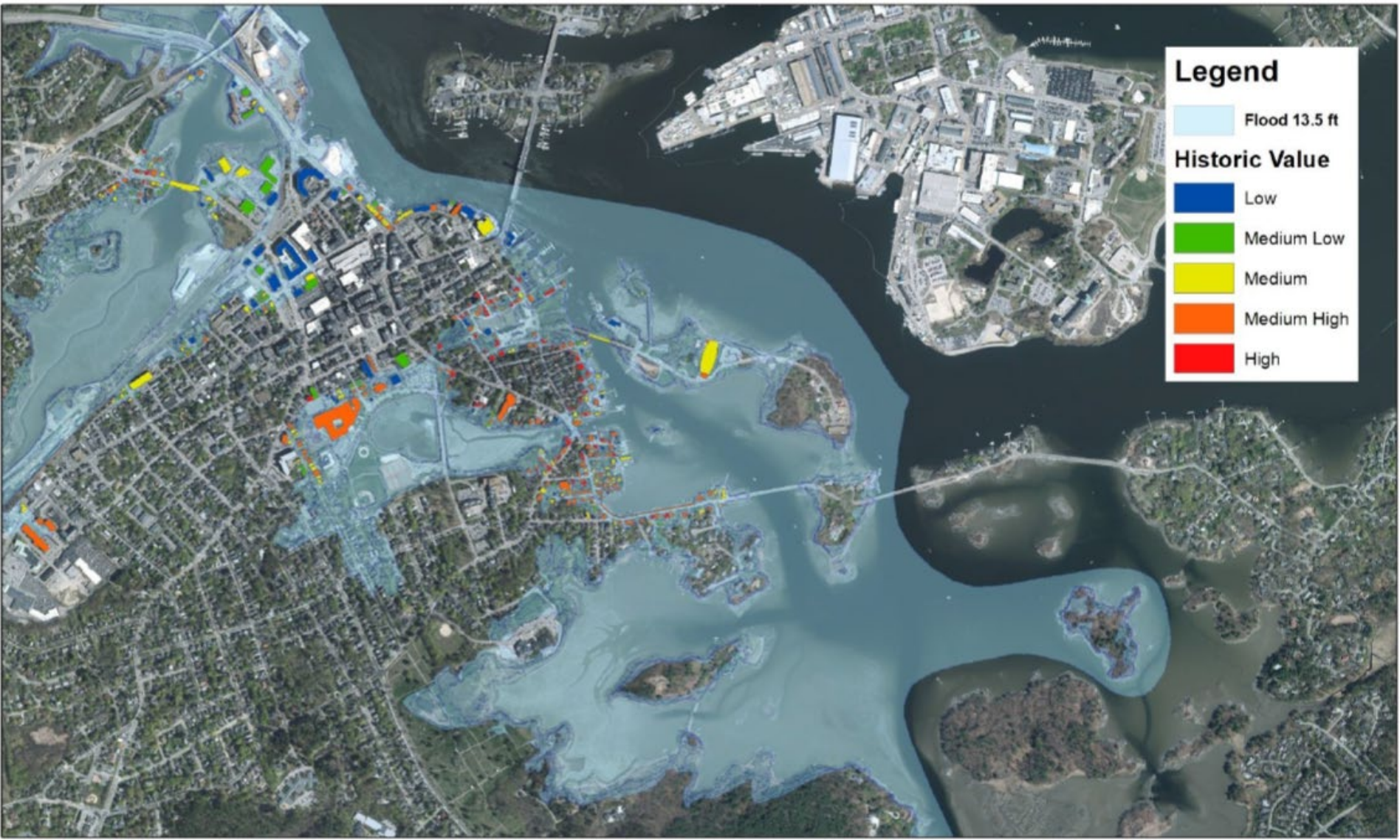


- Valuation Score 2
 - Retains very few aspects of integrity
 - Large or significant alterations
 - Additions, especially on the main facade
 - Use of modern building materials and loss of majority of original materials
 - Retains very few historic features

Historic Valuation in the NRHP District



- Valuation Score 1
 - Not of historic age
 - Retains almost no historic/original building materials
 - Major additions and/or alterations
 - No longer exhibits historic features



0 600 1,200 2,400 Feet

2015 Aerial Photography from NHGRANIT



Historic Value Map:
Buildings

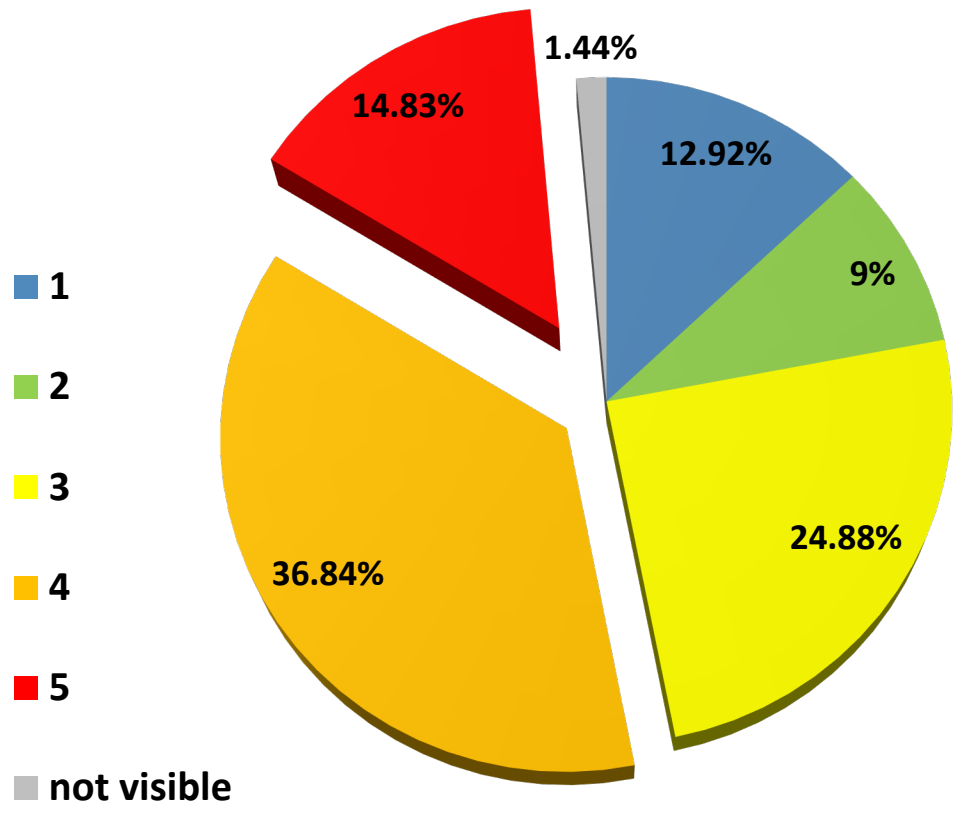




Historic Value Map:
Sites

Historic Valuation in the NRHP District

Value Scores



Methods

1. Identify four strategy areas
2. Survey parcels for their **historic value** scores
3. Determine **cultural resource value** scores

