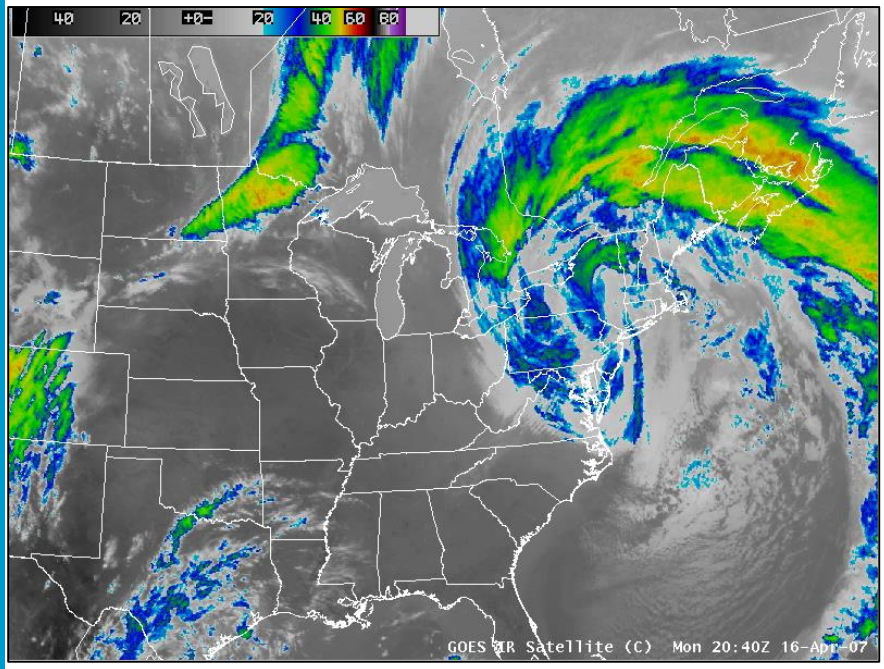
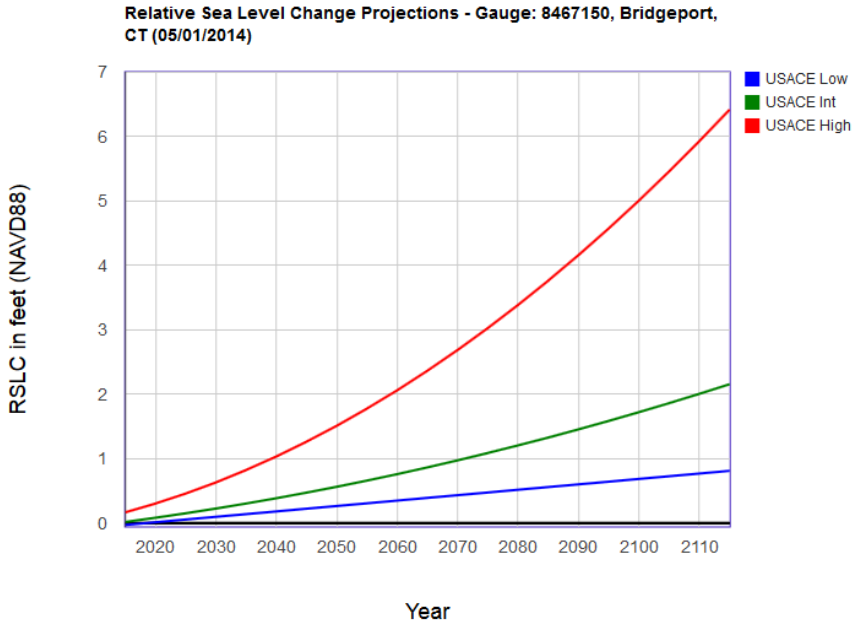
Proactive By Design.
Our Company Commitment

Setting Priorities for Nature – Based Solutions

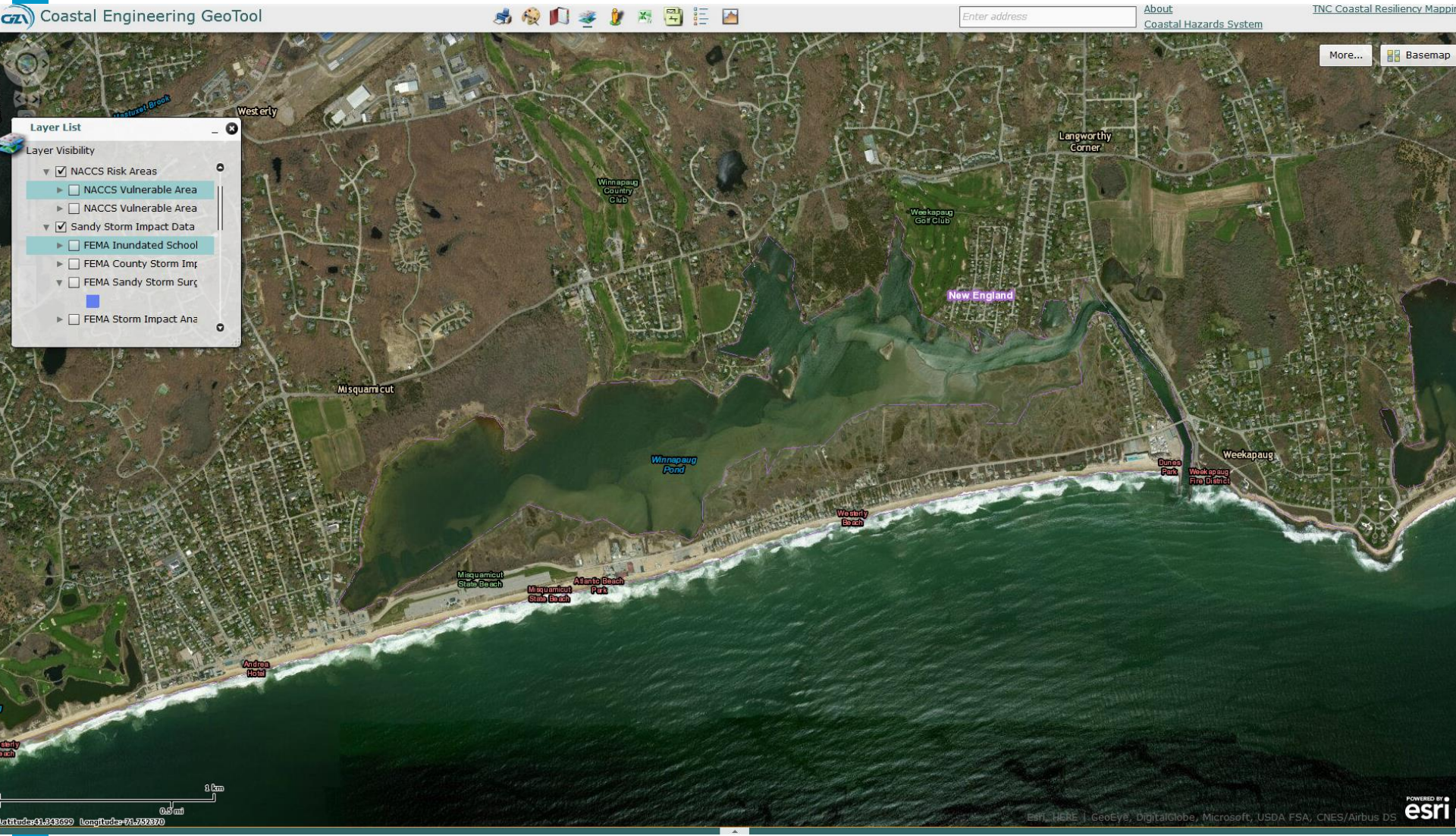
Hande Caliskan - McCaw, P.E.

