RiskMAP
Increasing Resilience Together

FEMA's Coastal Erosion Hazard Areas – Future Coastal Erosion and Sea Level Rise

Wednesday, September 28th, 2022

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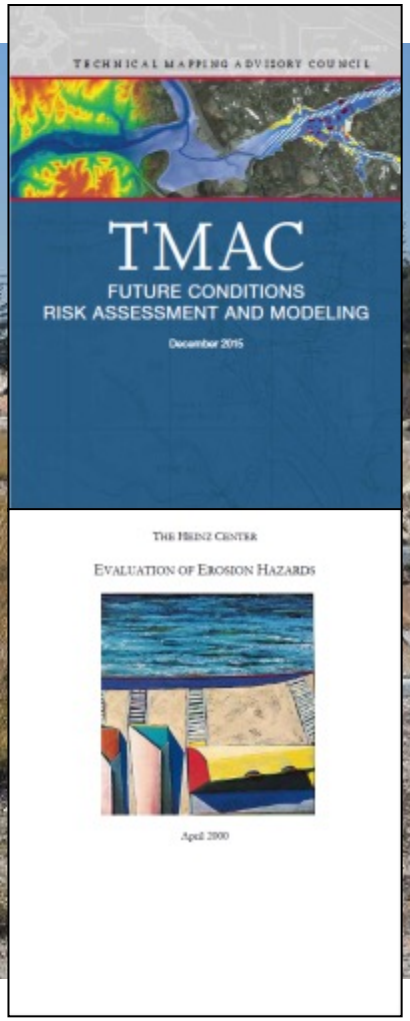
Brian Caufield (Compass)

FEMA

Purpose and Objectives of Study

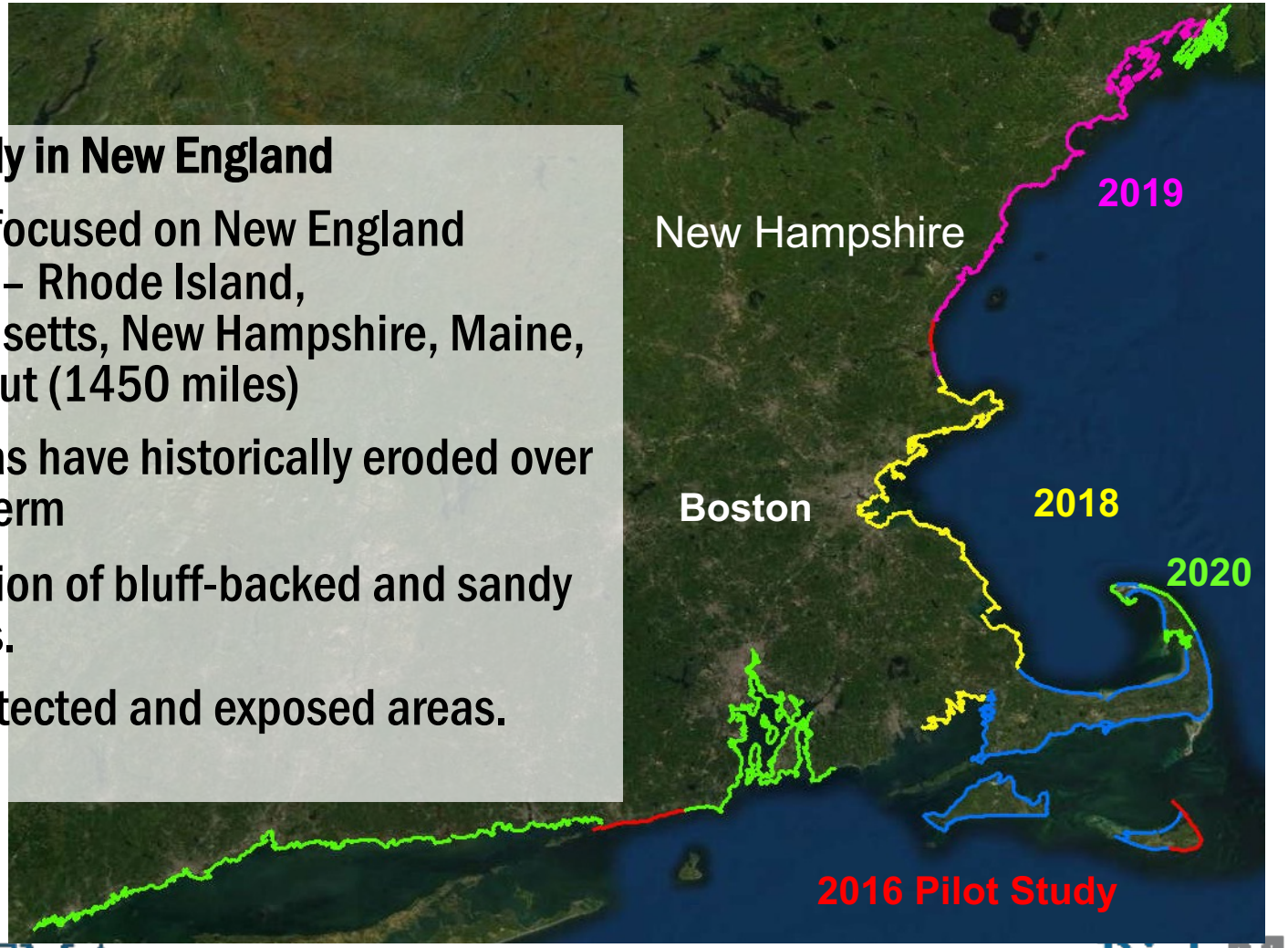
- **1994** - Congress directed FEMA to prepare and submit an evaluation of economic impacts and feasibility of mapping Erosion Hazard Areas (EHA) as part of the NFIP.
- **1994-1999** – Pilot studies conducted in coastal communities to estimate long-term shoreline change.
- **2000** – Heinz Center Study evaluates feasibility of FEMA mapping coastal erosion hazards.
- **2016** – TMAC recommends FEMA map coastal erosion hazards and future conditions due to SLR.



Study Approach

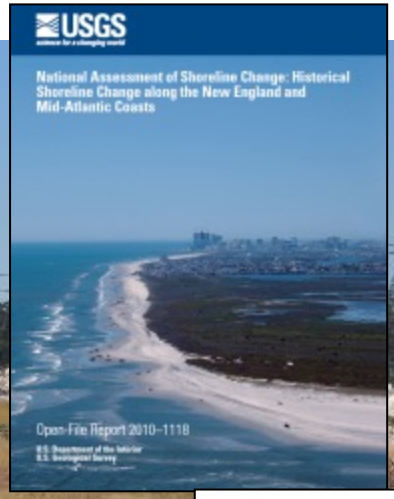
Current Study in New England

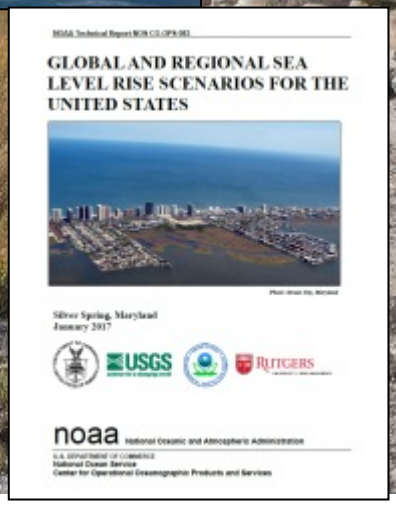
- Currently focused on New England Shoreline – Rhode Island, Massachusetts, New Hampshire, Maine, Connecticut (1450 miles)
- Many areas have historically eroded over the long-term
- Combination of bluff-backed and sandy shorelines.
- Mix of protected and exposed areas.