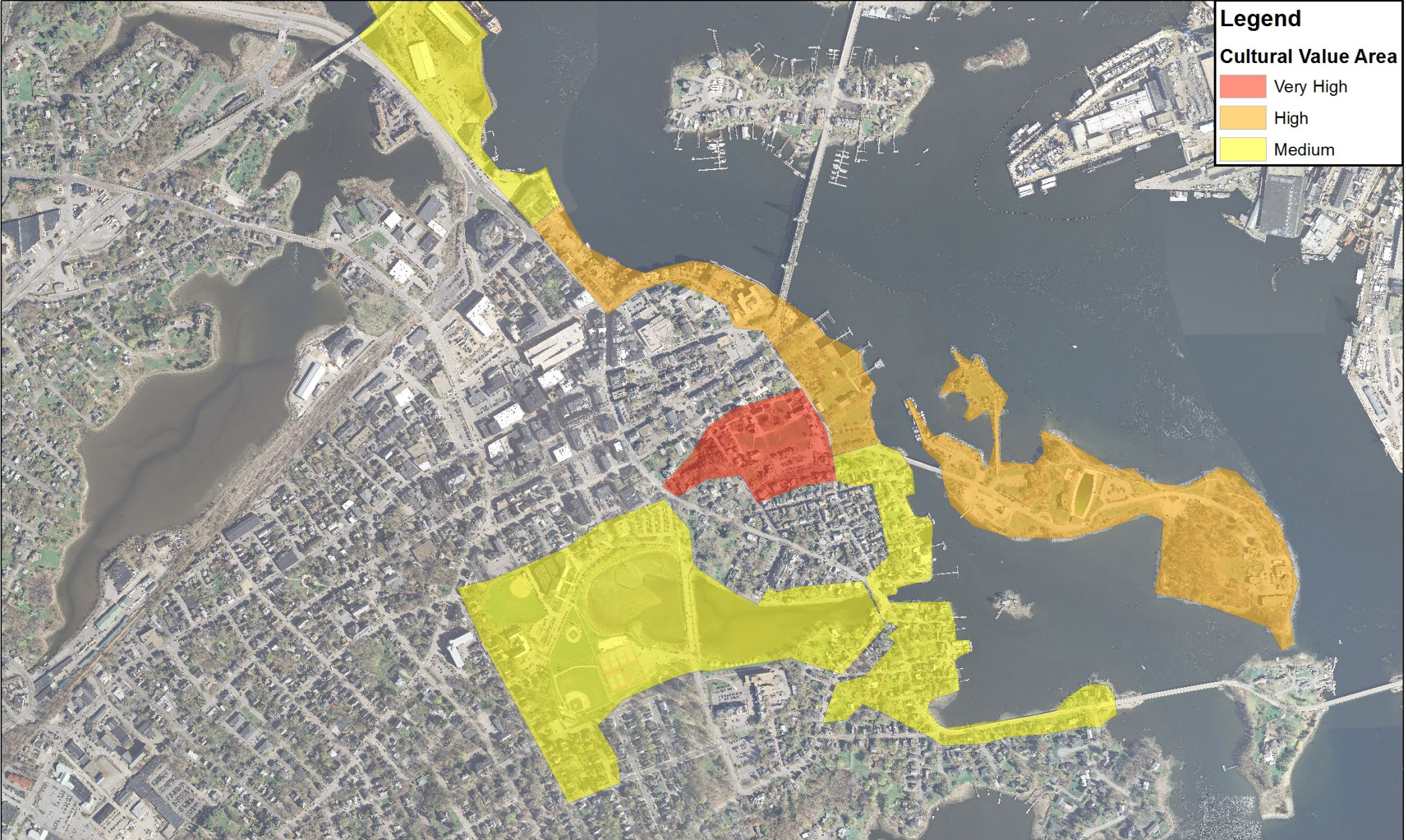


Cultural Value Areas Evaluation Matrix

- Public Use & Access
- Aesthetic Value
- Economic Value
- Educational Value
- Symbolic Value