CHANGING CLIMATE…





Westerly, RI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Basemap
Layer List
Layer Visibility
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NACCS Vulnerable Area
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Dunes Park
Weekapaug Fire District
Westerly Beach
Misquamicut State Beach
Atlantic Beach Park
Andrea Hotel
1 km
0.5 mi
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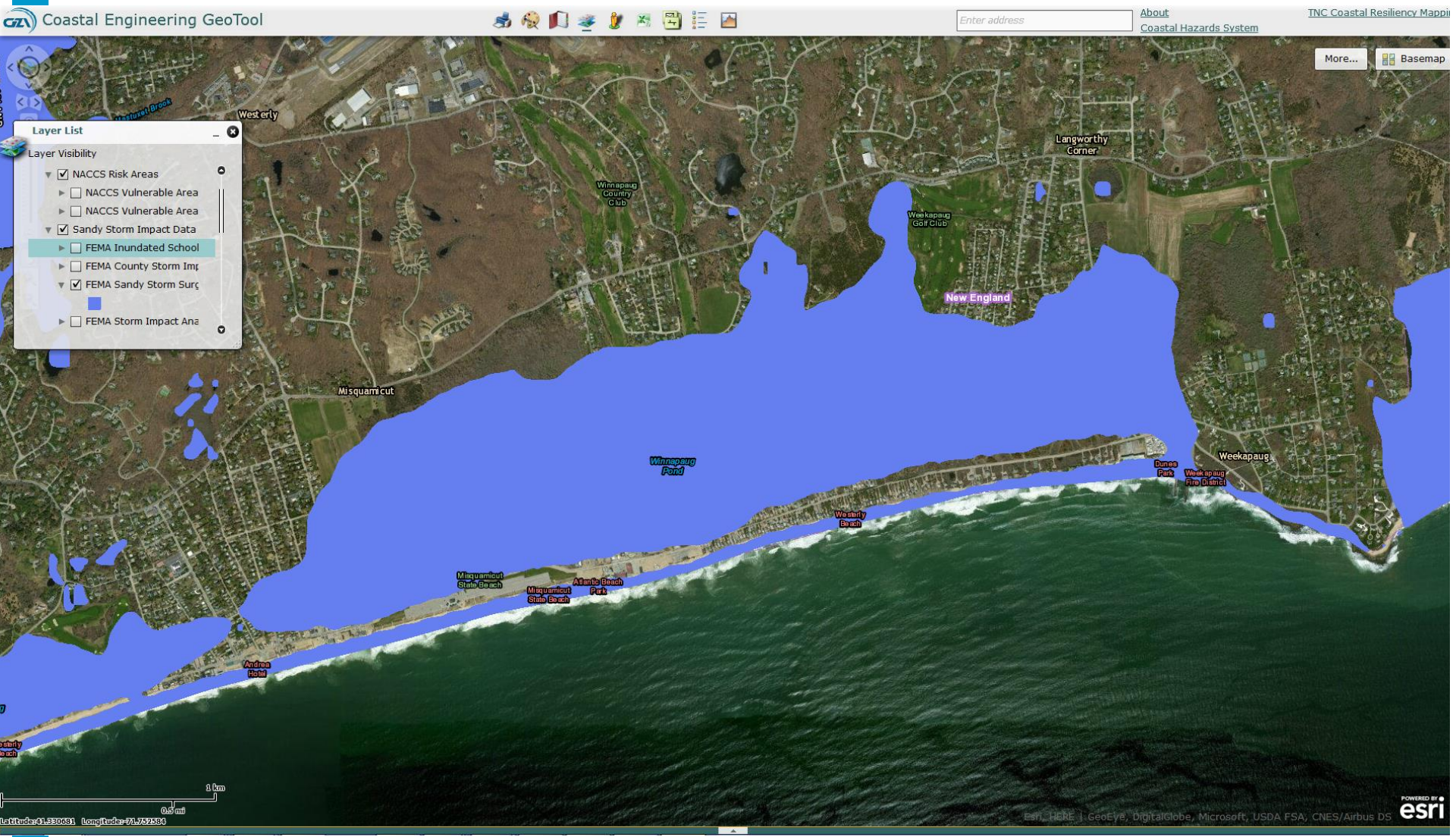
Westerly, RI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Atlantic Beach Park
Misquamicut State Beach
Andrea Hotel
1 km
0.5 mi
Latitude:41.330681 Longitude:-71.752584
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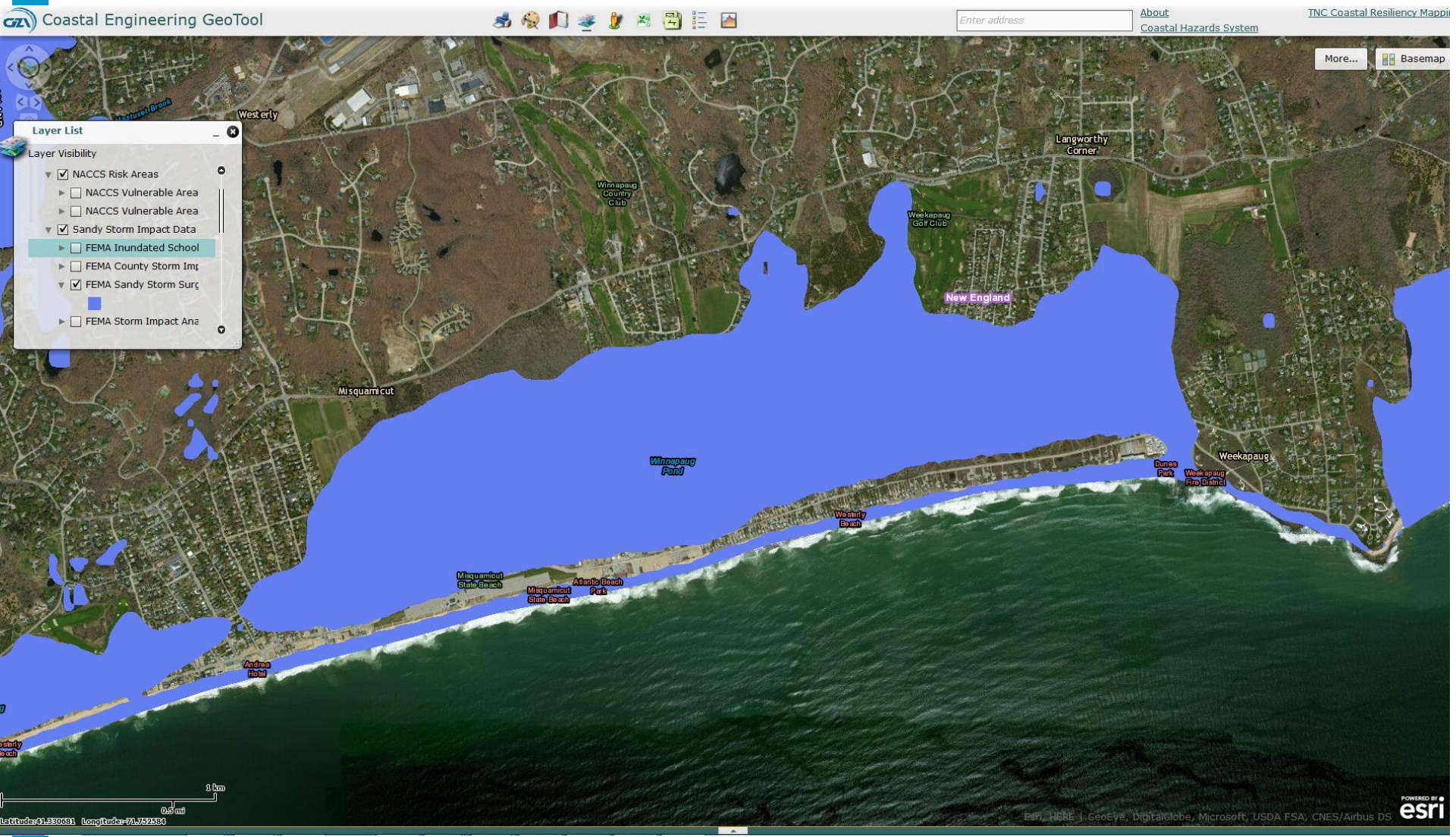
SUPERSTORM SANDY - STORM IMPACTED AREAS OF WINNAPAUG POND FROM EVENT SEDIMENTATION - NRCS DSR APPLICATION

PREPARED BY THE TOWN OF WESTERLY ENGINEERING DEPARTMENT
AS PART OF A COOPERATIVE PARTNERSHIP WITH RICRMC - DATED DECEMBER 12, 2013

Westerly, RI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1 km
0.5 mi
Latitude:41.330681 Longitude:-71.752584
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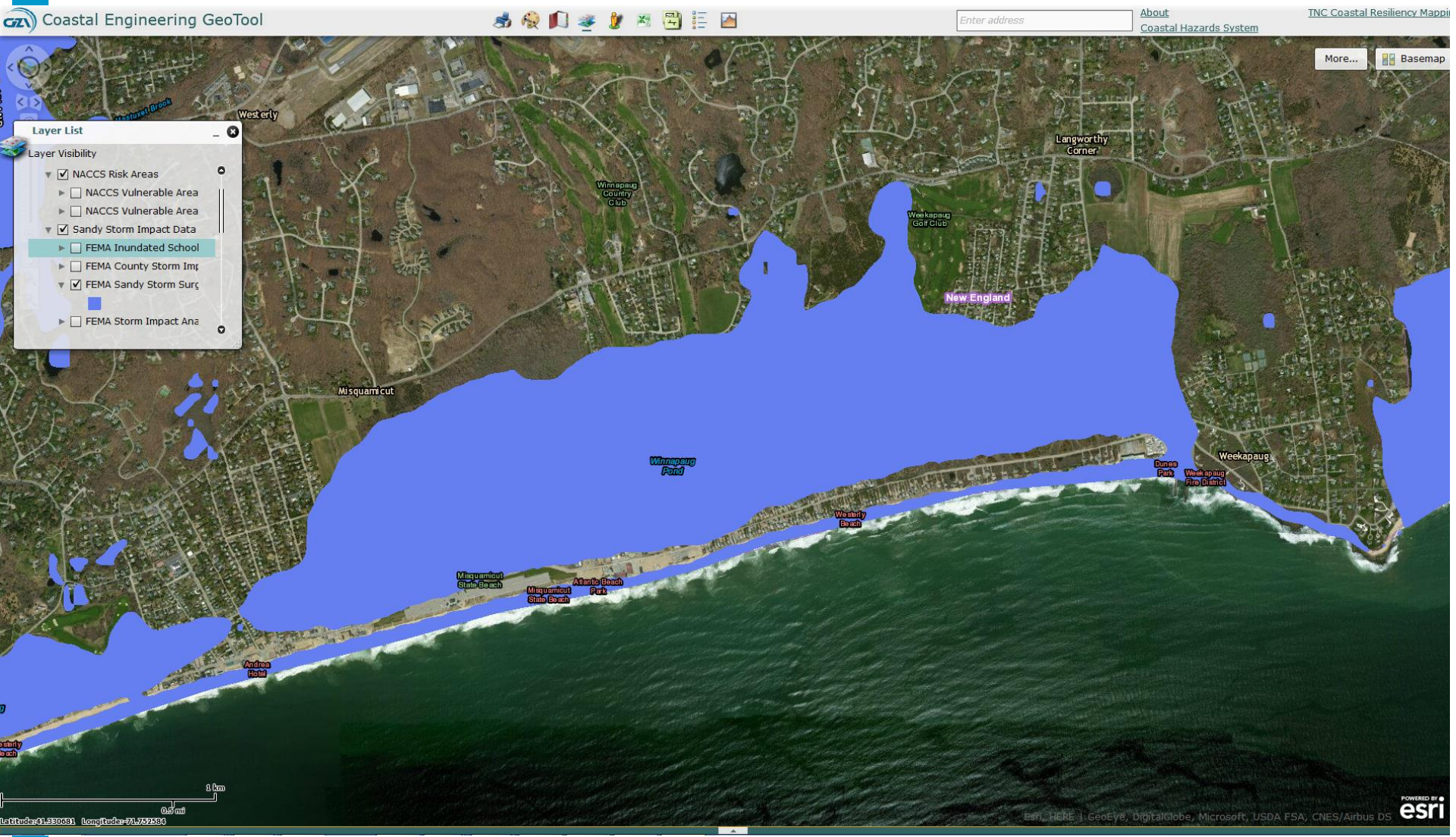
Project Goals