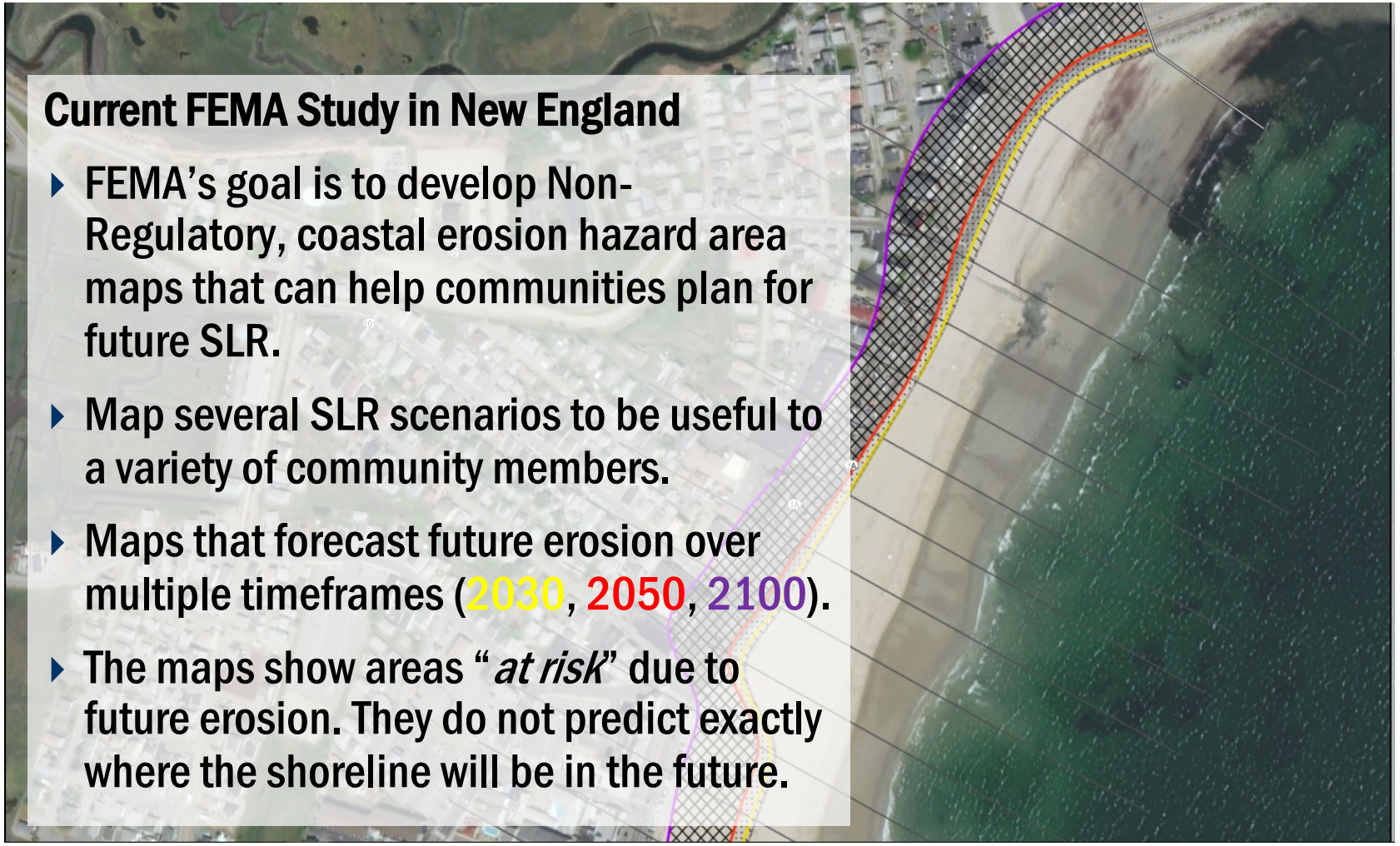
Purpose and Objectives of Study

- There have been several local and regional studies of SLR and coastal erosion.
- Most studies focus on 1) flooding and inundation to future SLR or 2) observed (historical) rates of coastal erosion.
- This study focuses on how SLR will accelerate observed of erosion and what future hazard zones might look like over multiple time frames.





Study Approach



Current FEMA Study in New England

- FEMA's goal is to develop Non-Regulatory, coastal erosion hazard area maps that can help communities plan for future SLR.
- Map several SLR scenarios to be useful to a variety of community members.
- Maps that forecast future erosion over multiple timeframes (2030, 2050, 2100).
- The maps show areas "*at risk*" due to future erosion. They do not predict exactly where the shoreline will be in the future.

Purpose and Objectives of Study

- Developed data that show future coastal erosion hazard areas under multiple SLR scenarios for the years 2030, 2050, and 2100.
- Data can be used to identify areas most at risk and help communities plan for SLR.