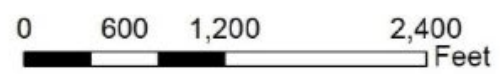
| # | CULTURAL VALUE AREA | SCORING - STEP 1 | | | RANKING - STEP 2 | | CULTURAL VALUE <i>(Final Score in Bold)</i> |
|---|--|------------------|-------------|---------------------|------------------|-------------|--|
| | | LAC Score | Staff Score | | LAC Score | Staff Score | |
| 1 | WORKING WATERFRONT | 0 | 0 | Public Use & Access | 0 | 0 | Very Low |
| | | 2 | 0 | Aesthetic Value | 0 | 2 | Low |
| | | 6 | 2 | Economic Value | 5 | 2 | Moderate |
| | | 2 | 2 | Educational Value | 0 | 0 | High |
| | | 6 | 4 | Symbolic Value | 0 | 0 | Very High |
| 2 | [Area Name] | 6 | 4 | Public Use & Access | 0 | 0 | Very Low |
| | | 6 | 4 | Aesthetic Value | 0 | 0 | Low |
| | | 6 | 4 | Economic Value | 3 | 1 | Moderate |
| | | 2 | 3 | Educational Value | 1 | 2 | High |
| | | 6 | 4 | Symbolic Value | 2 | 1 | Very High |
| 3 | PRESCOTT PARK | 6 | 4 | Public Use & Access | 0 | 0 | Very Low |
| | | 5 | 4 | Aesthetic Value | 1 | 0 | Low |
| | | 4 | 4 | Economic Value | 2 | 0 | Moderate |
| | | 2 | 4 | Educational Value | 2 | 4 | High |
| | | 3 | 4 | Symbolic Value | 1 | 0 | Very High |
| 4 | STRAWBERRY BANKE | 6 | 4 | Public Use & Access | 0 | 0 | Very Low |
| | | 6 | 4 | Aesthetic Value | 0 | 0 | Low |
| | | 6 | 4 | Economic Value | 0 | 0 | Moderate |
| | | 6 | 4 | Educational Value | 1 | 0 | High |
| | | 6 | 4 | Symbolic Value | 5 | 4 | Very High |
| 5 | PEIRCE ISLAND | 6 | 4 | Public Use & Access | 1 | 0 | Very Low |
| | | 4 | 2 | Aesthetic Value | 1 | 2 | Low |
| | | 4 | 3 | Economic Value | 2 | 2 | Moderate |
| | | 2 | 2 | Educational Value | 2 | 0 | High |
| | | 4 | 3 | Symbolic Value | 0 | 0 | Very High |
| 6 | CIVIC CAMPUS ALONG THE SOUTH MILL POND | 6 | 4 | Public Use & Access | 1 | 0 | Very Low |
| | | 5 | 2 | Aesthetic Value | 0 | 2 | Low |
| | | 2 | 0 | Economic Value | 2 | 2 | Moderate |
| | | 5 | 4 | Educational Value | 3 | 0 | High |
| | | 3 | 1 | Symbolic Value | 0 | 0 | Very High |
| 7 | SOUTH END NEIGHBORHOOD | 5 | 3 | Public Use & Access | 0 | 0 | Very Low |
| | | 6 | 4 | Aesthetic Value | 1 | 0 | Low |
| | | 6 | 4 | Economic Value | 1 | 0 | Moderate |
| | | 4 | 4 | Educational Value | 1 | 1 | High |
| | | 5 | 4 | Symbolic Value | 3 | 3 | Very High |

Portsmouth's Historic District and Sea Level Rise



0 300 600 1,200 1,800 2,400 Feet





2015 Aerial Photography from NHGRANIT



Cultural Value Map: Buildings



Methods

1. Identify four strategy areas
2. Survey parcels for their **historic value** scores (1 – 5)
3. Determine **cultural resource value** scores (1 – 5)
4. Calculate **tax value** scores





0 600 1,200 2,400 Feet

2015 Aerial Photography from NIHGRANIT



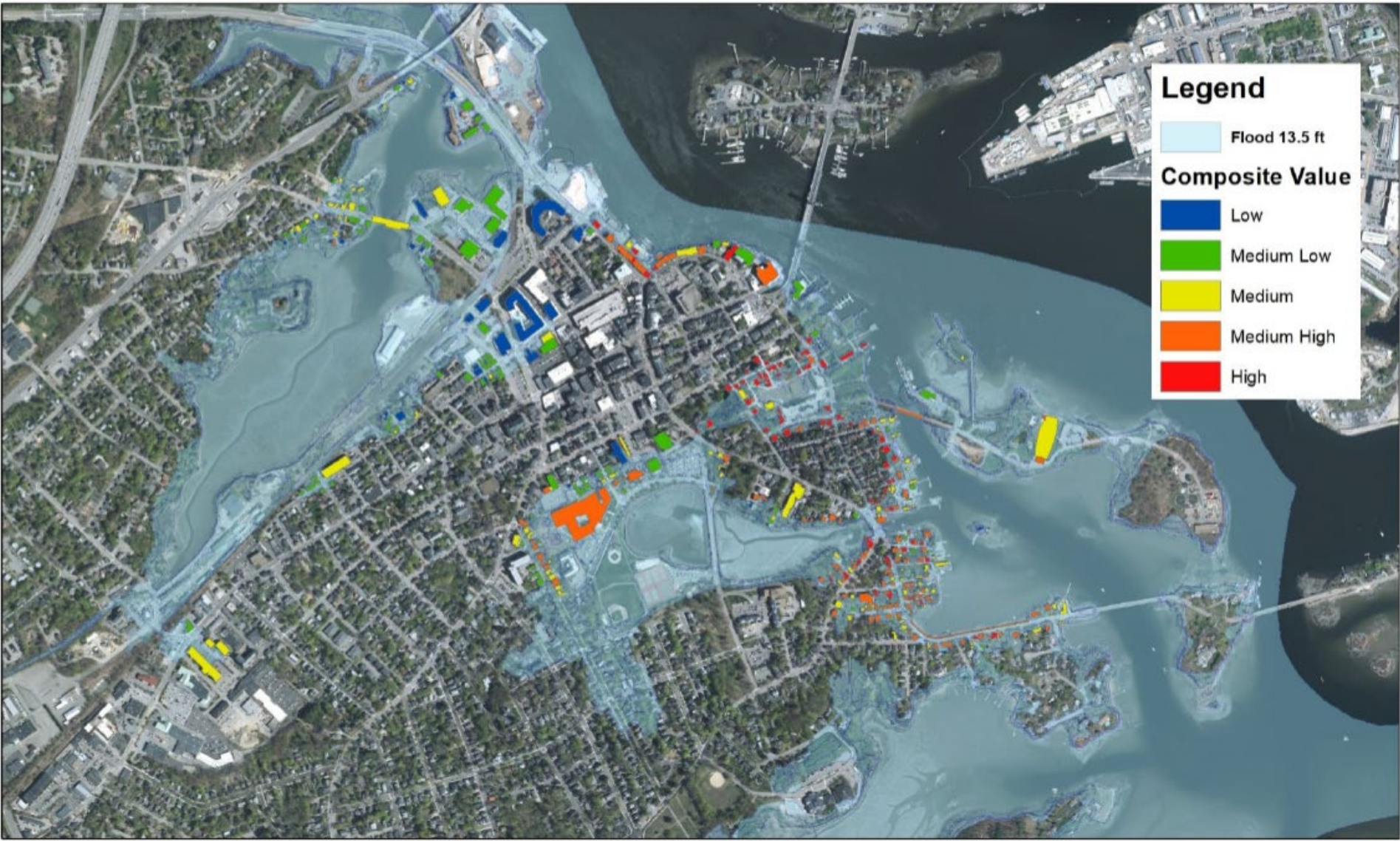
Tax Value Map:
Buildings



Methods

1. Identify four strategy areas
2. Survey parcels for their **historic value** scores
3. Determine **cultural resource value** scores
4. Calculate **tax value** scores
5. **Calculate historic/cultural/tax Composite score**