- Dredge the channel to allow navigation
- Restore Winnapaug Pond to Pre-Sandy conditions
- Nourish Town Beach

Westerly, RI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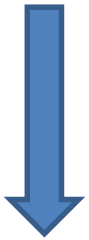
COASTAL RESILIENCY

Natural and Nature Based Solutions can:

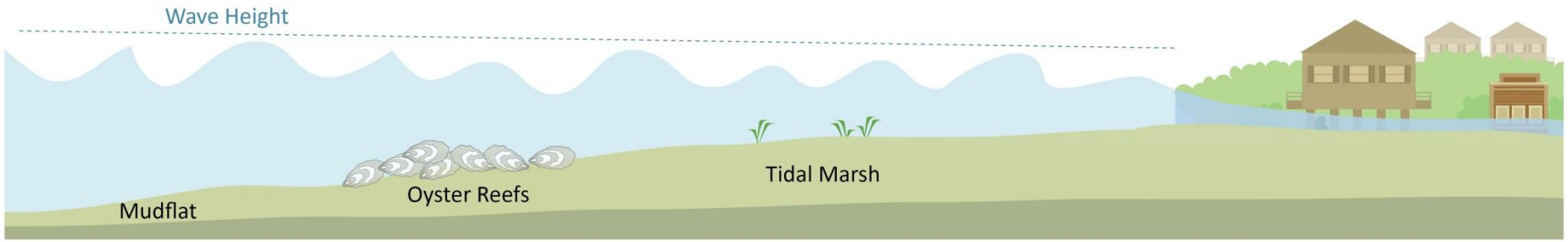
- ✓ attenuate wave heights
- ✓ attenuate storm surge
- ✓ stabilize sediment



Reduce Coastal Flood Risk

Establishing Nature-Based Solutions for Coastal Resilience

Waves with degraded coastal habitats.



Waves decreased with healthy coastal habitats.

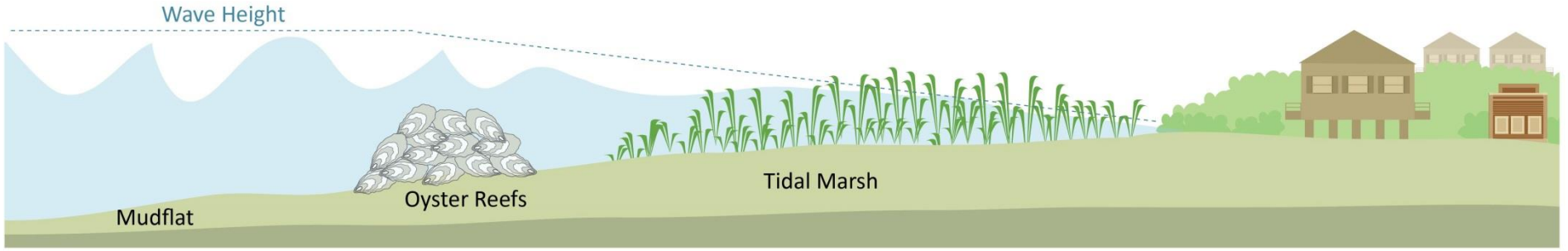
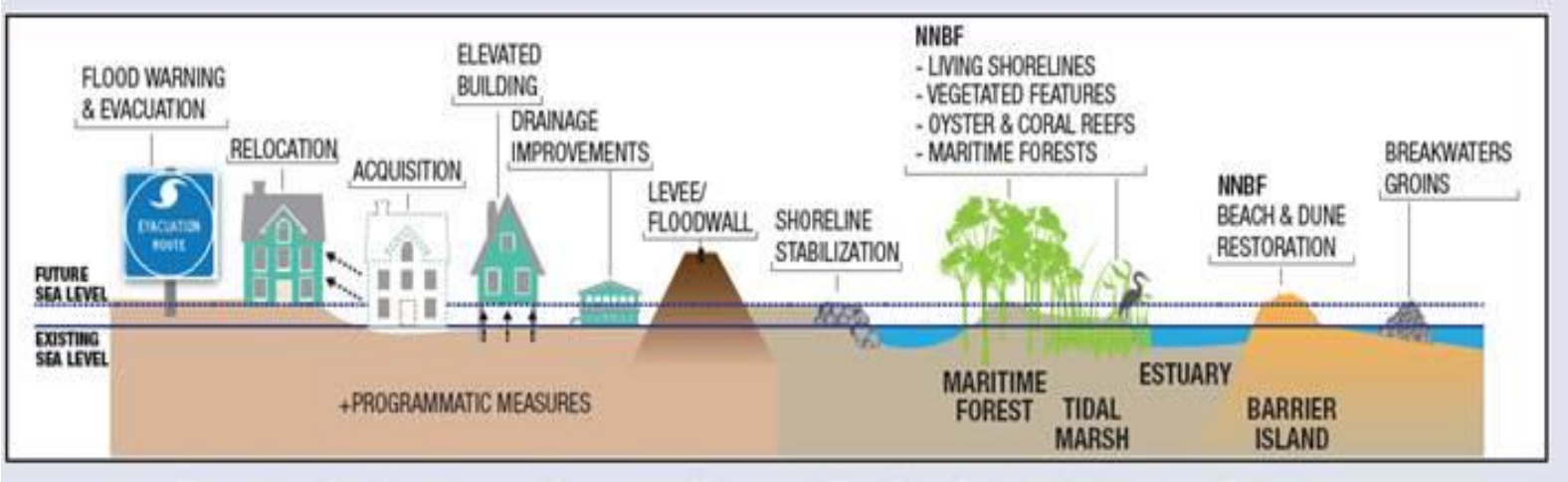


Table 1. Examples of NNBF relevant to coastal systems (USACE 2013).

NATURAL AND NATURE-BASED FEATURES AT A GLANCE				
				
Dunes and Beaches	**Vegetated Features (e.g., Marshes)**	**Oyster and Coral Reefs**	**Barrier Islands**	**Maritime Forests/Shrub Communities**
Benefits/Processes Breaking of offshore waves Attenuation of wave energy Slow inland water transfer	**Benefits/Processes** Breaking of offshore waves Attenuation of wave energy Slow inland water transfer Increased infiltration	**Benefits/Processes** Breaking of offshore waves Attenuation of wave energy Slow inland water transfer	**Benefits/Processes** Wave attenuation and/or dissipation Sediment stabilization	**Benefits/Processes** Wave attenuation and/or dissipation Shoreline erosion stabilization Soil retention
Performance Factors Berm height and width Beach slope Sediment grain size and supply Dune height, crest, and width Presence of vegetation	**Performance Factors** Marsh, wetland, or SAV elevation and continuity Vegetation type and density Spatial extent	**Performance Factors** Reef width, elevation, and roughness	**Performance Factors** Island elevation, length, and width Land cover Breach susceptibility Proximity to mainland shore	**Performance Factors** Vegetation height and density Forest dimension Sediment composition Platform elevation
General coastal risk reduction performance factors include: Storm surge and wave height/period, and water levels				

Ref. USACE

They also work as hybrid systems:



from, NACCS 2015

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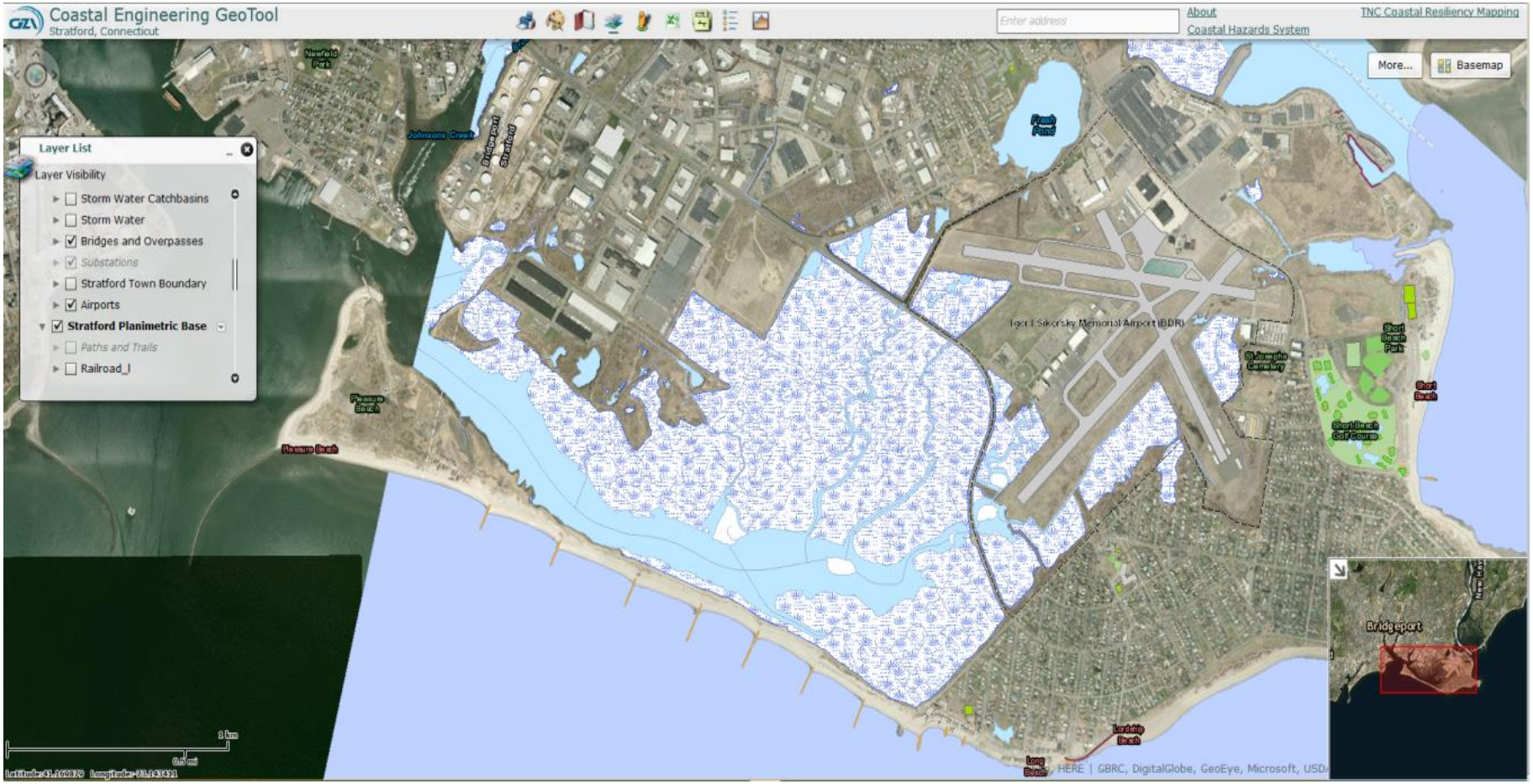

