



Blue Hill Climate Vulnerability Assessment Final Project Presentation

Leila Pike, P.E.

Project Goals

GOALS

1. Understand **climate threats** in Blue Hill, Brooksville, and Surry

WORK PRODUCTS



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WORK PRODUCTS

Joint Climate Vulnerability Report



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2. Evaluate coastal **flood risk** and **adaptation** options



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Coastal Flood Risk & Adaptation Report



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3. Introduce a **pilot project**



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Pilot Project Report



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Coastal Flood Risk & Adaptation Report



Pilot Project Report



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Coastal Flood Risk & Adaptation Report

Pilot Project Report

Community Science & StoryMap



Presentation Overview

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Climate Vulnerabilities

Created **report** that summarized these vulnerabilities for the **3 towns**:

- Heat
- Drought & Drinking Water
- Power Outages
- Ocean Acidification
- Plant Hardiness
- Tick-Borne Diseases
- The Working Waterfront



Climate Vulnerabilities

Findings and recommendations include:

DROUGHT & DRINKING WATER

Well water: high rates of arsenic contamination (>40% of tested wells); saltwater intrusion
Encourage testing of private wells, zoning around new well locations



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HEAT

More extreme heat days; warmer nights; Mainers particularly vulnerable
Establish public cooling centers; incentivize heat-pumps



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OCEAN ACIDIFICATION

Gulf of Maine vulnerable due to low pH and temperature
Reduce local nutrient loading via stormwater and wastewater management
Diversify fisheries to reduce economic reliance on sensitive species (e.g., clams, oysters)



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Coastal Flood Risk

Which areas and assets are at risk of coastal flooding due to **storm surge** and **sea level rise** now and in the future?

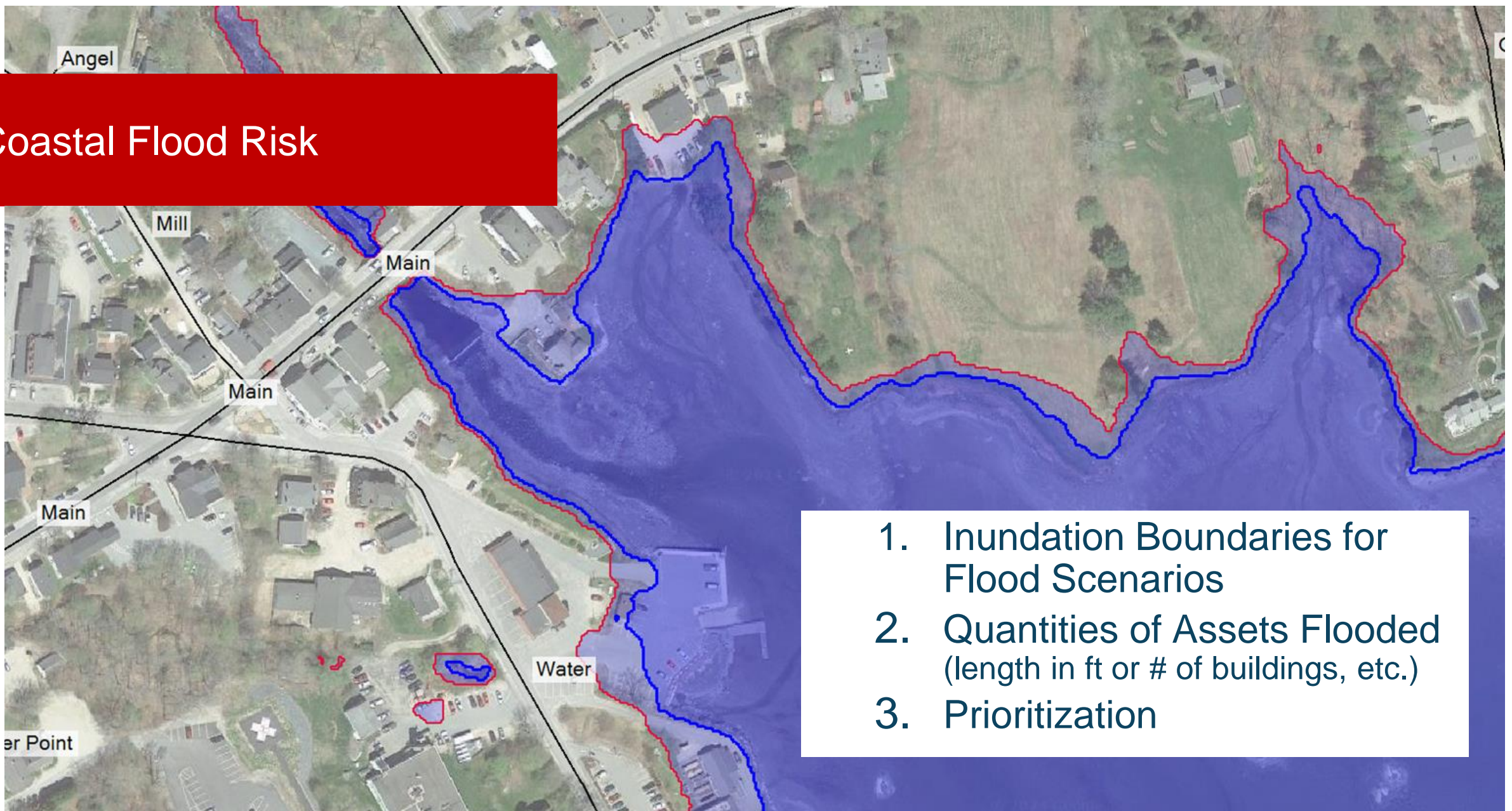


Coastal Flood Risk

Mapping Scenario	Flood Scenario	Water Level (ft, NAVD88)	SLR Amount (ft)
1	2050, High Tide, Commit to Manage	6.7	1.5
2	2070, High Tide, Commit to Manage	7.6	2.4
3	2070, High Tide, Prepare to Manage	8.2	3.0
4	Present Day, 100-yr Storm Surge	9.4	0.0
5	2090, High Tide, Prepare to Manage	10.2	5.0
6	2050, 100-yr Storm Surge, Commit to Manage	10.8	1.5
7	2070, 100-yr Storm Surge, Commit to Manage	11.7	2.4
8	2070, 100-yr Storm Surge, Prepare to Manage	12.3	3.0
9	2090, 100-yr Storm Surge, Prepare to Manage	14.3	5.0



Coastal Flood Risk



1. Inundation Boundaries for Flood Scenarios
2. Quantities of Assets Flooded (length in ft or # of buildings, etc.)
3. Prioritization