Legend

Flood 13.5 ft

Composite Value

- Low
- Medium Low
- Medium
- Medium High
- High



2015 Aerial Photography from NHGRANT

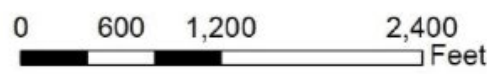


Composite Value Map:
Buildings



1. Identify four strategy areas
2. Survey parcels for their **historic value** scores
3. Determine **cultural resource value** scores
4. Calculate **tax value** scores
5. Calculate historic/cultural/tax Composite score
- 6. Calculate risk scores**





2015 Aerial Photography from NHGRANIT

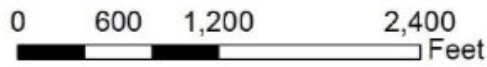
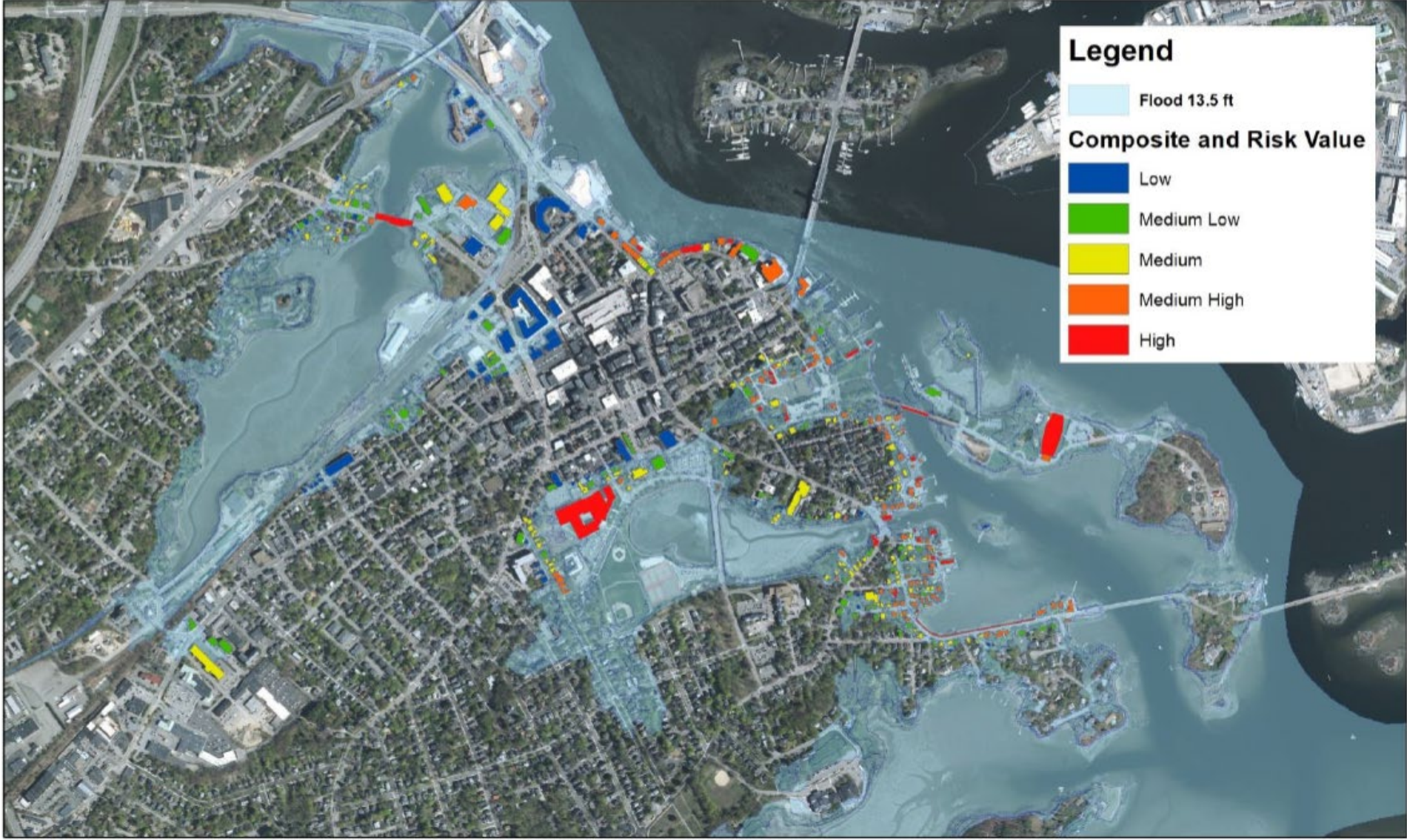


Risk Map:
Buildings



Methods

1. Identify four strategy areas
2. Survey parcels for their **historic value** scores (1 – 5)
3. Determine **cultural resource value** scores (1 – 5)
4. Calculate **tax value** scores (1 – 5)
5. Calculate **risk** scores (1 – 5)
6. Calculate composite **risk and value score**

