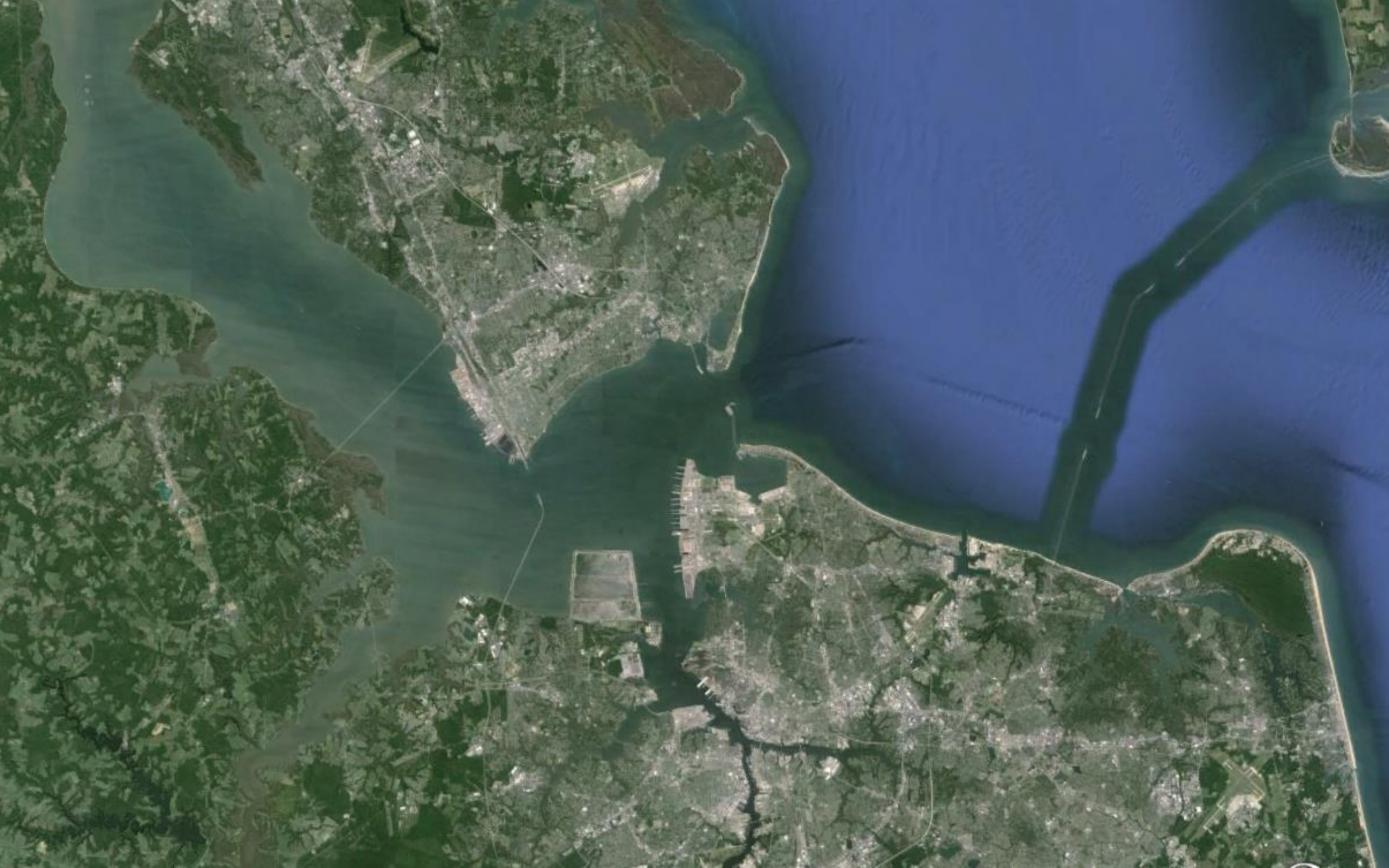
Key Issues Facing Hampton Roads

Christy Everett, Chesapeake Bay Foundation

Citizens Advisory Committee- May 18, 2016

Williamsburg
Gloucester Point
Cape Charles
JAMES CITY CO.
Yorktown
York River
Jamestown
YORK CO.
NORTHAMPTON CO.
CHESAPEAKE BAY
Surry
Newport News
Poquoson
SURRY CO.
James River
Hampton
Dendron
Smithfield
Hampton Roads
ATLANTIC OCEAN
ISLE OF WIGHT CO.
Norfolk
Elizabeth River
Lafayette River
Lynnhaven River
Nansemond River
Portsmouth
Virginia Beach
SOUTHAMPTON CO.
Suffolk
Chesapeake
CHESAPEAKE BAY WATERSHED
0 5 Miles
Franklin
N