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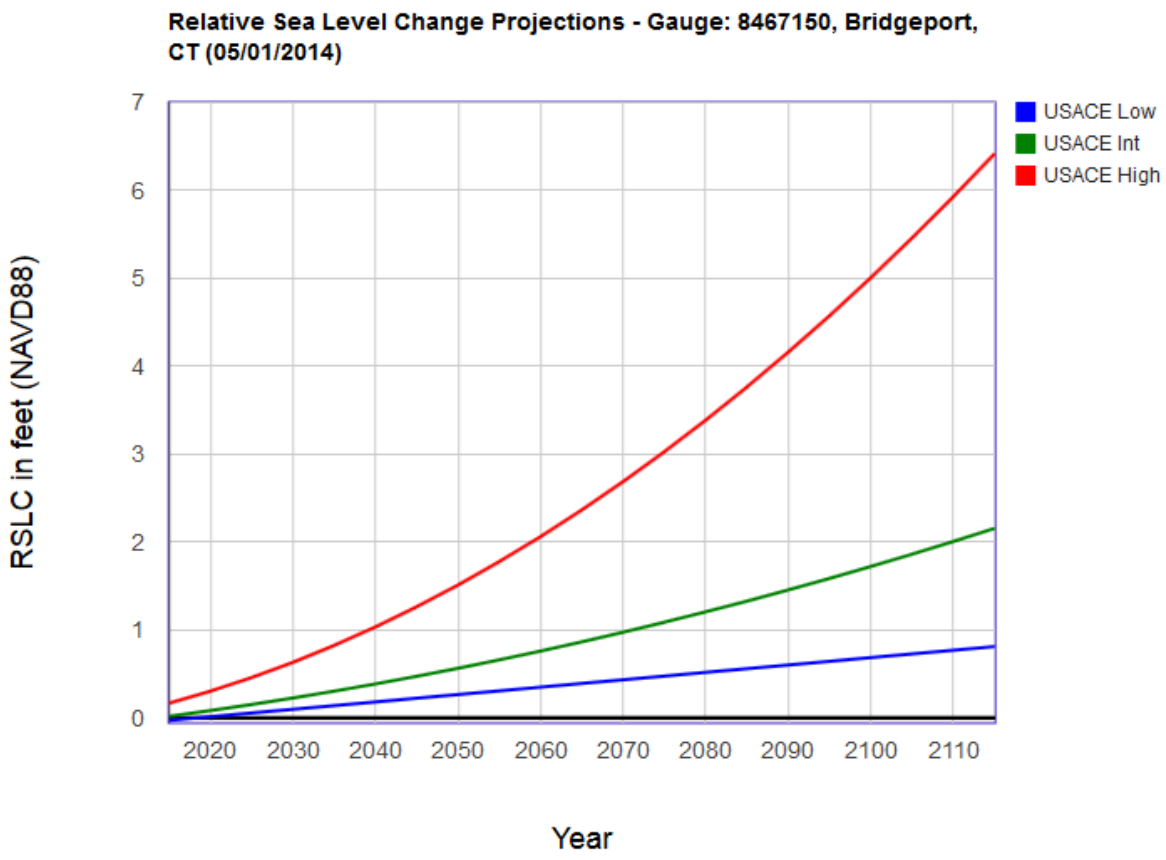
8467150, Bridgeport, CT
NOAA's Published Rate: 0.00840 feet/yr
All values are expressed in feet relative to NAVD88

Year	USACE Low	USACE Int	USACE High
2015	-0.03	0.02	0.17
2020	0.02	0.09	0.31
2025	0.06	0.15	0.46
2030	0.10	0.23	0.63
2035	0.14	0.31	0.83
2040	0.18	0.39	1.04
2045	0.23	0.48	1.27
2050	0.27	0.57	1.51
2055	0.31	0.66	1.78
2060	0.35	0.76	2.07
2065	0.39	0.87	2.37
2070	0.44	0.98	2.69
2075	0.48	1.09	3.03
2080	0.52	1.21	3.39
2085	0.56	1.33	3.77
2090	0.60	1.46	4.16
2095	0.65	1.59	4.58
2100	0.69	1.72	5.01
2105	0.73	1.86	5.46
2110	0.77	2.01	5.93
2115	0.81	2.16	6.42

Print Table

USACE Sea Level Rise Scenarios

8467150, Bridgeport, CT
NOAA's Published Rate: 0.00840 feet/yr



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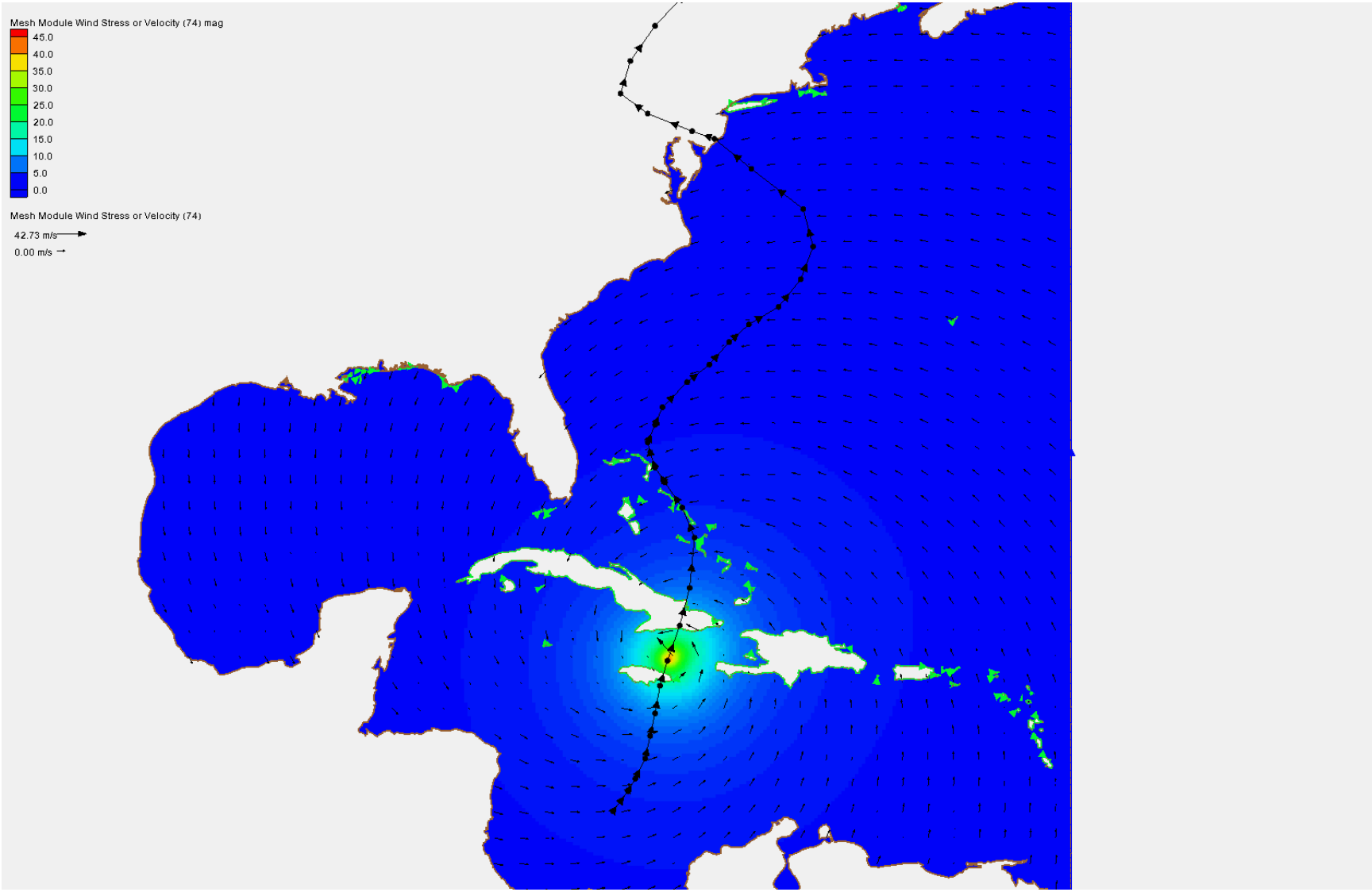
Maximum Water Level: 2115 HAT SLR High