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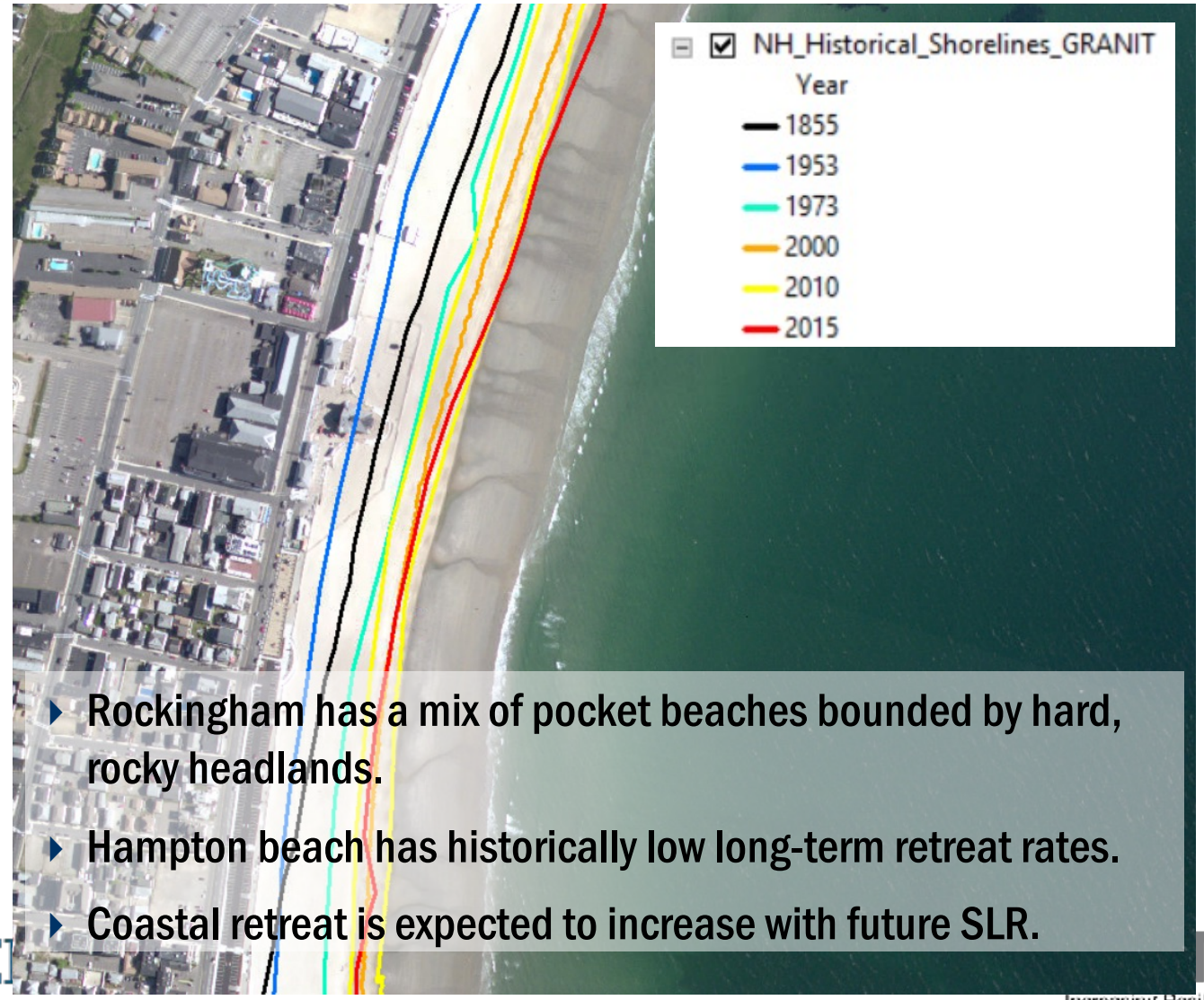
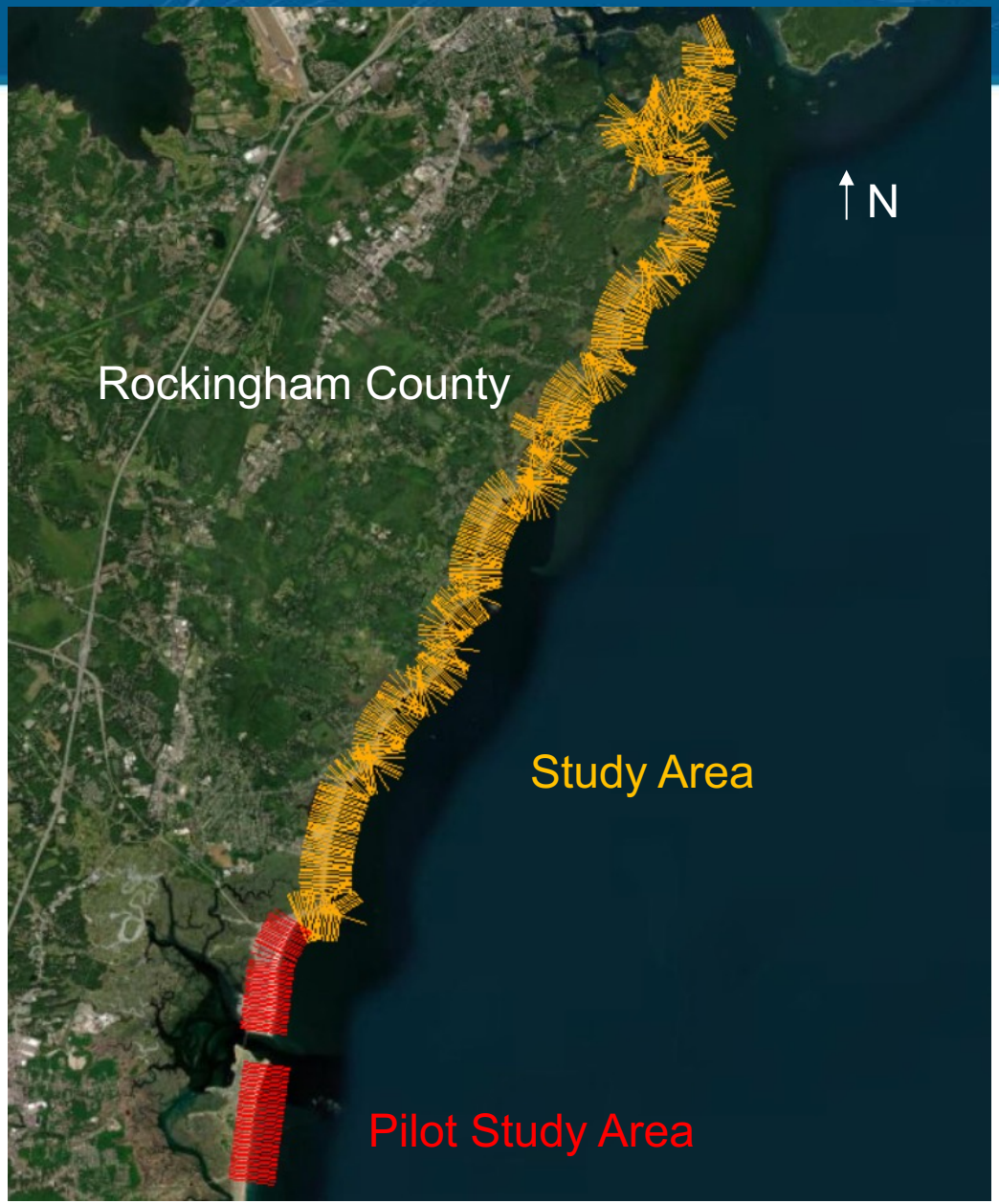
Purpose and Objectives of Study



- Rockingham has a mix of pocket beaches bounded by hard, rocky headlands.
- Hampton beach has historically low long-term retreat rates.
- Coastal retreat is expected to increase with future SLR.

Study Approach

- 1-D Transect-Based Analysis
- Spaced every ~50 meters
- Capture both sandy and bluff-backed shorelines
- Extracted cross-shore profiles from airborne topographic LiDAR data
- Nearly 630 transects in Rockingham County.