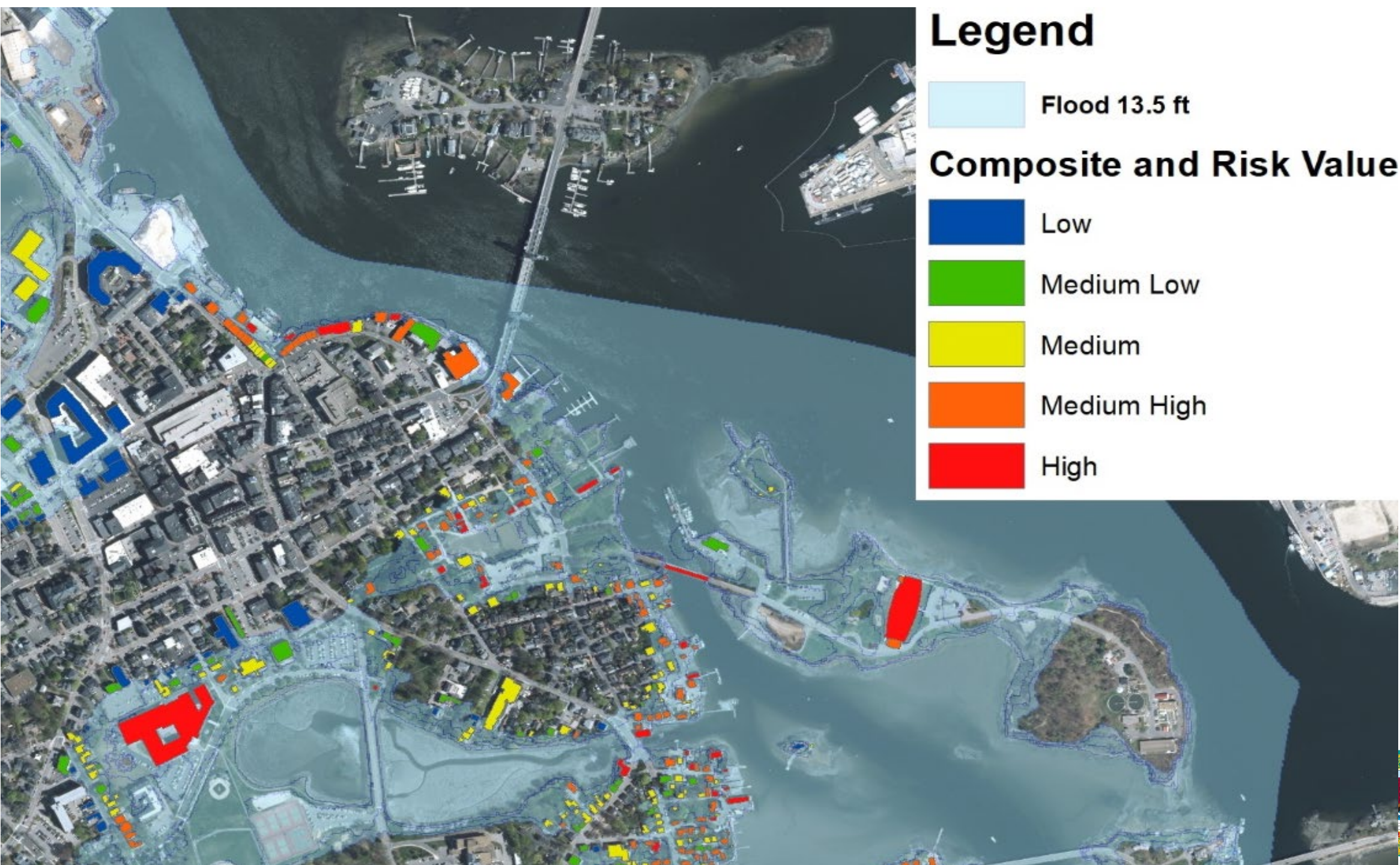


2015 Aerial Photography from NHGRANIT

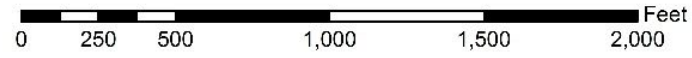
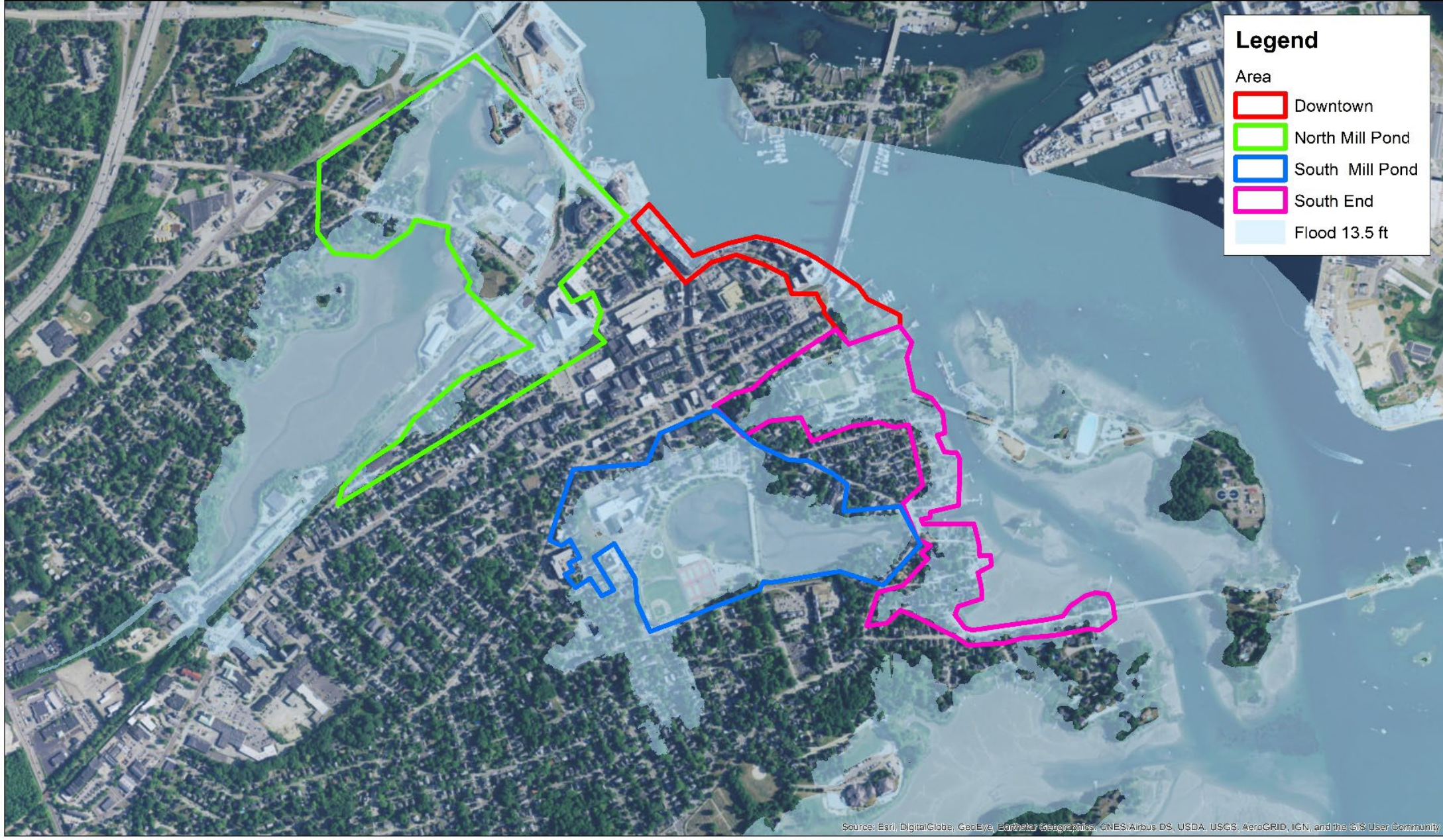