ADCIRC Model “Sandy” Simulation



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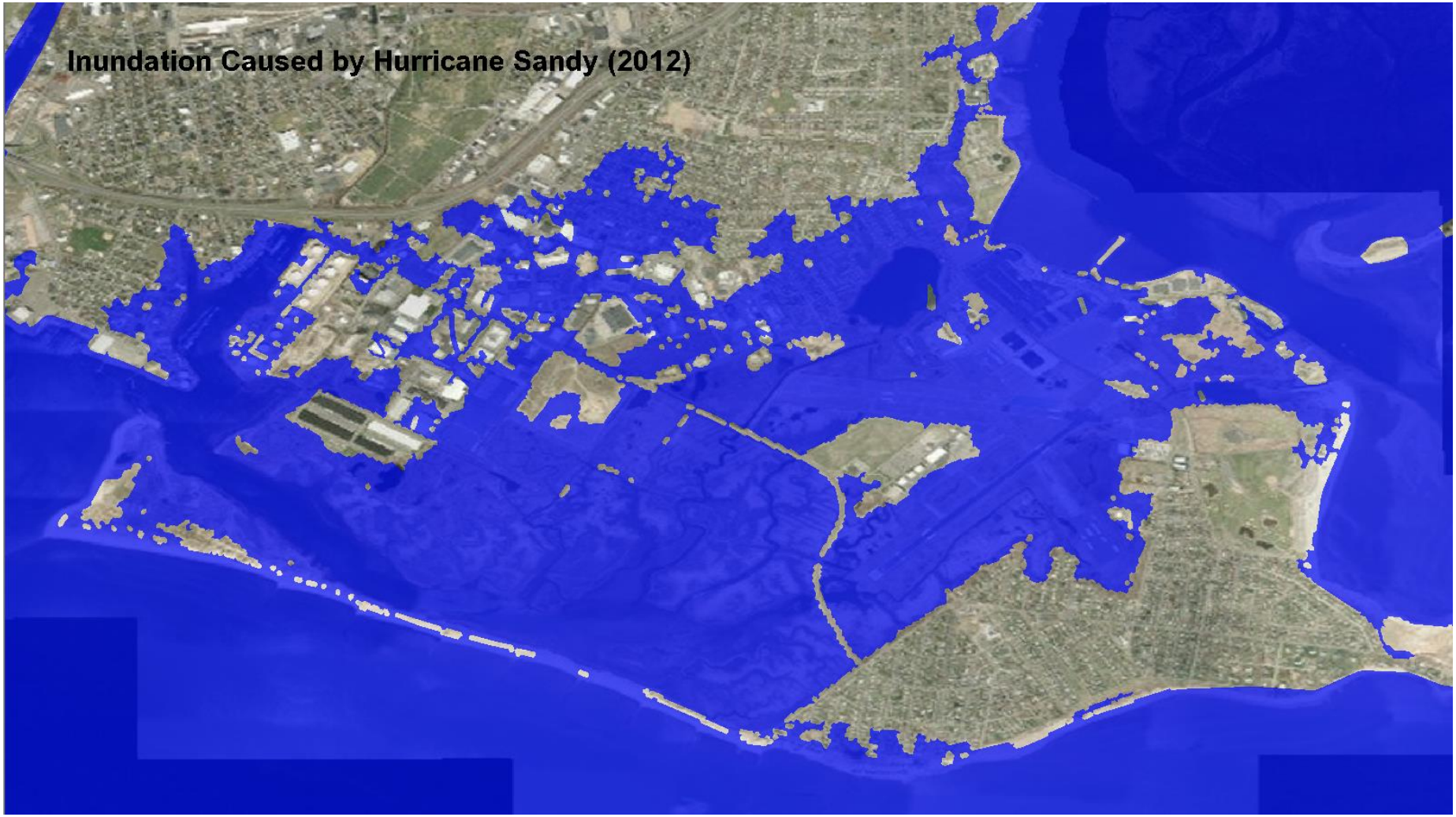
Sandy Maximum Storm Surge



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Maximum Water Level: 2115 HAT SLR High

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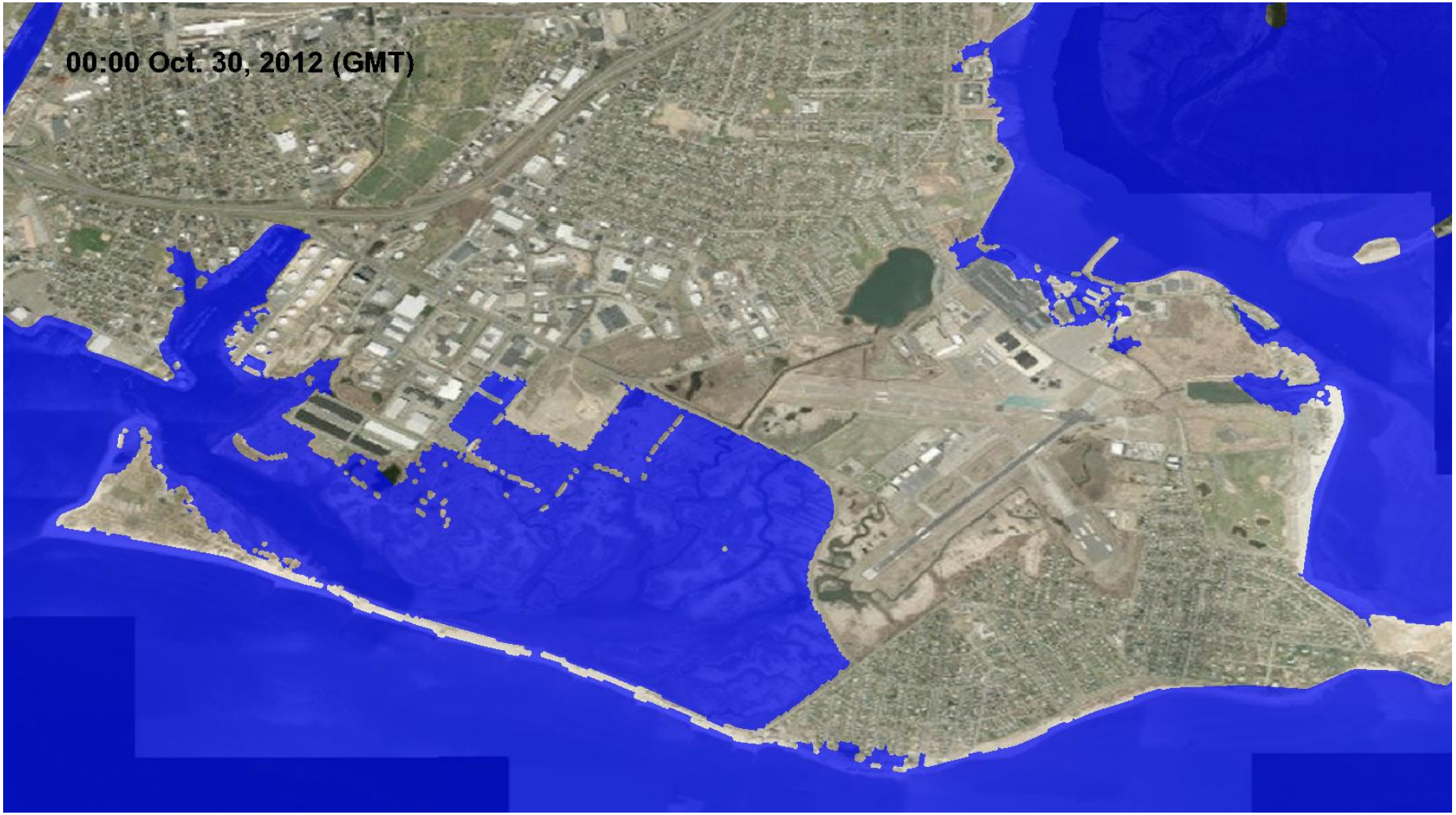
Sandy Storm surge simulations (Snapshot 1)