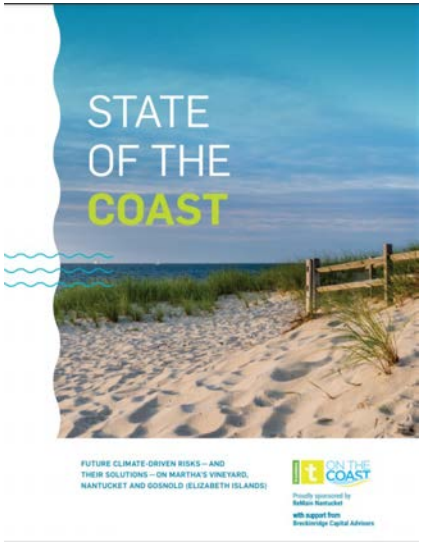


FEMA

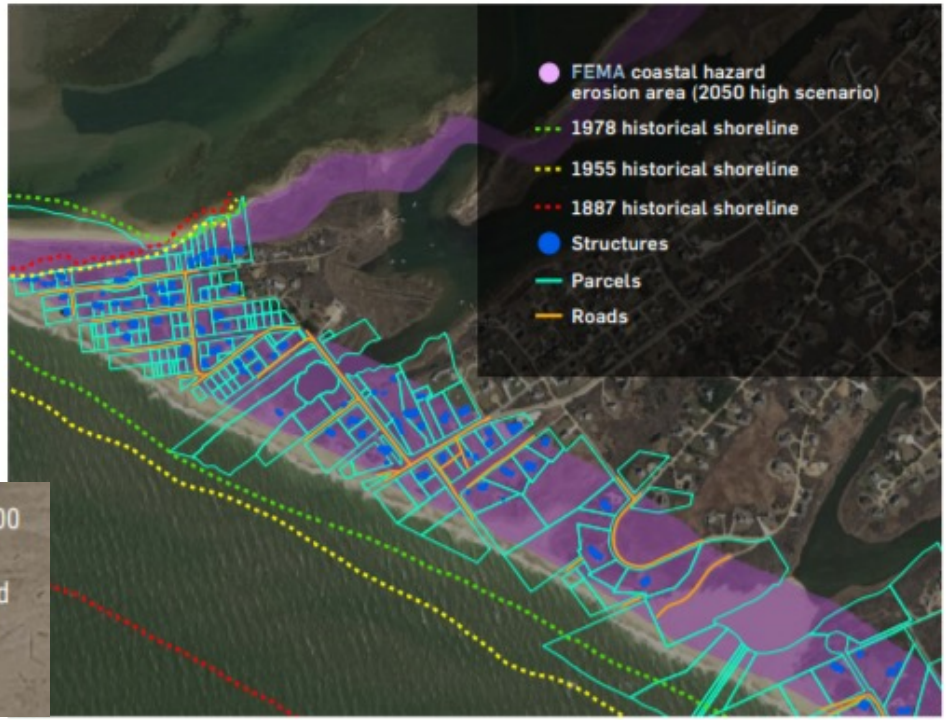
Study Approach

- Used historical shorelines from 1800s-2000s to calculate historical rates of shoreline change
- Calculate how much future SLR would accelerate shoreline change
- Projected future, accelerated rates of shoreline change to 2030, 2050, and 2100 to estimate coastal erosion hazard areas.

How data has been used elsewhere



FEMA COASTAL HAZARD EROSION AREA (2050 HIGH SCENARIO): MADAKET, NANTUCKET [CIT. 5 AND 10]



- **BEACHES ERODE** Martha's Vineyard beaches have lost more than 1,400 acres since 1897, and Nantucket nearly 1,900 acres. A section of Nantucket's southwest coast, from Madaket to Hummock Pond Road receded about 1,450 feet since 1887 [CIT. 5]. FEMA predicts the coast may erode another 1,350 feet by 2100 [CIT. 10].

- 2021 "State of the Coast" report has incorporated results from this study.

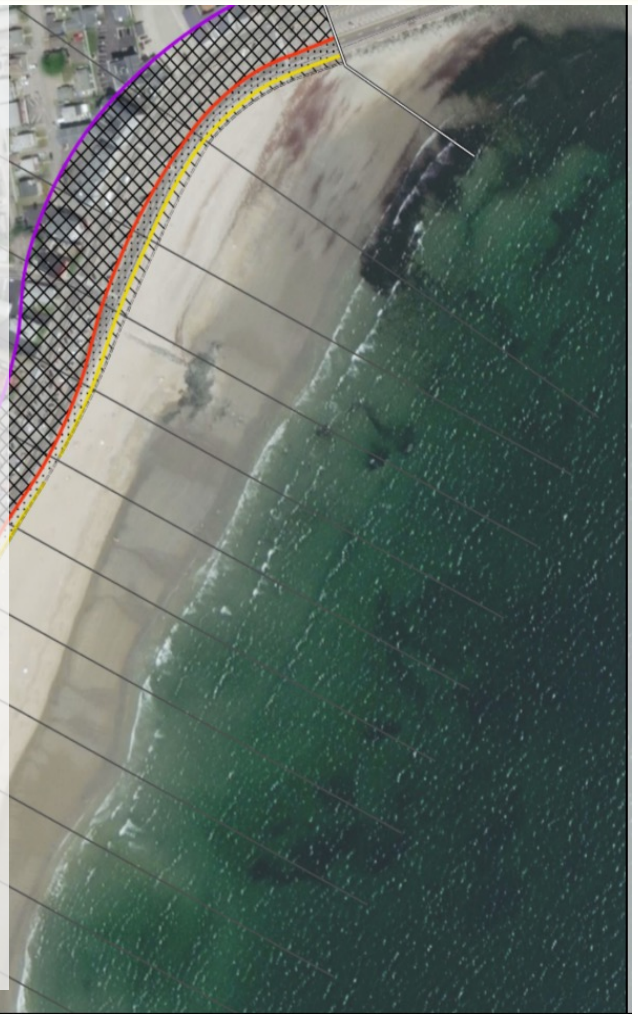
How data has been used elsewhere

		Cosnold	Aquinnah	Chilmark	West Tisbury	Tisbury	Oak Bluffs	Edgartown	Nantucket
Max Short Term Erosion Rates (Feet/Year) 1970–2014 [CIT. 5]	BEACH	No Data	4.6	6.6	7.8	3.1	5.5	54.5	16.6
Max Long Term Erosion Rates (Feet/Year) 1800s–2014 [CIT. 5]	BEACH	No Data	4.9	6.2	6.9	3.1	4.4	27.0	11.5
Acreage Lost to Erosion 1887–2014 [CIT. 5]	BEACH	No Data	40.3	520.2	238.6	21.8	37.1	579.0	1857.8
Acreage Projected to be Lost to Erosion by 2050 (FEMA) [CIT. 10]	BEACH	No Data	76.7	332.0	135.1	74.0	68.3	585.0	1700.8
Acres Total Marsh Loss in 2050 [CIT. 2]	MARSH	3.6	-3.1	0.3	-8.1	21.8	28.8	227.1	50.0
Acreage of New Marsh Growth or Migration through 2050 [CIT. 2]	MARSH	0.3	37.5	16.8	10.1	5.4	29.1	89.3	438.0
Structures in Area Flooded from Daily Tidal Flooding in 2050 [CIT. 3]	STRUCTURES FLOODED	10	0	34	1	92	87	76	628
Structures in Areas Flooded from 10-Year Storm in 2050 [CIT. 3]	STRUCTURES FLOODED	81	39	164	93	437	554	757	1436
Miles of Road Flooded from Daily Tidal Flooding in 2050 [CIT. 1]	ROADS FLOODED	1.1	0.4	0.9	0.8	2.1	1.4	10.9	25.1
Miles of Road Flooded from 10-Year Storm in 2050 [CIT. 3]	ROADS FLOODED	8.7	4.1	11.9	10.5	8.1	11.0	49.4	68.6
Structures in Areas Impacted by Erosion by 2050 (FEMA) [CIT. 10]	EROSION OF STRUCTURES AND ROADS	No Data	3	27	15	108	89	44	500
Miles of Roads Impacted by Erosion in 2050 (FEMA) [CIT. 10]	EROSION OF STRUCTURES AND ROADS	No Data	0.6	3.4	1.6	1.3	2.8	10.5	24.3

- 2021 “State of the Coast” Report.