Coastal Flood Risk

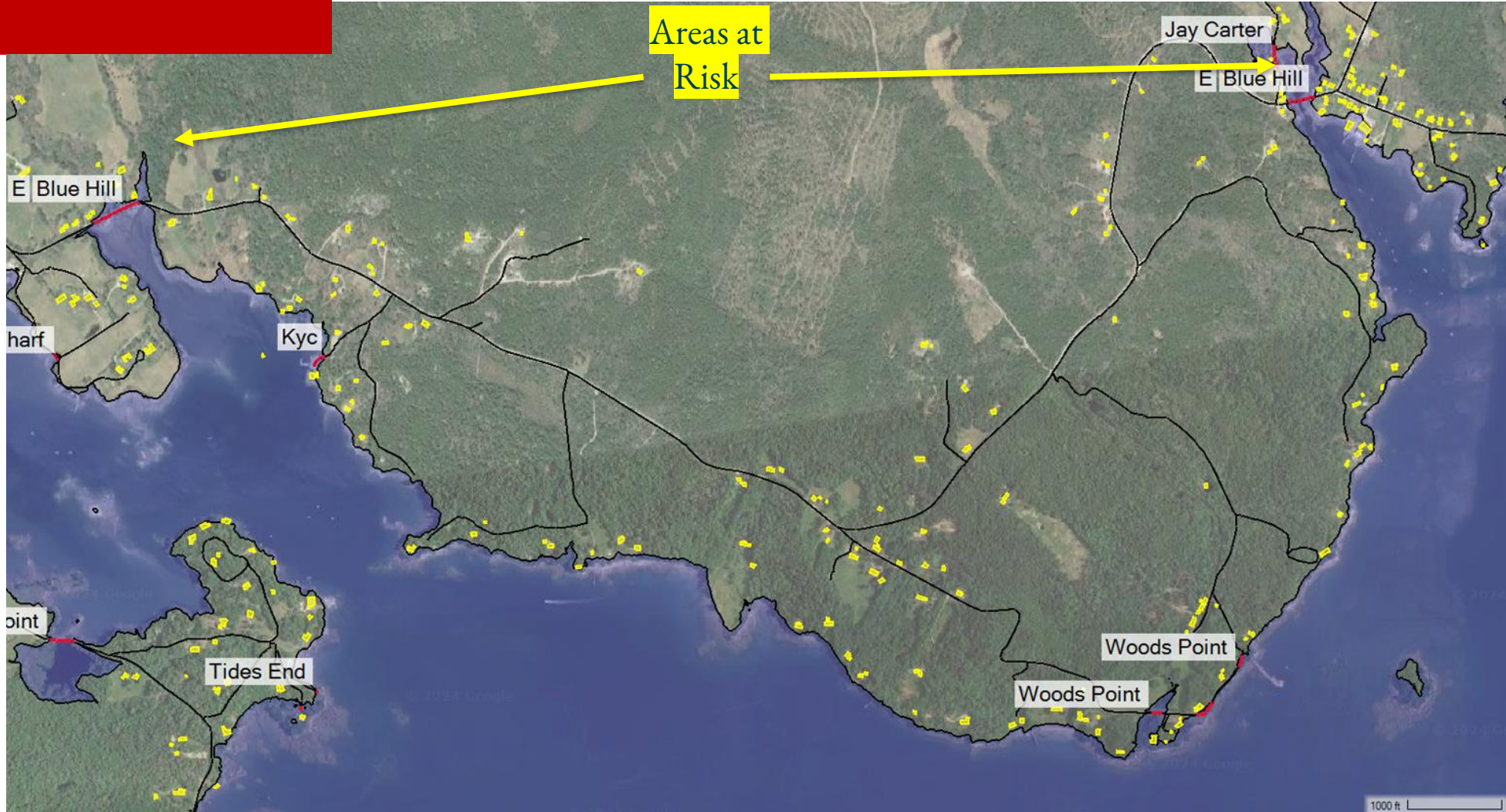
Road results & prioritization

Road Name	Ownership	1	2	3	4	5	6	7	8	9
High Priority Roads										
E Blue Hill Rd	State	-	-	-	-	24	165	424	522	821
Falls Bridge Rd	State	-	-	-	-	197	311	540	658	1,204
Parker Point Rd	Town	-	-	-	-	-	76	148	181	323
Jay Carter Rd	Town	-	-	-	-	-	-	147	202	289
Medium Priority Roads										
Kyc Ln	Town	-	-	37	101	131	140	153	156	175
Salt Pond Rd	State	-	-	-	-	78	111	151	169	223
Leveque Ln	Town	-	-	-	-	-	36	147	171	208
Curtis Cove Rd	Town	-	-	-	-	-	-	-	-	145
Low Priority Roads										
Steamboat Wharf Rd	Town	-	-	-	-	-	-	13	30	81
Shady Ln	Town	-	-	-	-	-	-	4	14	28
Allen Point Ln	Town	-	-	-	-	-	-	-	56	237
Osprey Ln	Town	-	-	-	-	-	-	-	-	13
SC Ln	Town	-	-	-	-	-	-	-	-	159
Seal Ledge Ln	Town	-	-	-	-	-	-	-	-	47
Tides End Ln	Town	-	-	-	-	-	-	-	-	34
Woods Point Rd	Town	-	-	-	-	-	-	-	-	477