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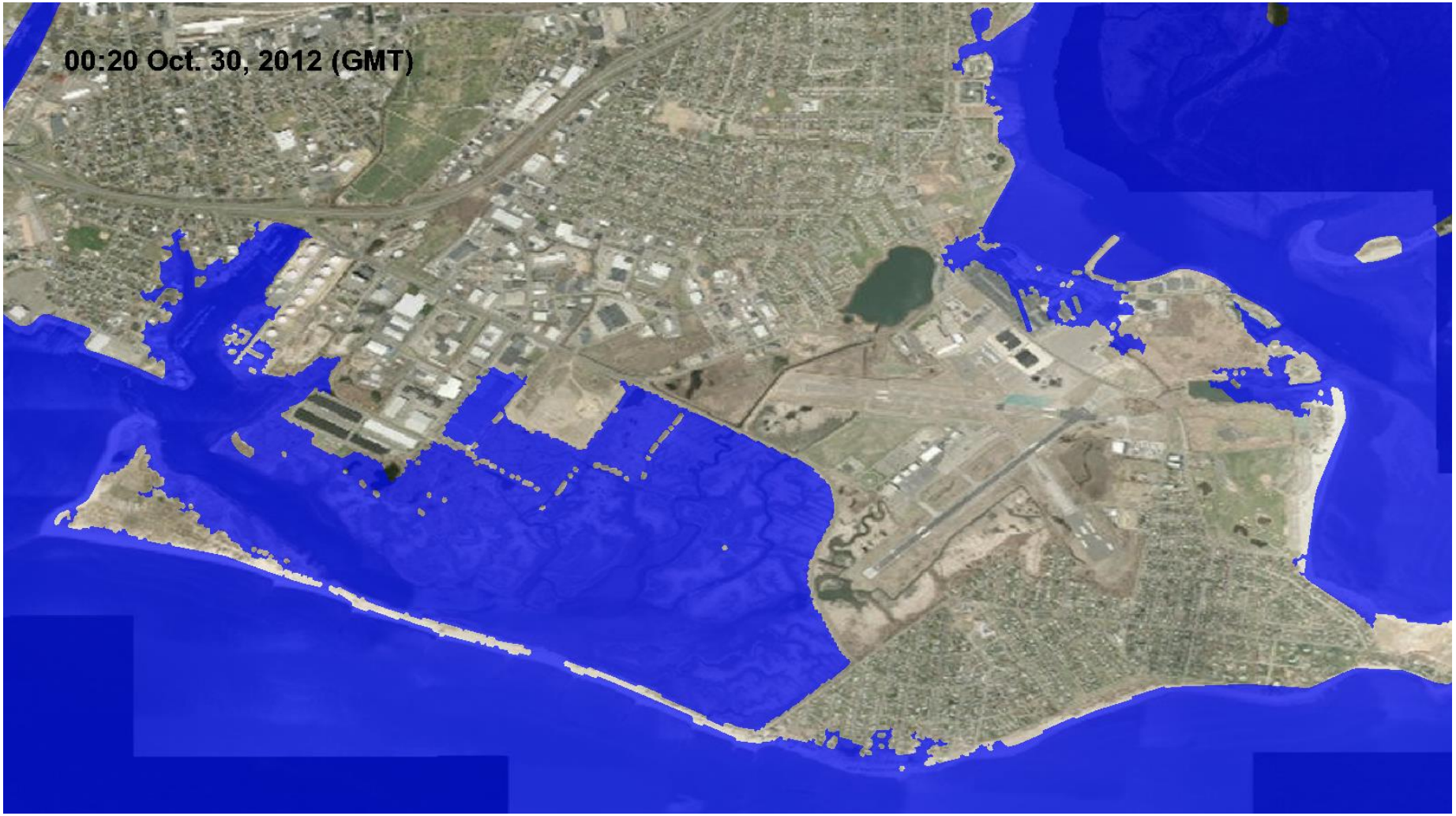
Sandy Storm surge simulations (Snapshot 2)



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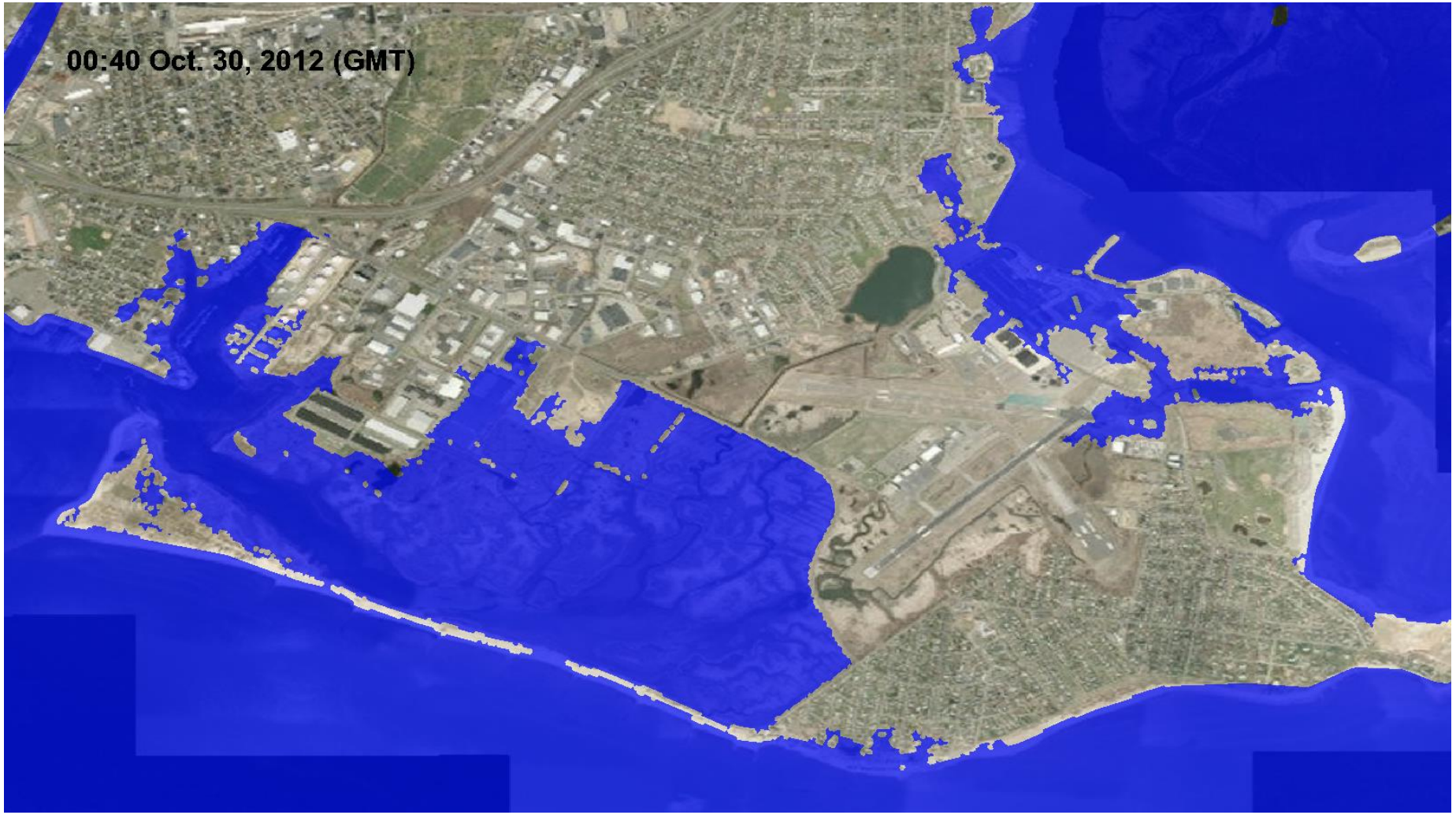
Sandy Storm surge simulations (Snapshot 3)



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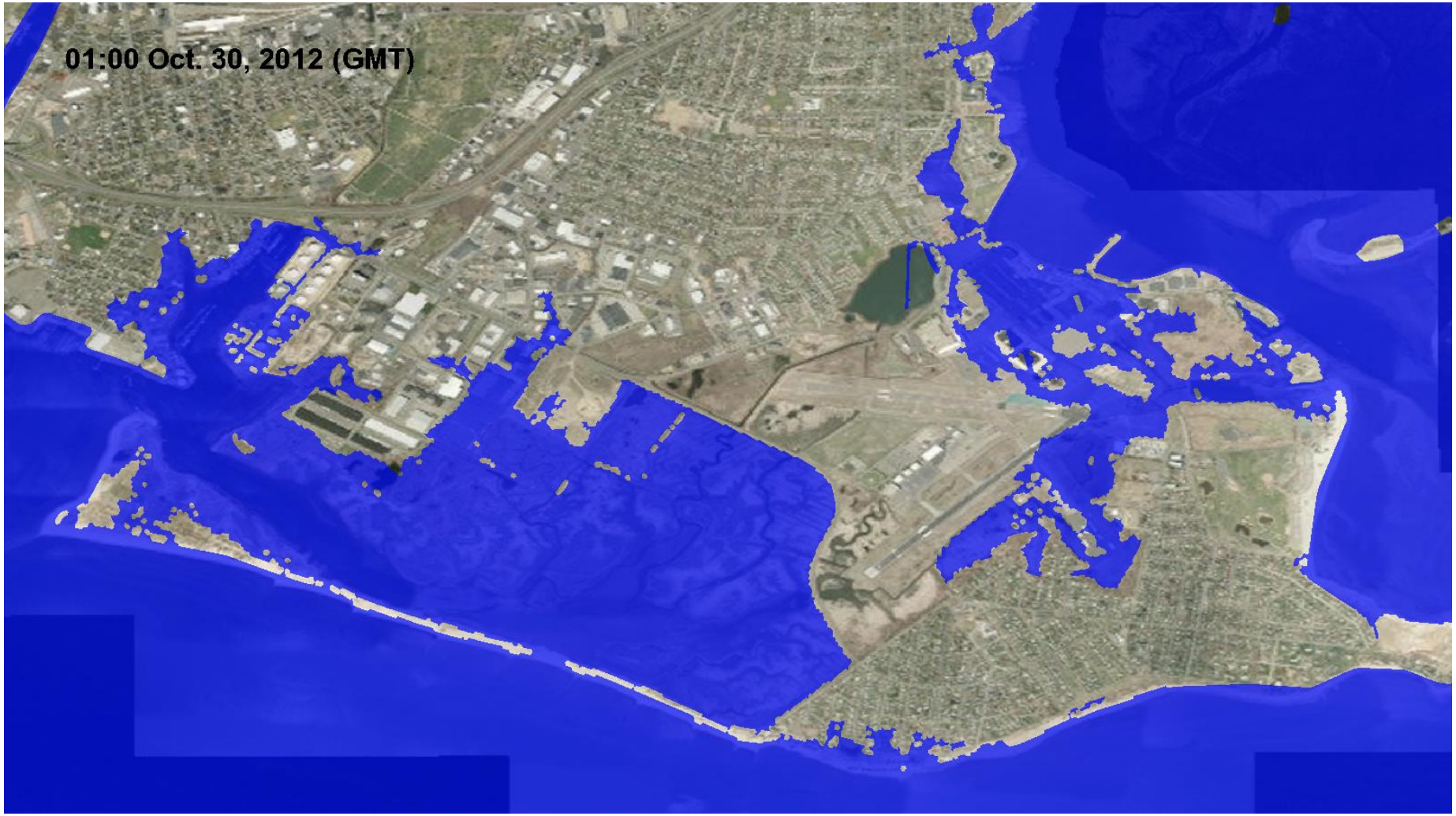
Sandy Storm surge simulations (Snapshot 4)