Summary

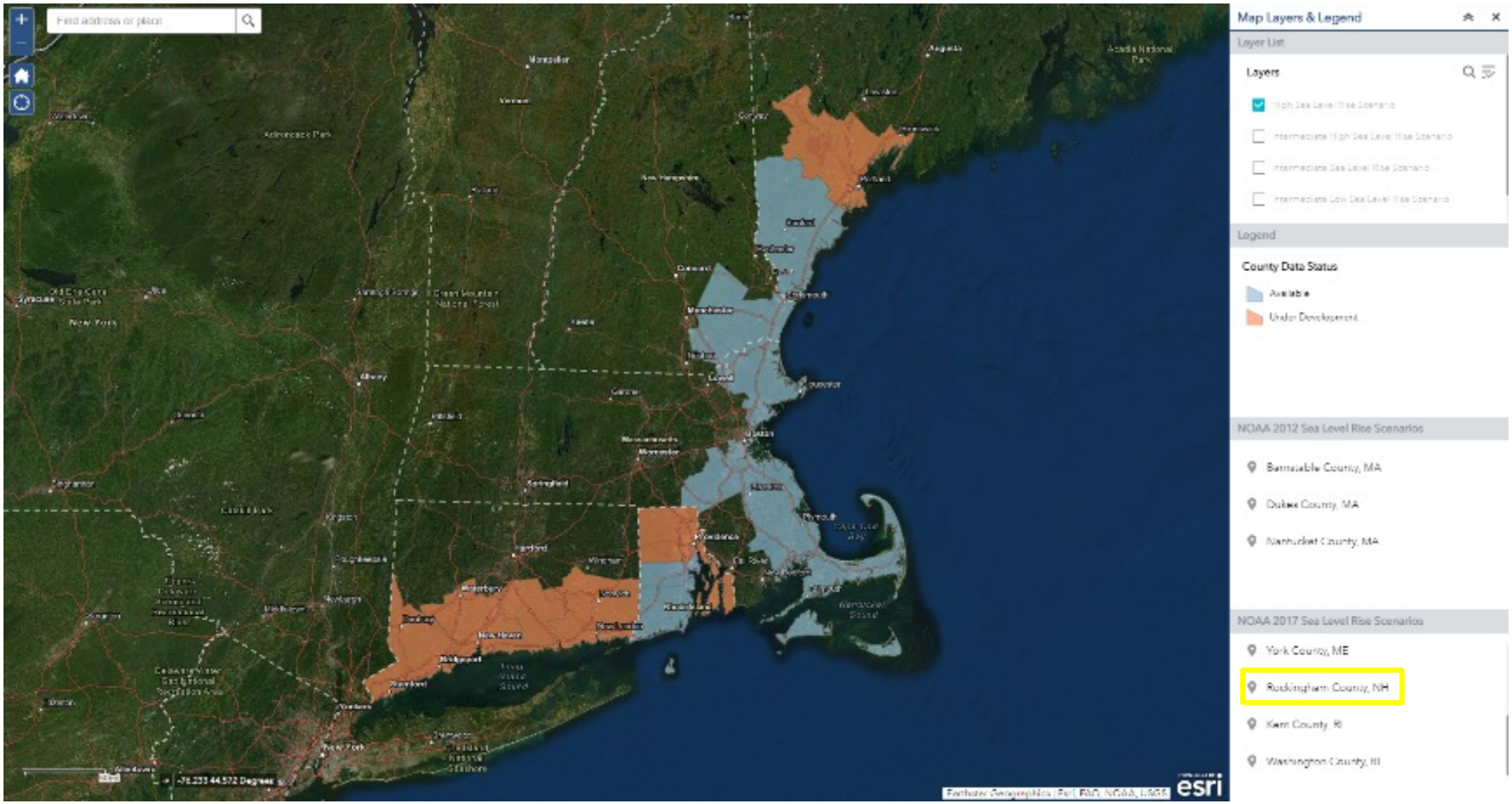
- Developed coastal erosion hazard area maps that cover the FEMA Region I shoreline.
- Incorporate future SLR (*local rates for Rockingham County*).
- Maps forecast future erosion over multiple timeframes (2030, 2050, 2100).
- NOAA 2017 Low-High SLR scenarios (4 total) for a variety of planning purposes.
- Include both sandy shorelines and bluffs.
- Incorporate observed erosion trends.
- Show areas "*at risk*" to future erosion.