Coastal Flood Risk

East Blue Hill Road



Coastal Flood Risk

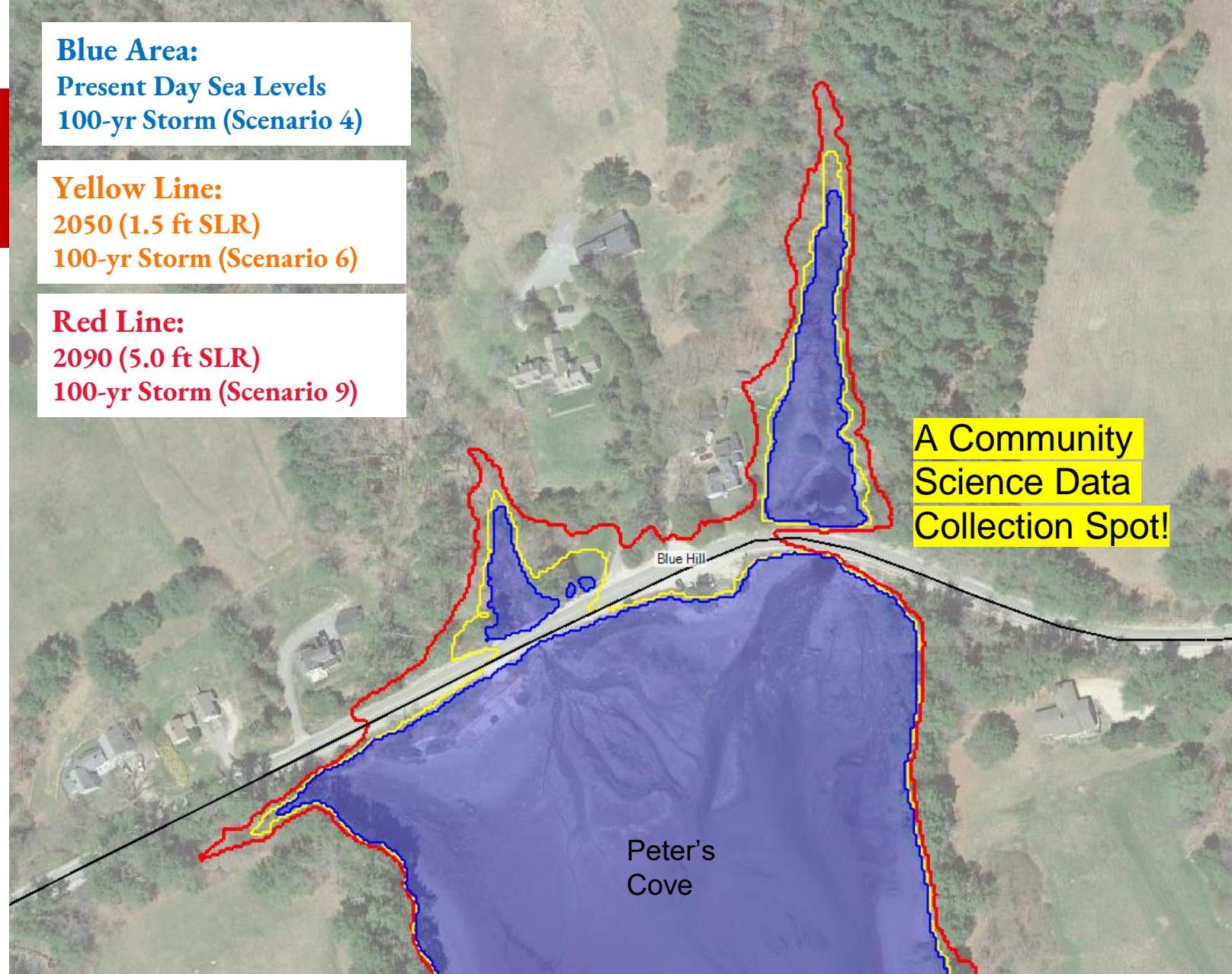
East Blue Hill Road:

- **Now:** Waves overtopping
- **2050 and beyond:** Standing water during 100-yr storms
- **2090:** High-Tide flooding
- **157 buildings isolated** when East Blue Hill Bridge also flooded; no alternate route

Blue Area:
Present Day Sea Levels
100-yr Storm (Scenario 4)

Yellow Line:
2050 (1.5 ft SLR)
100-yr Storm (Scenario 6)

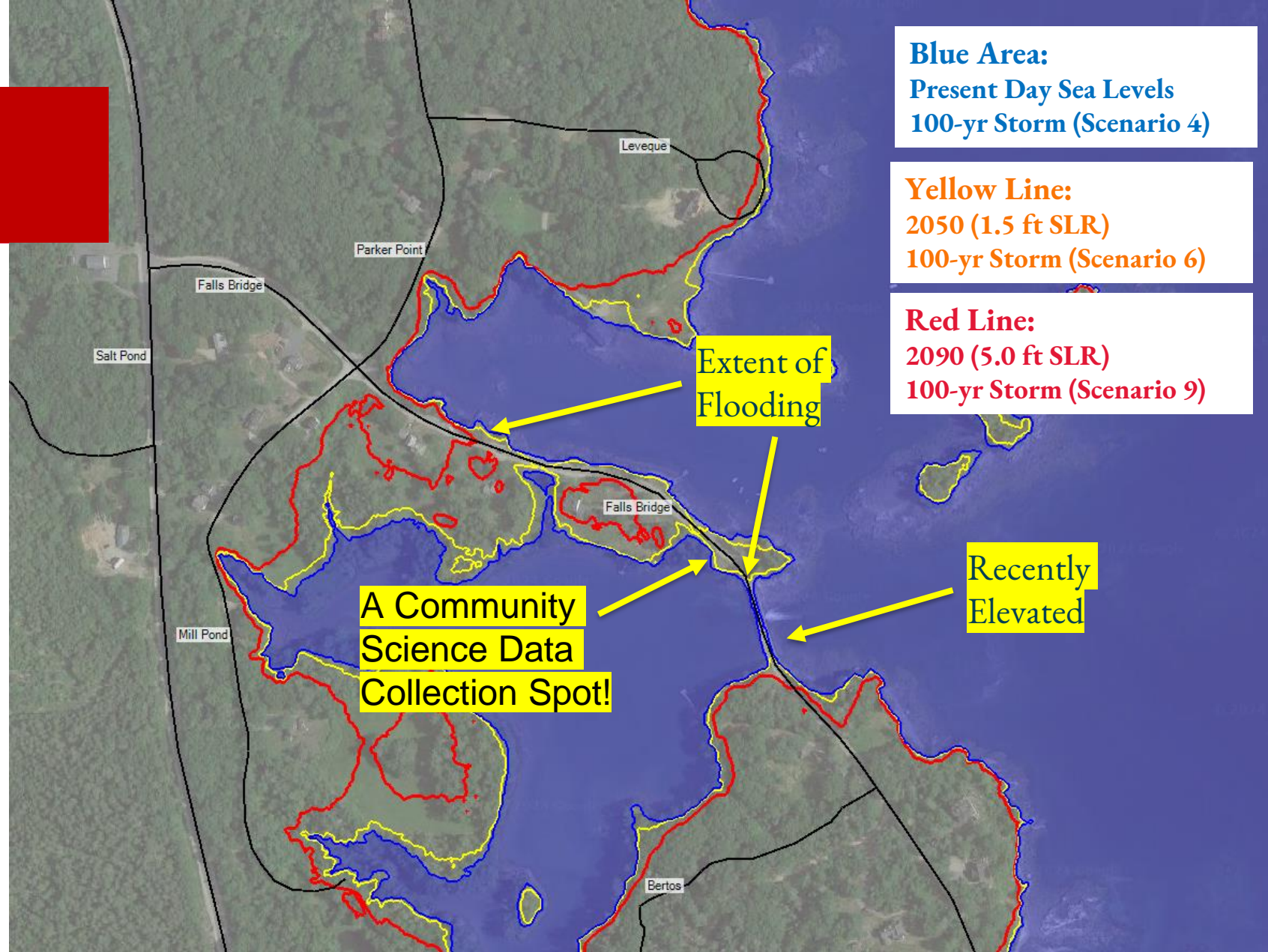
Red Line:
2090 (5.0 ft SLR)
100-yr Storm (Scenario 9)