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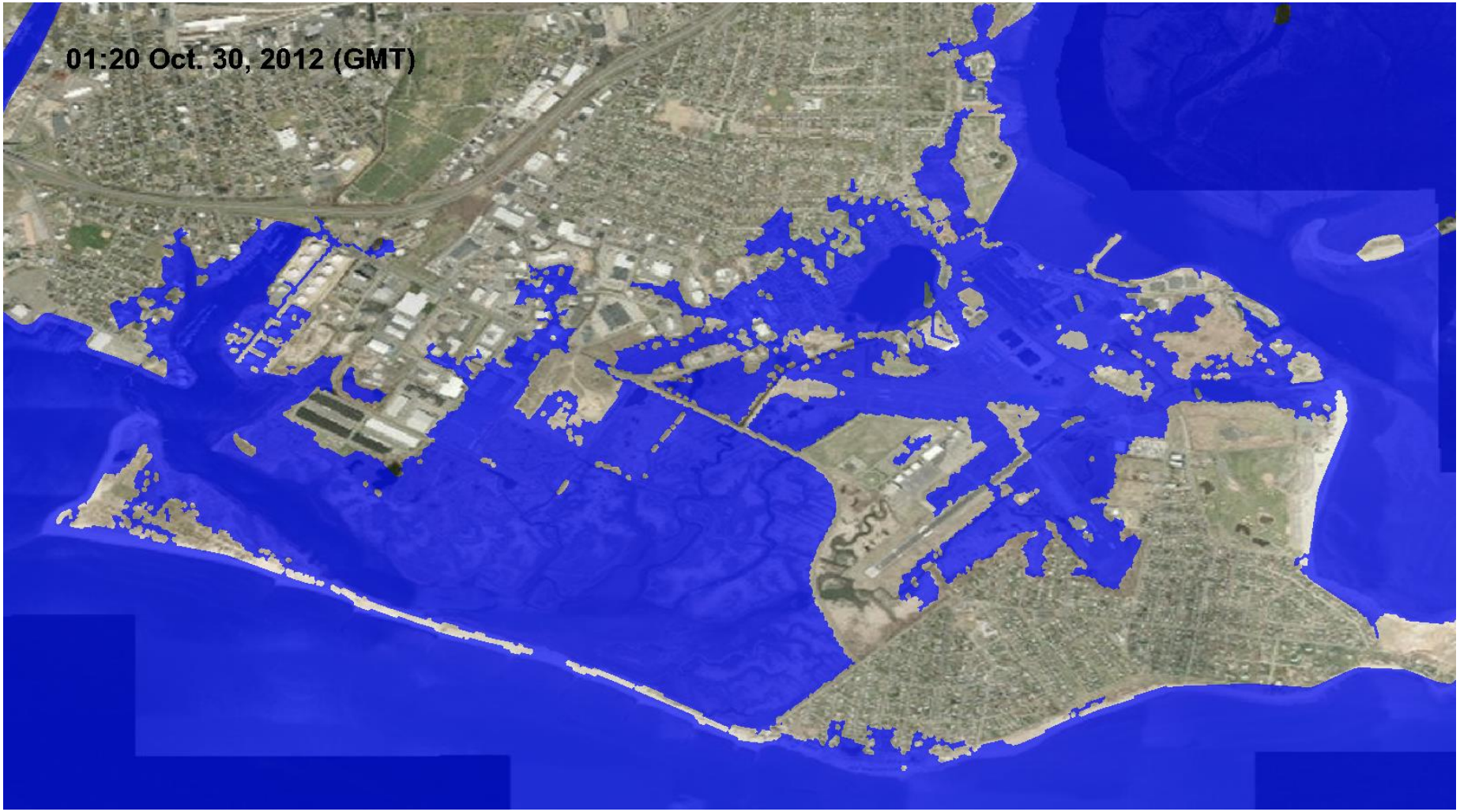
Sandy Storm surge simulations (Snapshot 5)



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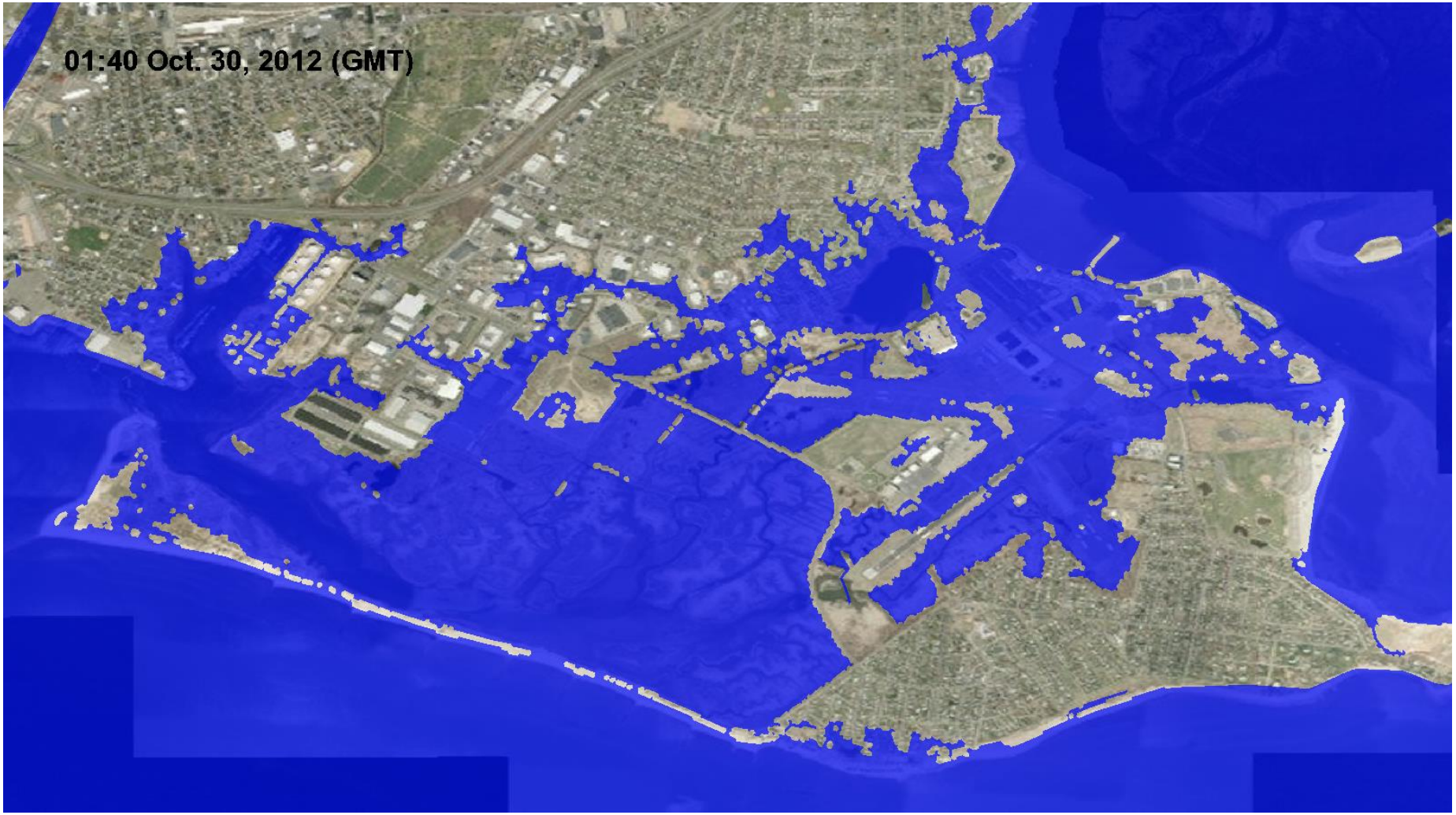
Sandy Storm surge simulations (Snapshot 6)



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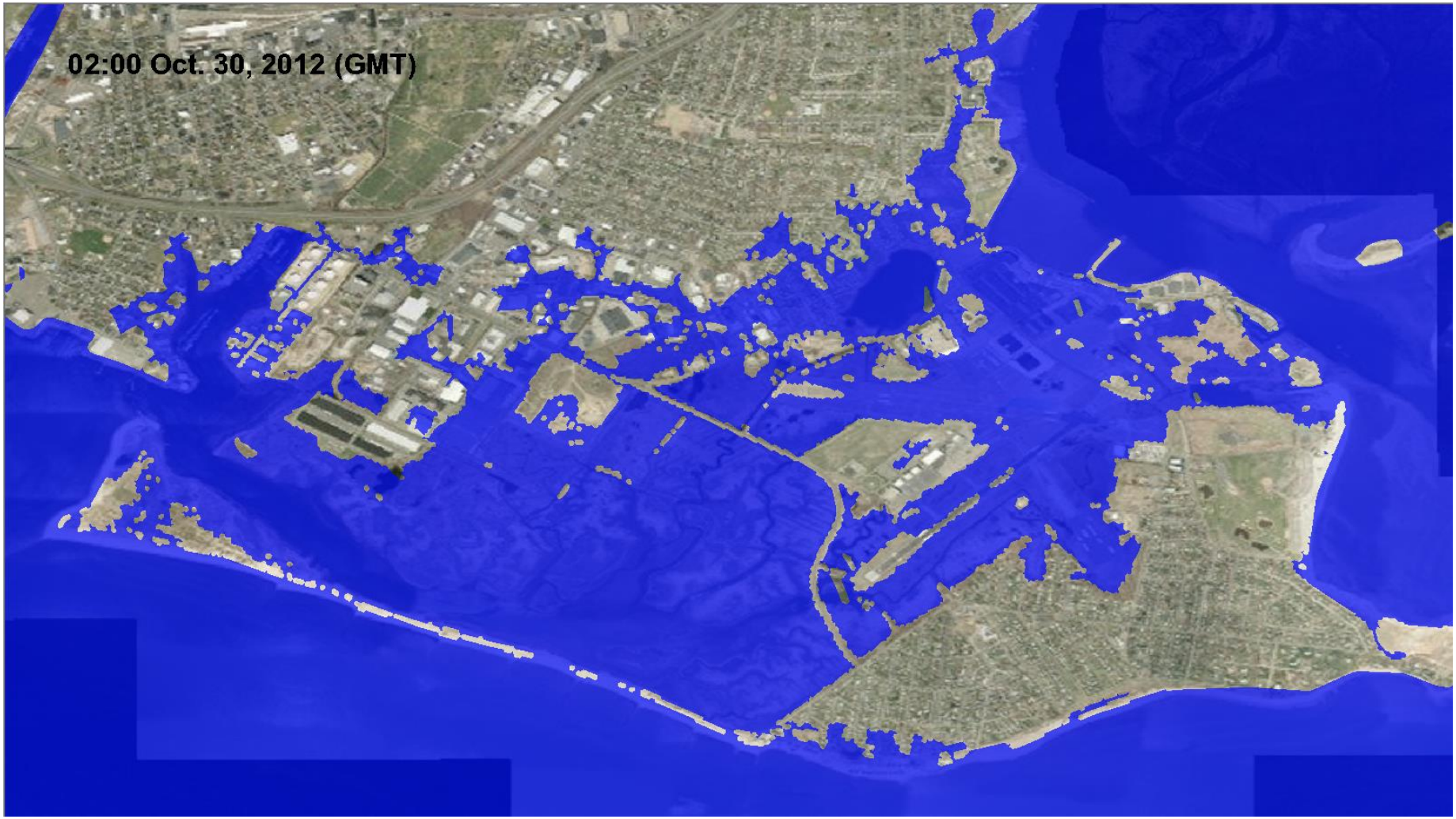
Sandy Storm surge simulations (Snapshot 7)