Composite and Risk Value Map:
Buildings





Portsmouth's Historic District and Sea Level Rise



Strategy Areas Map



Adaptation Actions

- 1) Examined 16 candidate locations and specific actions
- 2) Considered planning and emergency management actions
- 3) Developed possible groundwater monitoring actions

Adaptation Actions

- 1) Examined 16 candidate locations and specific actions
 - Grouped by neighborhood and action type
 - Presented in an interactive online format

Portsmouth Historic Vulnerability Assessment

Portsmouth Historic Properties Climate Change Vulnerability Assessment and Adaptation Planning Initiative
Using coastal flooding projections, Historic District studies, and input from the Local Adaptation Committee, a set of adaptation actions has been developed to illustrate a range of approaches that may merit further consideration by the City. For each of 16 actions, this site discusses feasibility, potential effectiveness, cost, and impact on historic character.



16-18

 ADD SECTION

 ORGANIZE



Story Map Online Visualization

Actions evaluated included

- Floodproofing structures (dry and wet techniques)
- Structural elevation
- Sea walls, revetments
- Voluntary buyout programs
- Floodproofing rebate programs

<https://arcg.is/1XXj5u>





Portsmouth Historic Vulnerability Assessment

Strategy #15



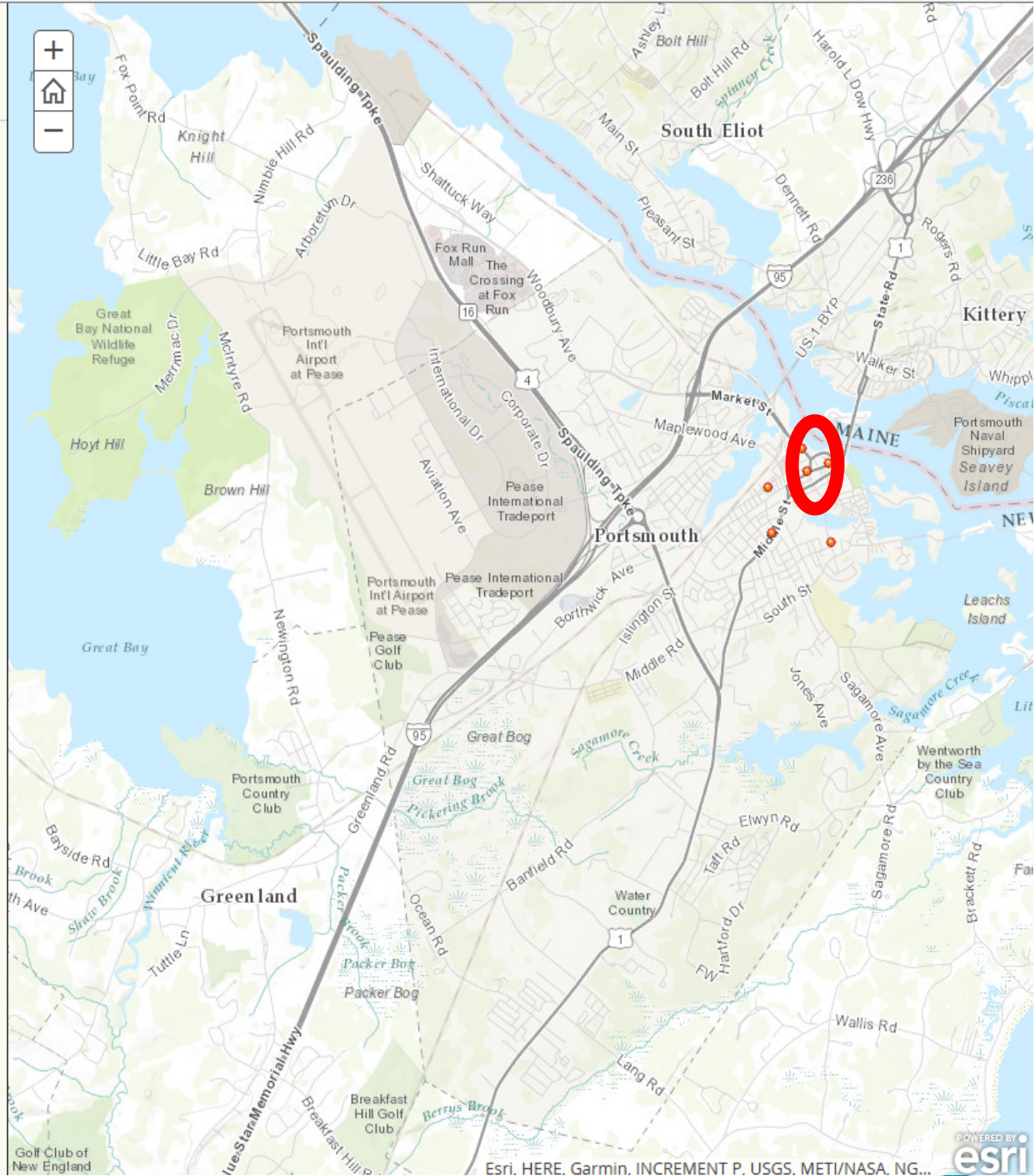
Market and Ceres Streets/Warehouses

Candidate Actions

Dry floodproof, abandon below grade space

Potential Feasibility

Dry floodproofing is a standard approach used in many commercial and residential coastal settings that involves keeping water out of the structure and away from its contents. It comprises a diverse set of possible activities including sealing exterior brick and concrete, closing basement openings, and arranging for immediate availability of temporary flood barriers over doors and windows. These buildings of masonry construction are good candidates for dry floodproofing. Openings around the perimeter of the buildings can be protected with removable flood coverings over doors and windows, which can be stored when flood conditions are not present. The first several feet of brick can be sealed with impermeable coating and recovered with false brick covering to eliminate the appearance of a modified structure. An additional strategy to consider is providing incentives to encourage abandonment of below grade space, including providing incentives for termination of all business activity there and moving objects to higher floors. Feasibility of these actions is often determined by cost, who would pay, and public or private acceptance of both the possible aesthetic changes and the reduction in business activity that might accompany abandonment of commercial space currently in use. Although these actions may be feasible in this location, firm conclusions would need to be further evaluated through additional engineering, and conversations with property