Coastal Flood Risk

Falls Bridge Road:

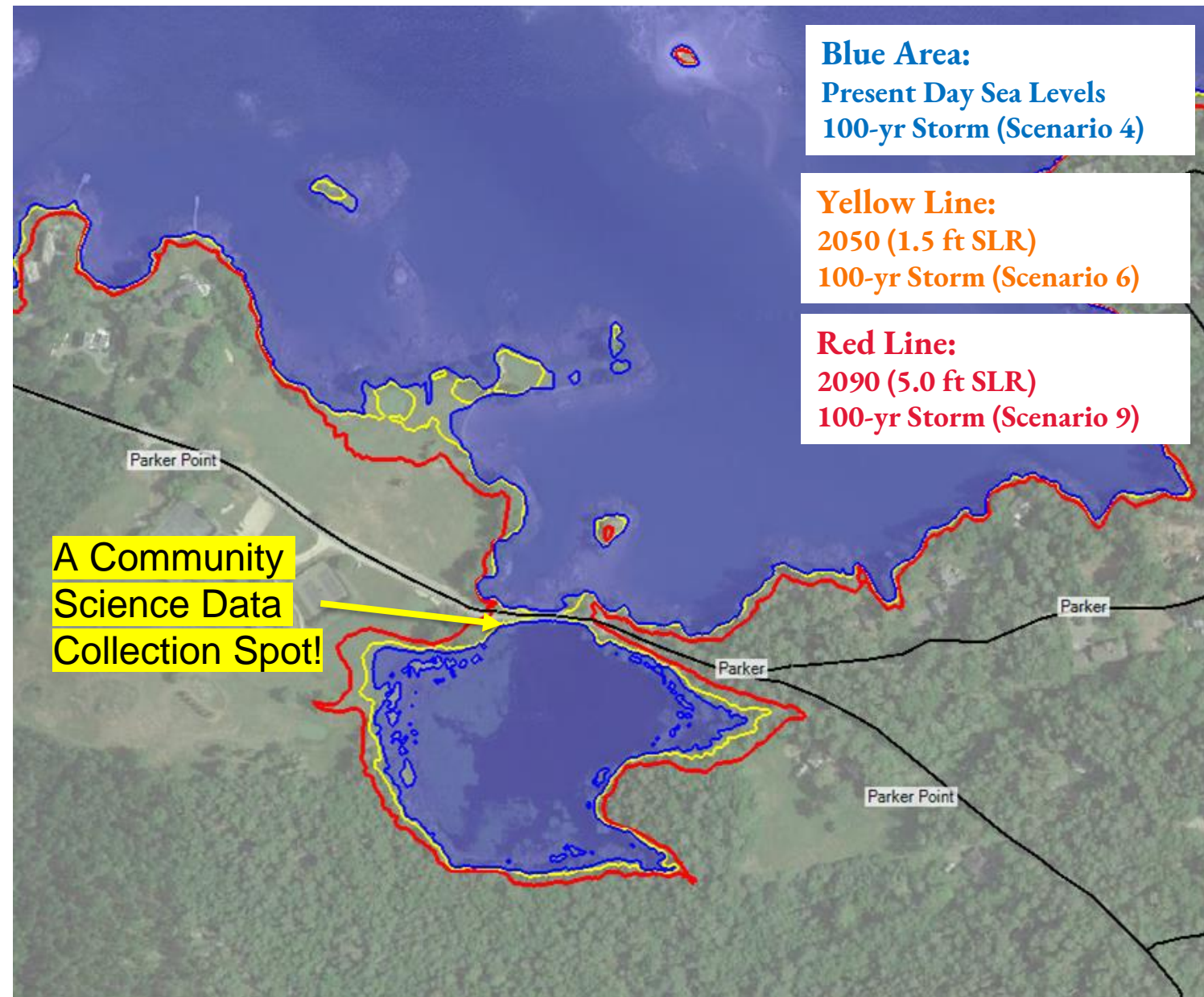
- **Now:** Wave overtopping during coastal storms
- **2050 and beyond:** Standing water during 100-yr storms
- **2090:** High-Tide flooding
- **217 buildings isolated;** alternate routes in Brooklin and Sedgwick also likely to be flooded



Coastal Flood Risk

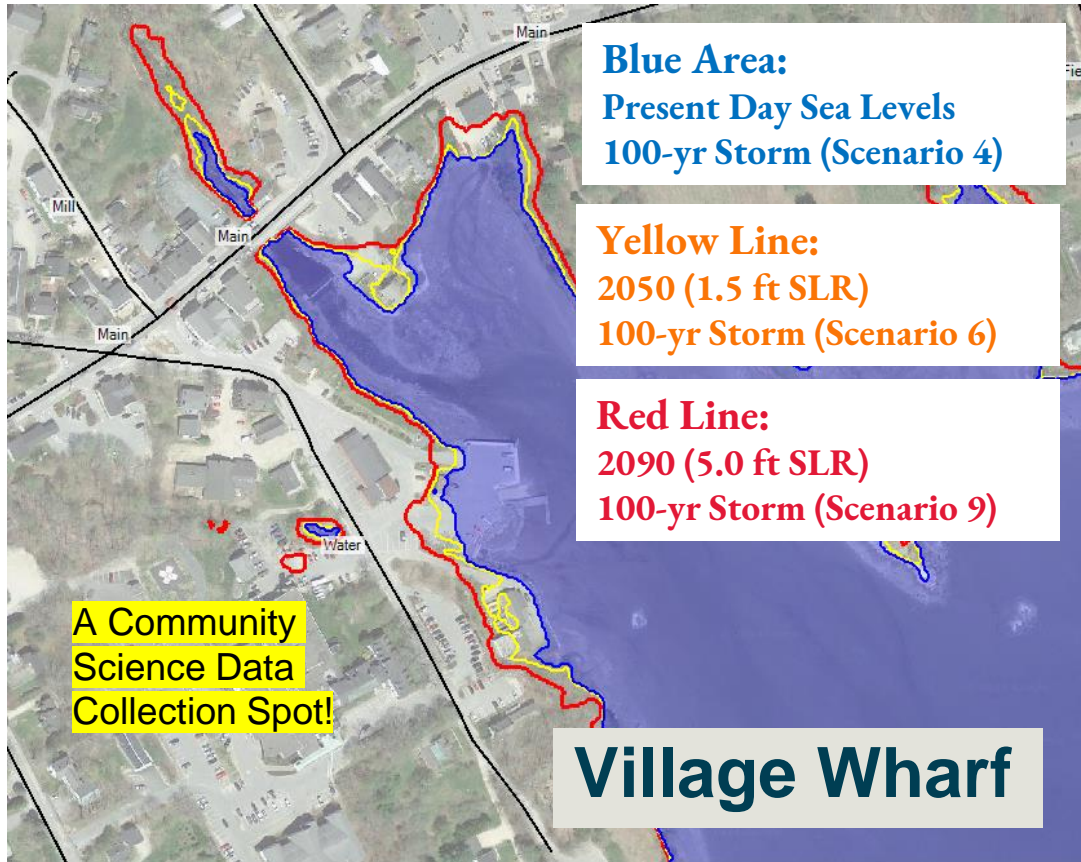
Parker Point Road:

- **Now:** Wave overtopping during coastal storms
- **2050 and beyond:** Standing water during 100-yr storms
- **48 buildings** impacted; alternate route available until 2090



Coastal Flood Risk

Maine Coastal Program Shore and Harbor Planning Grant Recipient



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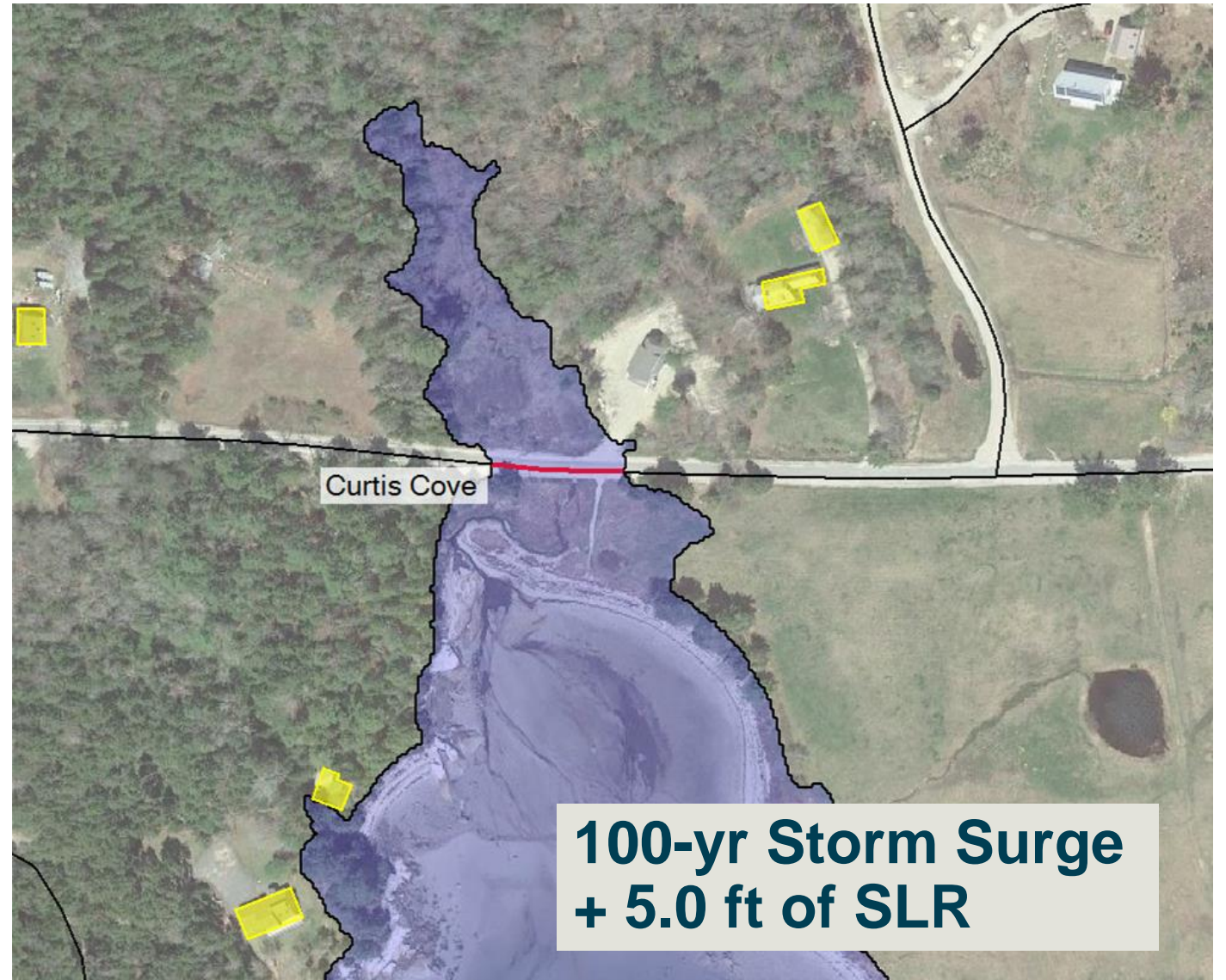


Pilot Project: Curtis Cove Road

Selected as **Pilot Project**

Flood Risk:

- **Now:** Wave overtopping during storm events
- **2090 and beyond:** Standing water during 100-yr storms
- **40 buildings isolated** during inundation; no alternate routes