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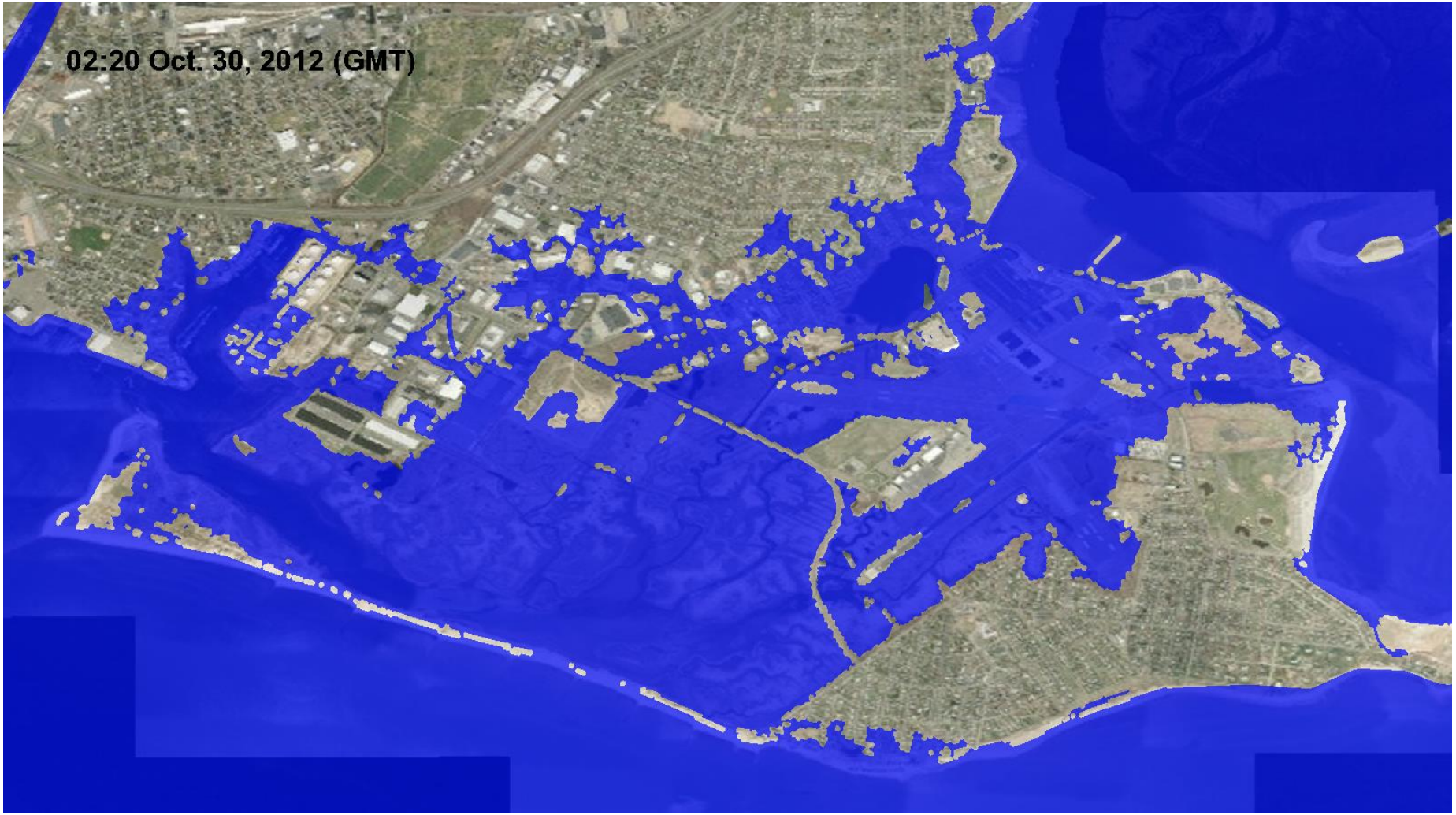
Sandy Storm surge simulations (Snapshot 8)



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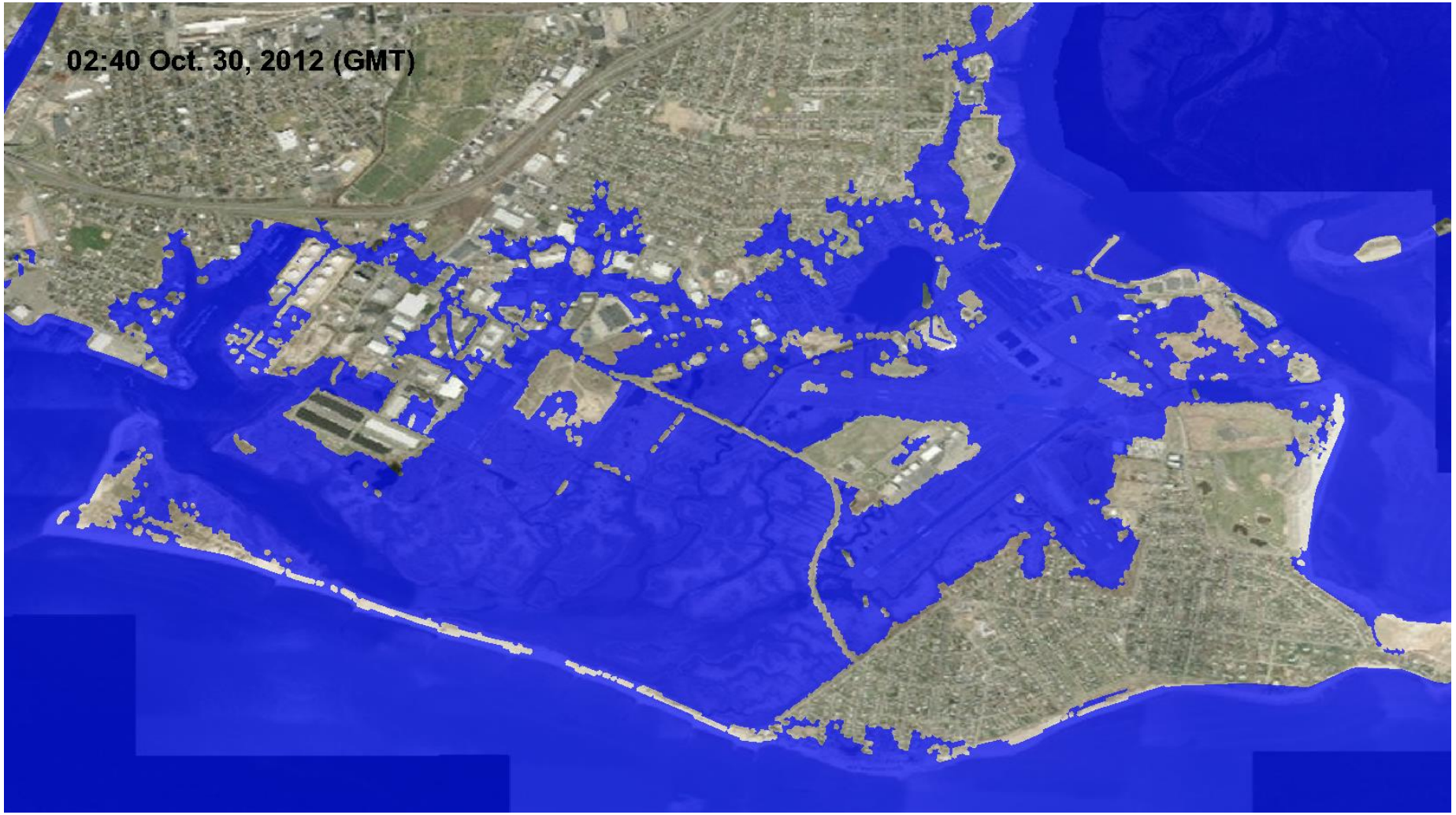
Sandy Storm surge simulations (Snapshot 9)



While designing Nature-Based Solutions for coastal resilience, it is important to :

- Identify vulnerable areas,
- Determine level of risk,
- Select features that are suitable to the site geomorphology.

QUESTIONS?