Story Map Online Visualization

For each action we discuss:

- Potential feasibility
- Potential effectiveness
- Potential cost
- Potential impacts to historic character

<https://arcg.is/1XXj5u>



Adaptation Actions

- 1) Examined 16 candidate locations and specific actions
- 2) Considered planning and emergency management actions
- 3) Developed groundwater monitoring actions



Possible Planning Actions

City of Portsmouth Master Plan (2017)

Theme 2 Authentic. A city that treasures its unique character, natural resources, and historic assets.

Action 2.1.1. Implement standards and guidelines to protect community character and assets, including....resilience.

Theme 5 Resilient. A city that considers and values the long-term health of its natural and built environments.

Action 5.5.1. Incorporate sea-level rise projections....into adaptation planning and land use regulations.

Local Design and Guidelines

Flood Risk Assessment. Require evaluation of 100-year/1% chance flood and projected sea-level rise

Resilient Design. Require for developments in identified high risk flood areas

Habitat and Shoreline Protection. Encourage “living shoreline” practices where feasible

Property Buy-Out Program. Voluntary program; convert land to open space, parks, flood storage



Possible Planning Actions

Regulatory Options

Section 10.620 - Portsmouth's Flood Plain District

Variations. When a variance is requested, require that utilities be relocated to appropriate elevations (may be determined on a case by case based on flood depth maps) when interior renovations are made, and floodproofing to the extent practicable when exterior renovations are made.

Section 10.630 - Portsmouth's Historic District

Exempt Activities. Add incentives and performance standards for adaptation strategies.

Certificate of Approval - Major Projects. Add requirements for adaptation strategies.

Design Guidelines. Develop guidelines and policies that encourage adaptation strategies.

Possible Planning Actions

Historic District Flood Hazard Adaptation Plan to provide a long-term framework for floodproofing of structures, and opportunities for protection or relocation of structures.

Extended Flood Hazard Overlay District Capture high risk flood areas not contained within the current 100-year/1% chance annual flood area. For example a requirement that properties include a 2 foot first floor finished elevation above the 100 year floodplain.

Infrastructure Planning. Establish road and street elevations based on flood elevations in high risk flood areas. Determine costs associated with maintenance and reinforcement of critical infrastructure based on increasing flood risks.

Guidance for voluntary adaptation actions by property owners.

Possible Emergency Management Actions

Recommendation

Addendum to Hazard Mitigation Plan (HMP) designating high-risk flood area of the Historic District, as identified in this assessment, as a “special flood mitigation area” for the purpose of protecting against and mitigating flood impacts from sea-level rise and storm surge. Specific flood hazard mitigation strategies should describe specifically what historic resources in the designated area would be saved or protected.

Other Recommendations

Adopt Addendum to HMP and incorporate in 2022 HMP update.

Incorporate HMP adaptation measures into Capital Improvement Plan and DPW work plan.

Convene an annual meeting of the HMP workgroup to evaluate implementation progress.

Explore public/private partnerships for implementation of adaptation measures.

Provide public outreach about the benefits of flood insurance.

Adaptation Actions

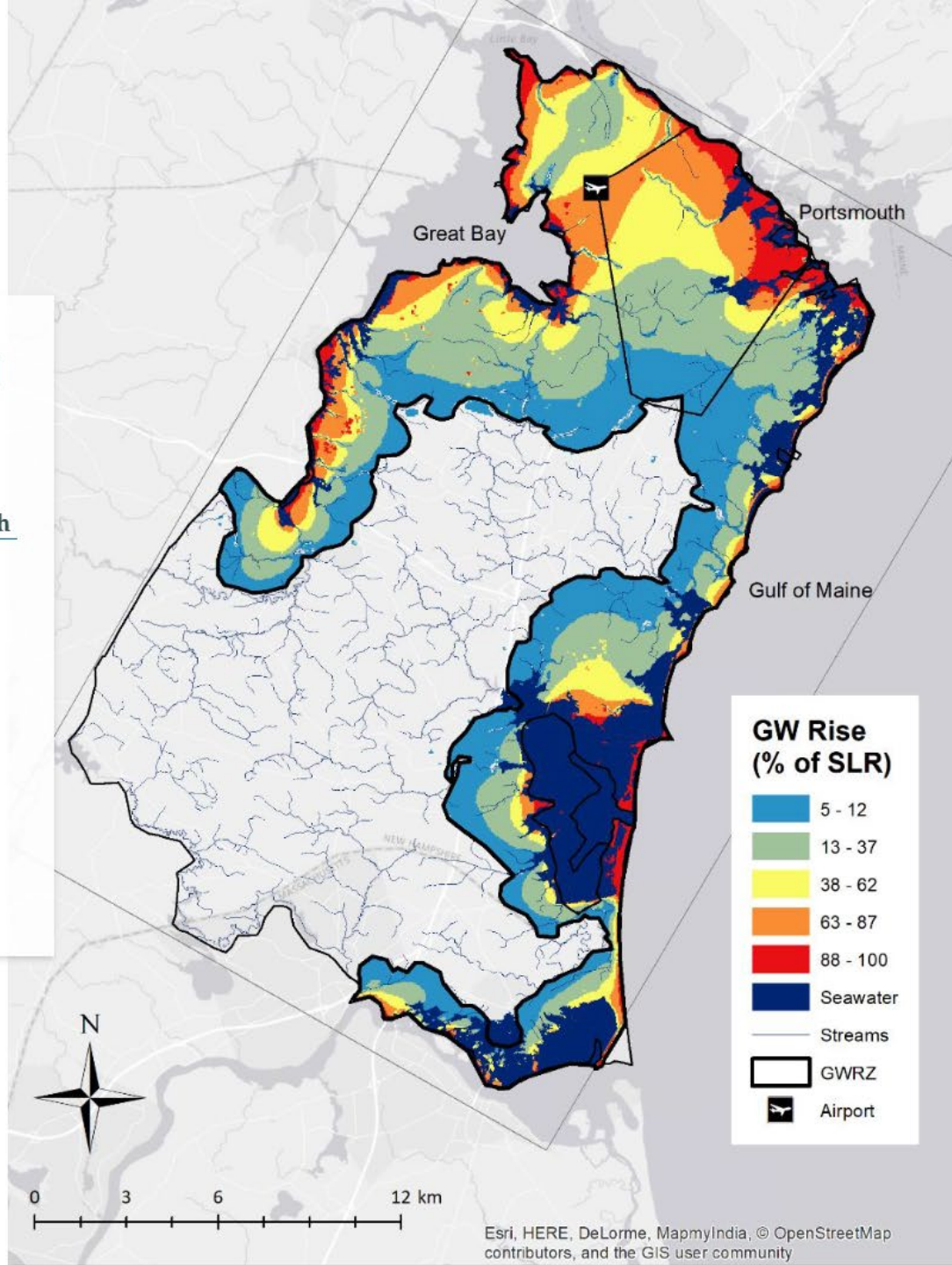
- 1) Examine 16 candidate locations and specific actions
- 2) Considered planning and emergency management actions
- 3) Developed groundwater monitoring actions