Pilot Project: Curtis Cove Road

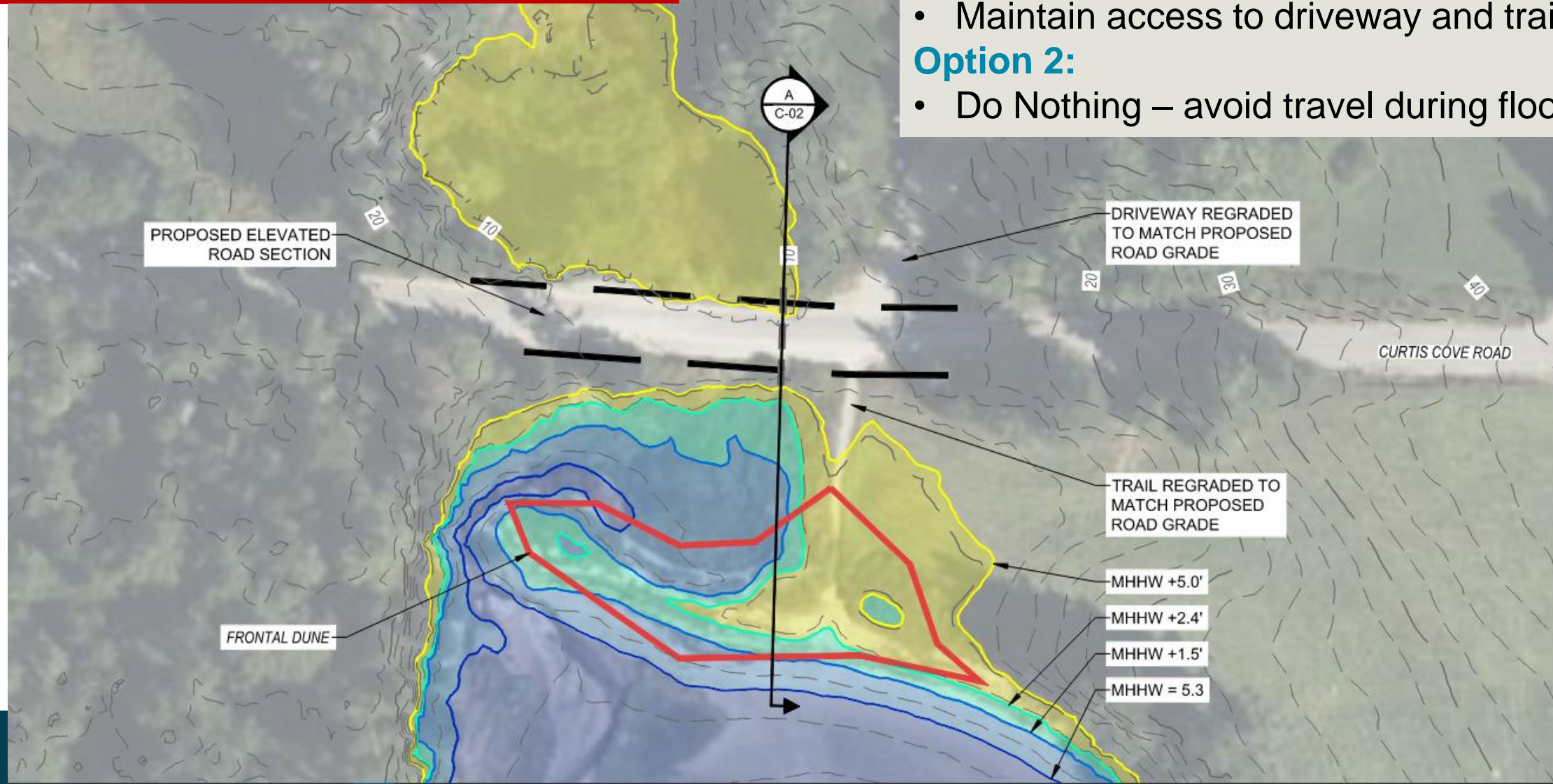
Adaptation Alternatives:

Option 1:

- Elevate up to 2.5 ft from low point to El. 15 ft
- Install larger culvert to reduce rainfall flooding
- Maintain access to driveway and trail

Option 2:

- Do Nothing – avoid travel during flooding



Pilot Project: Curtis Cove Road

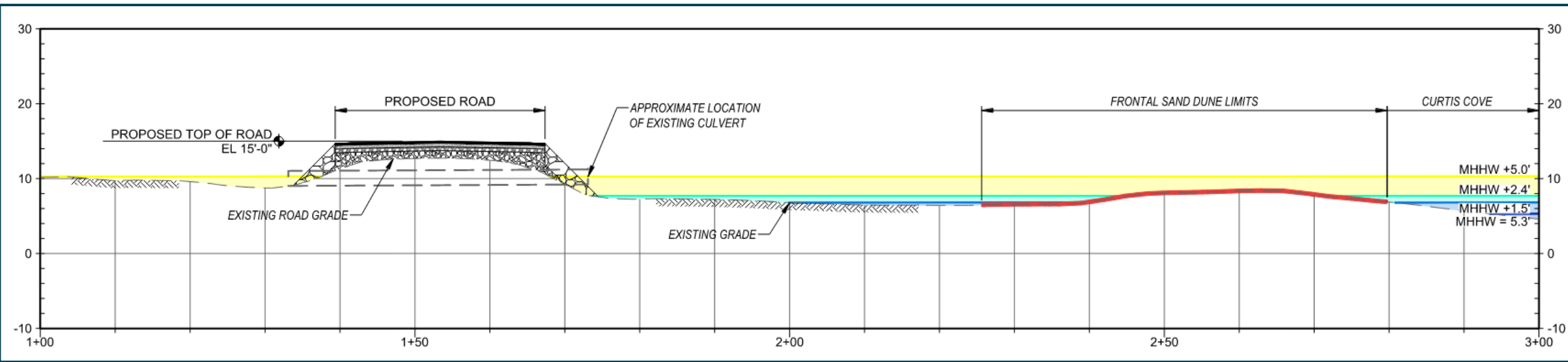
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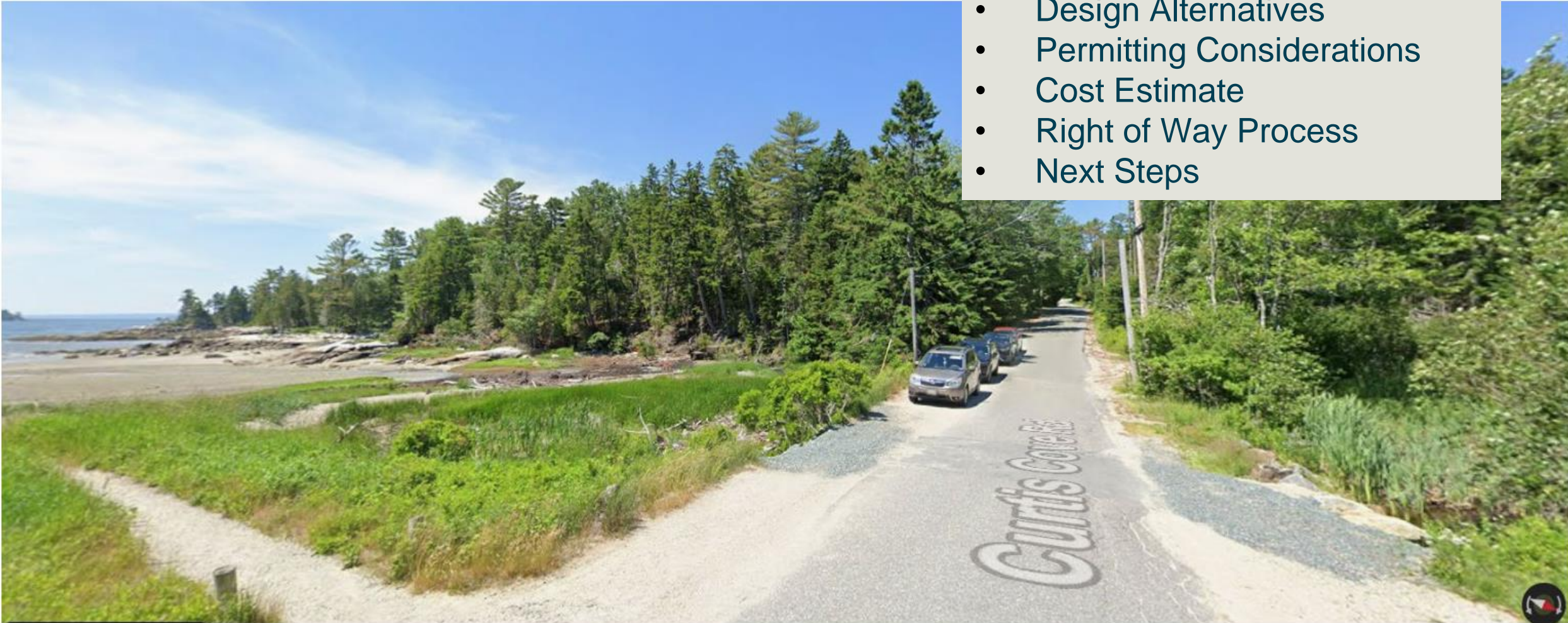
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Pilot Project: Curtis Cove Road