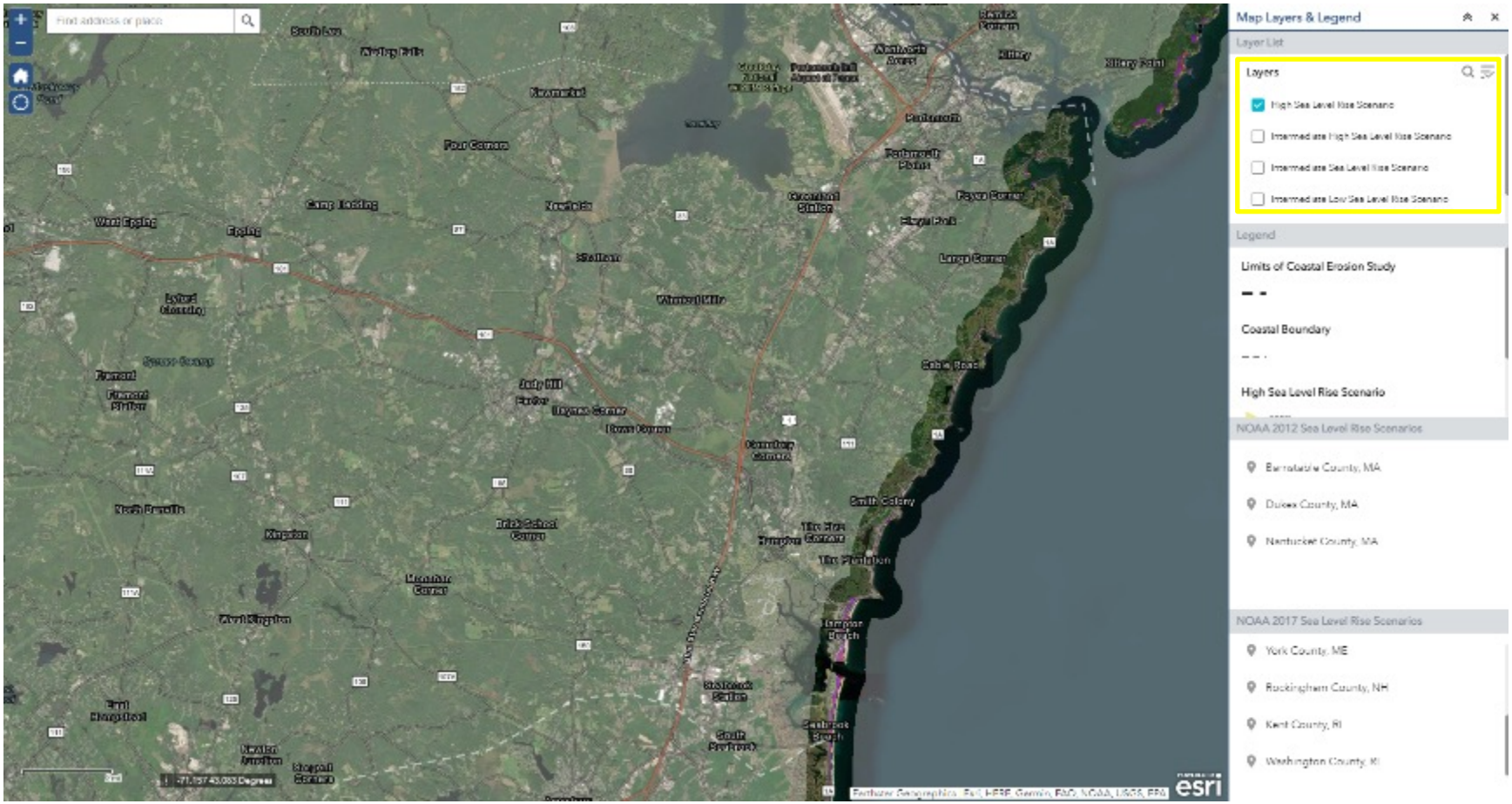
Data Viewer

Landing Page

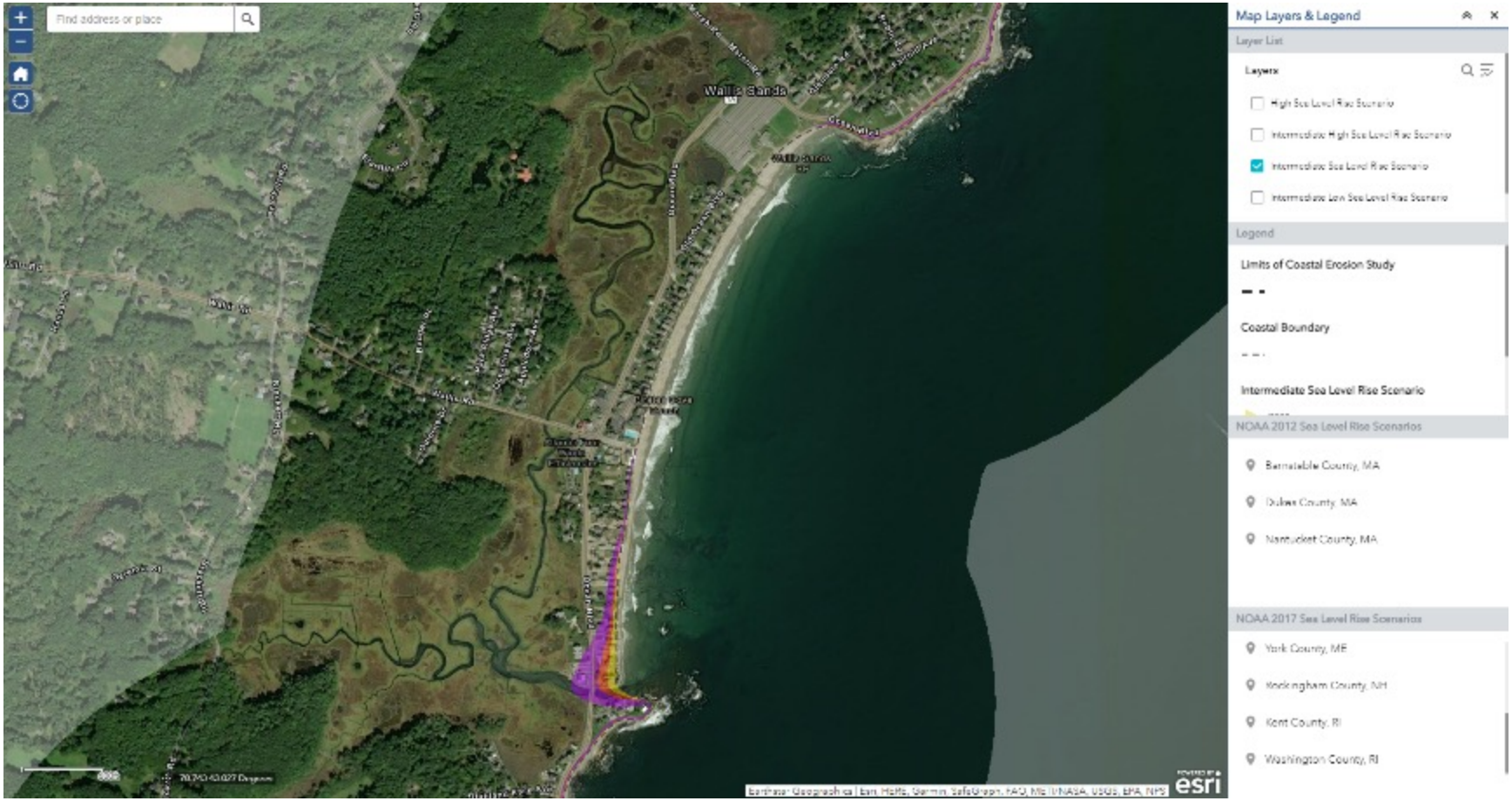
Select County of Interest



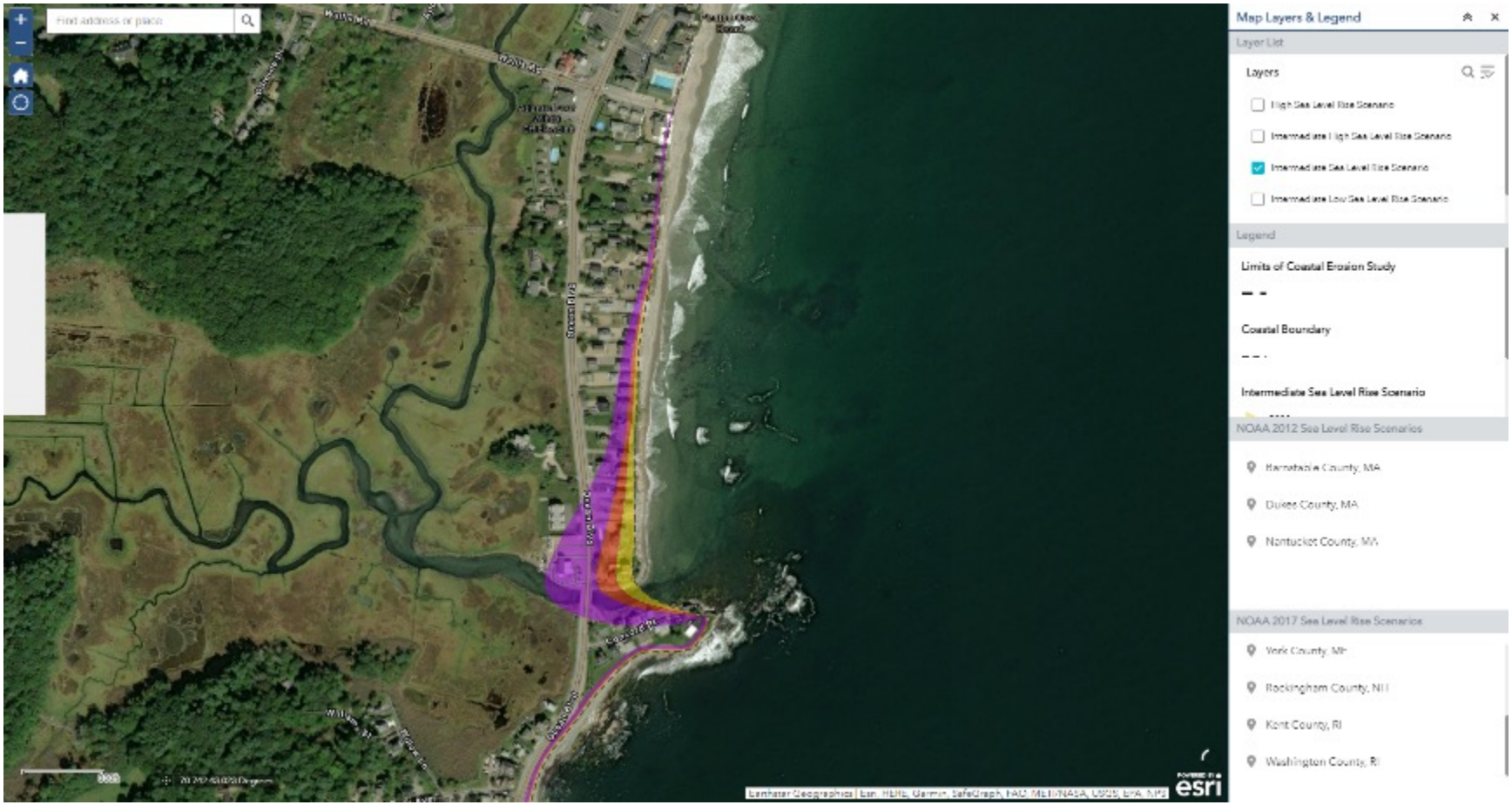
Select Risk Level to View