Groundwater Flooding in Historic Portsmouth

As part of the vulnerability assessment, the Groundwater Flooding In Historic Portsmouth Story Map was developed. The story map provides information about how these at-risk areas suffer not just from coastal flooding and storm surge events, but also from groundwater flooding, an often overlooked threat that is especially prevalent in Portsmouth and is starting to raise concern.

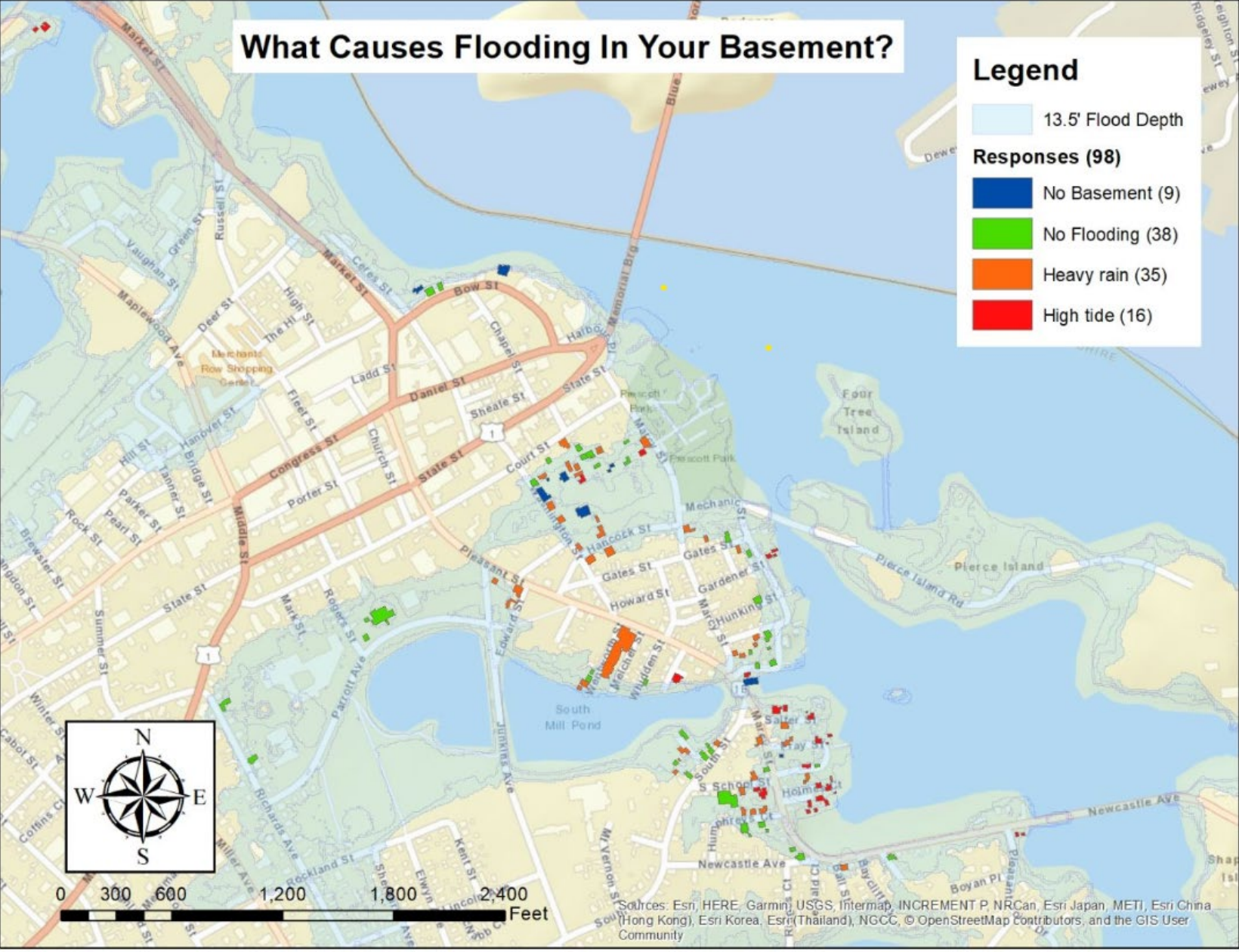
[Go To Groundwater Flooding Map](#)



Collaborative Monitoring

- Steps taken to track changes that could trigger actions in policy, finance, or other adaptation action. e.g.,
 - Property owners checking basements for humidity and standing water, possibly through checklists provided to homeowners with request for data submission.
 - The City establishing a new network of groundwater monitoring wells and a system to track changes over time and identify appropriate actions at certain trigger points.

What Causes Flooding In Your Basement?





GROUNDWATER

Strawbery Banke Museum prepared a short video
(<https://www.youtube.com/watch?v=IHAPJUQGwjg>)

Looking at the potential impacts of groundwater flooding.