Pilot Project Report Contains:

- Environmental Considerations
- Flood Exposure
- Design Alternatives
- Permitting Considerations
- Cost Estimate
- Right of Way Process
- Next Steps



Pilot Project: Curtis Cove Road

Pilot Project Next Steps:

- Decide on whether, when, and which **adaptation alternative** to pursue
- Pursue relevant **funding** options
- Contract with a **consultant:**
 - Field investigations
 - Designs
 - Permits
 - Community Engagement
 - Oversee Construction



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Ongoing Community Engagement

StoryMap
QR Code:



1. **ArcGIS StoryMap:** Interact with coastal flood risk results
2. **Community Science Data Collection:** Indefinitely



ArcGIS StoryMap



Blue Hill, Brooksville & Surry Vulnerability Assessment

An assessment of infrastructure
vulnerability to flooding from storm
surge and sea level rise

GEI Consultants, Inc. (GEI) & Gulf of Maine Research Institute
(GMRI)

November 27, 2024



ArcGIS StoryMap

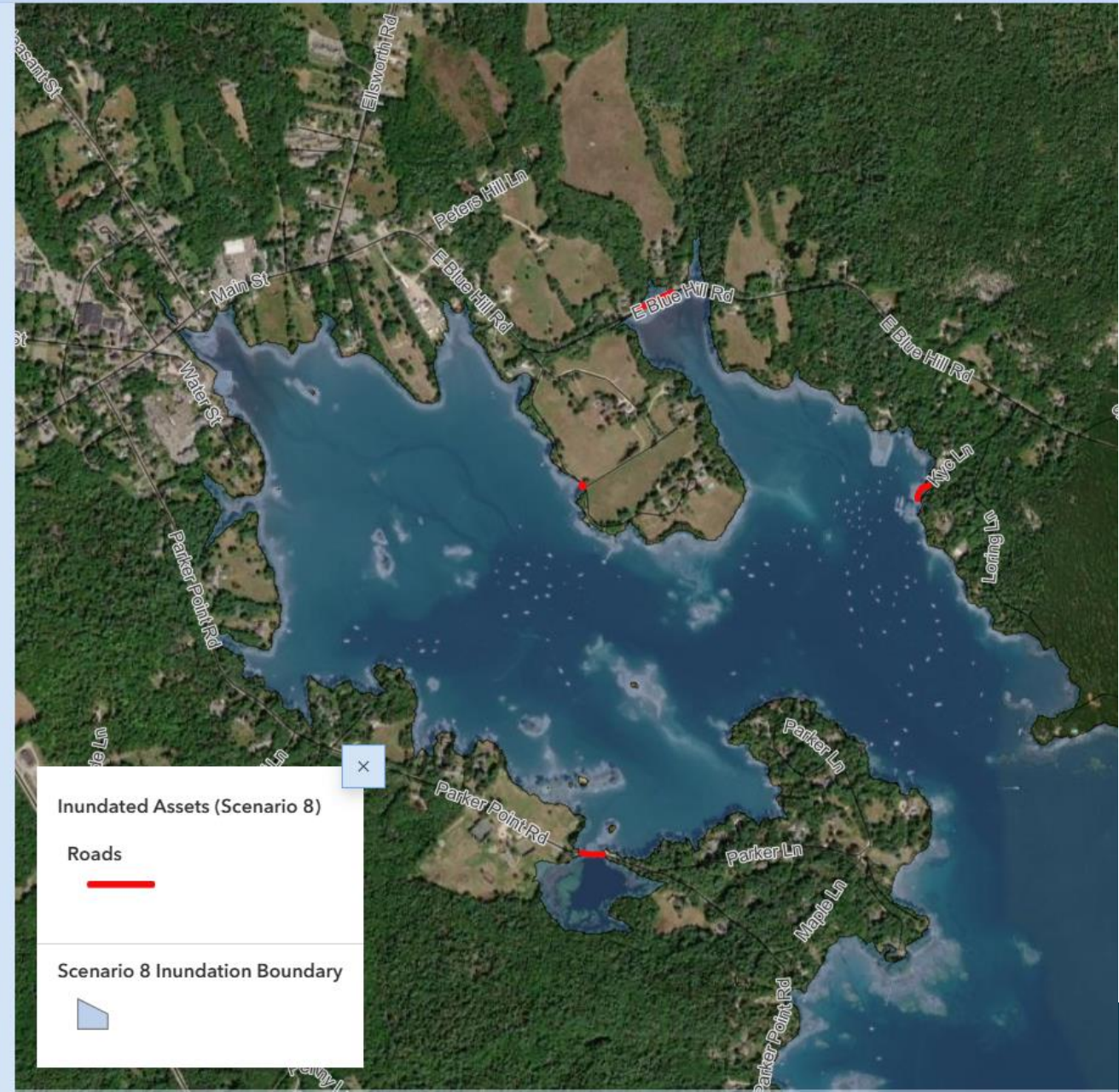
Flood Risk in 2070

High Tide, 2.4 ft SLR (Scenario 2)

High Tide, 3.0 ft SLR (Scenario 3)

100-yr Storm, 2.4 ft SLR (Scenario 7)

100-yr Storm, 3.0 ft SLR (Scenario 8)