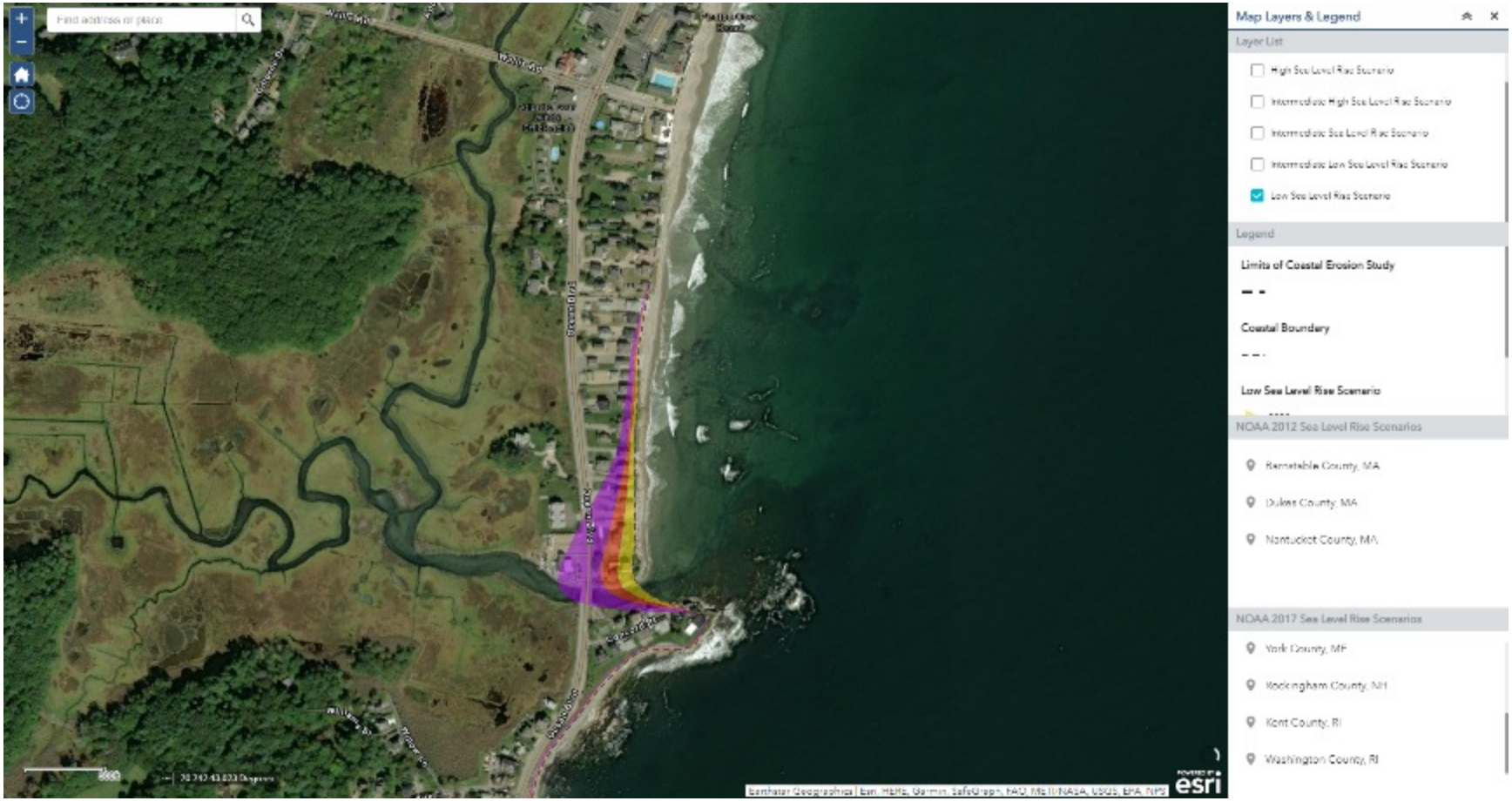
Pirates Cove Beach, Rye



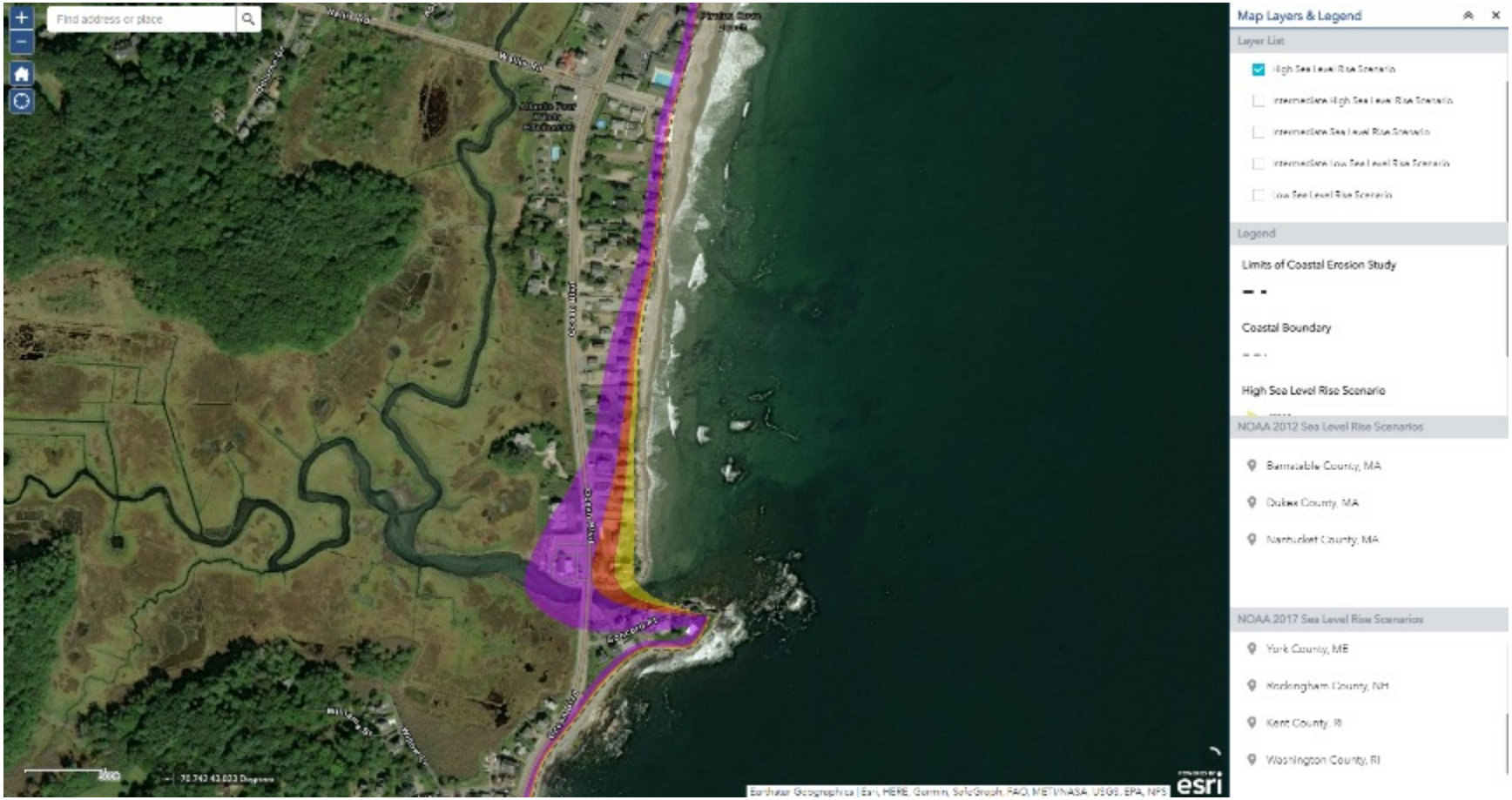
Pirates Cove Beach, Rye - Intermediate



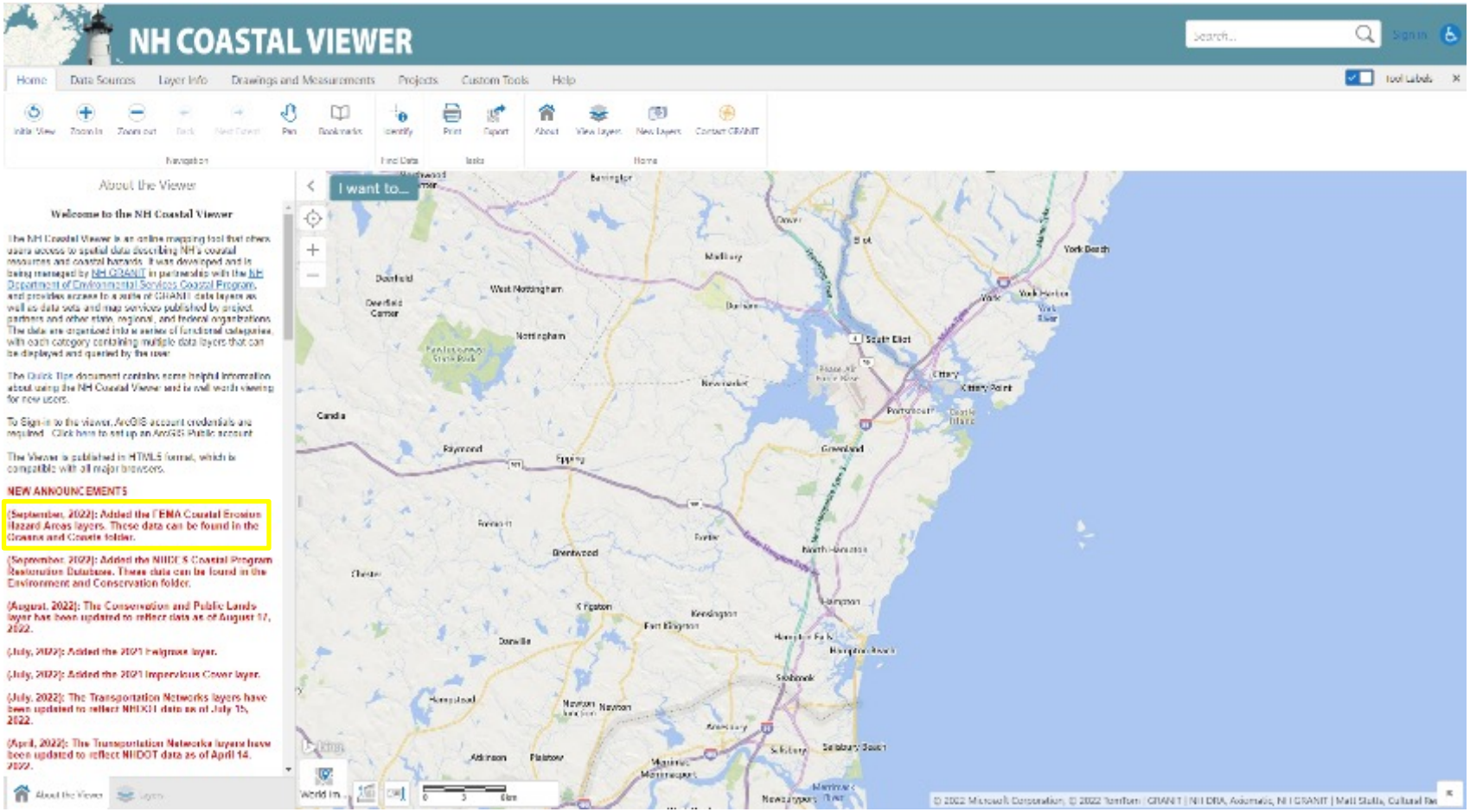
Pirates Cove Beach, Rye - Low



Pirates Cove Beach, Rye - High



NH Coastal Viewer



Invitation to Town Hall!

- Evening Meeting open to all
- Registration is required
  - Link is in the chat, copy and share
- October 19th
- 6:30 – 8:00 p.m.