ArcGIS StoryMap

Coastal Flood Risk Results Blue Hill Brooksville Surry



East Blue Hill Road



Falls Bridge Road



Parker Point Road



Jay Carter Road



Curtis Cove Road: Pilot Project



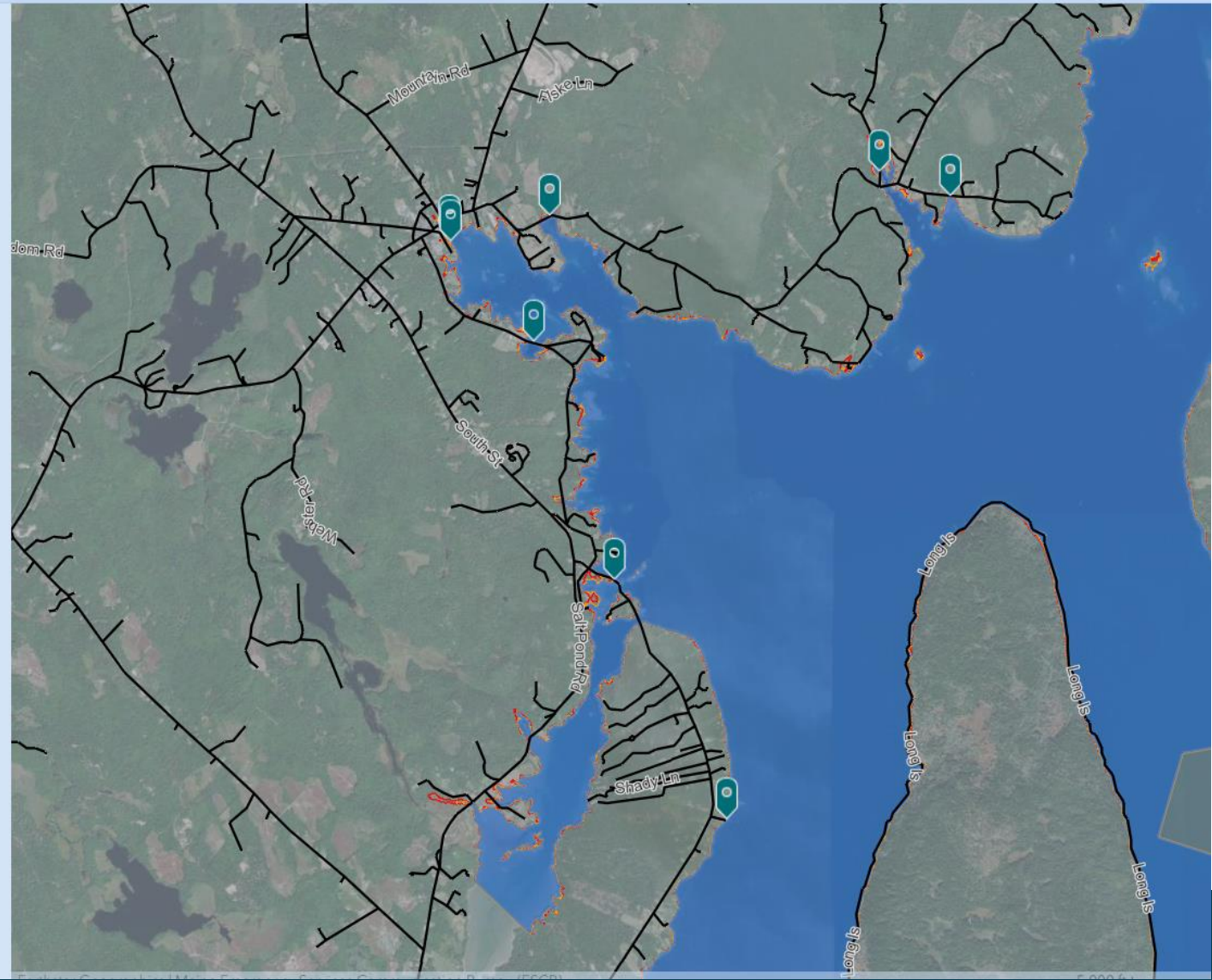
Wastewater Treatment Facility



Blue Hill Village Wharf



South Blue Hill Wharf



Ongoing Community Science

6 sites in Blue Hill:



Blue Hill: Parker Point Road



Blue Hill: Falls Bridge Road



Blue Hill: South Blue Hill Town Wharf



Blue Hill: Peter's Cove Beach



Blue Hill Town Wharf



Blue Hill: Mill Stream and Salt Pond



Ongoing Community Science

Summary

Flood impact: Moderate flooding: 1-3 feet of water, looks knee deep

High water marks: Yes

Signs of erosion: Yes

User role in community: Resident, Student

Observed weather

Precipitation: No precipitation

Wind: Strong breeze (umbrella is difficult to use) to near-gale (trees in motion)

Waves: Small waves that are not likely to cause damage

Other observations

Level of concern: I'm concerned for the future

How does this event make you feel? Surprised

Does the community seem prepared?: No

Suggested climate adaptation action: Protect: Block the physical hazard (ex. build a sea wall)

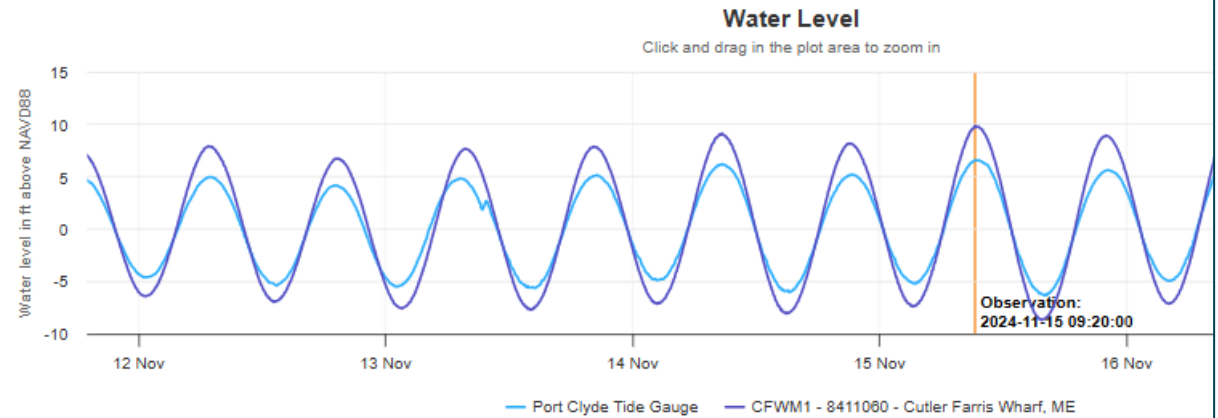
Flooding observed in this location previously: Yes

Story of how the coastline has changed over time: It was about 5 feet lower last time I was here.

Additional misc observations: None

Observation at Blue Hill - Blue Hill Town Wharf on 2024-11-15

Moderate flooding



Next Steps

Next Steps in Climate Adaptation for Blue Hill:

- Create and maintain **GIS database** of “assets”
 - Culverts, pump stations, etc.
- **Refine flood risk** in key areas through wave analysis, rainfall-runoff analysis.
- Continue **regional collaboration** and increase “social” resiliency.
- Engage with planners and/or consultants to secure **grant funds**.



Thank you!
Questions?



Consulting
Engineers and
Scientists

Leila Pike, P.E. (GEI)