Number Of Impaired Segments Per Watershed (All Impairments)

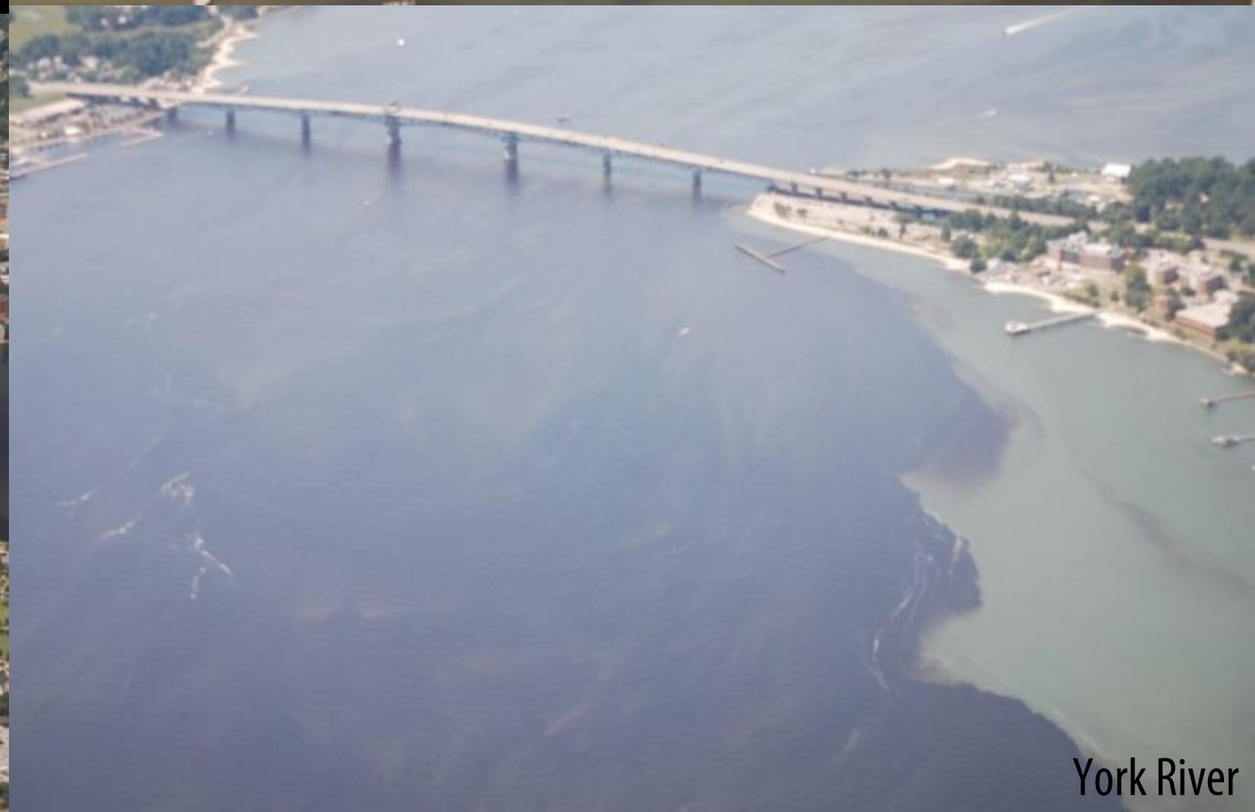
- 0 (131 Watersheds - 10%)
- 1 - 2 (543 Watersheds - 44%)
- 3 - 5 (373 Watersheds - 30%)
- 6 - 9 (129 Watersheds - 10%)
- 10 Or More (71 Watersheds - 6%)

Impaired Waters

Atlantic Ocean

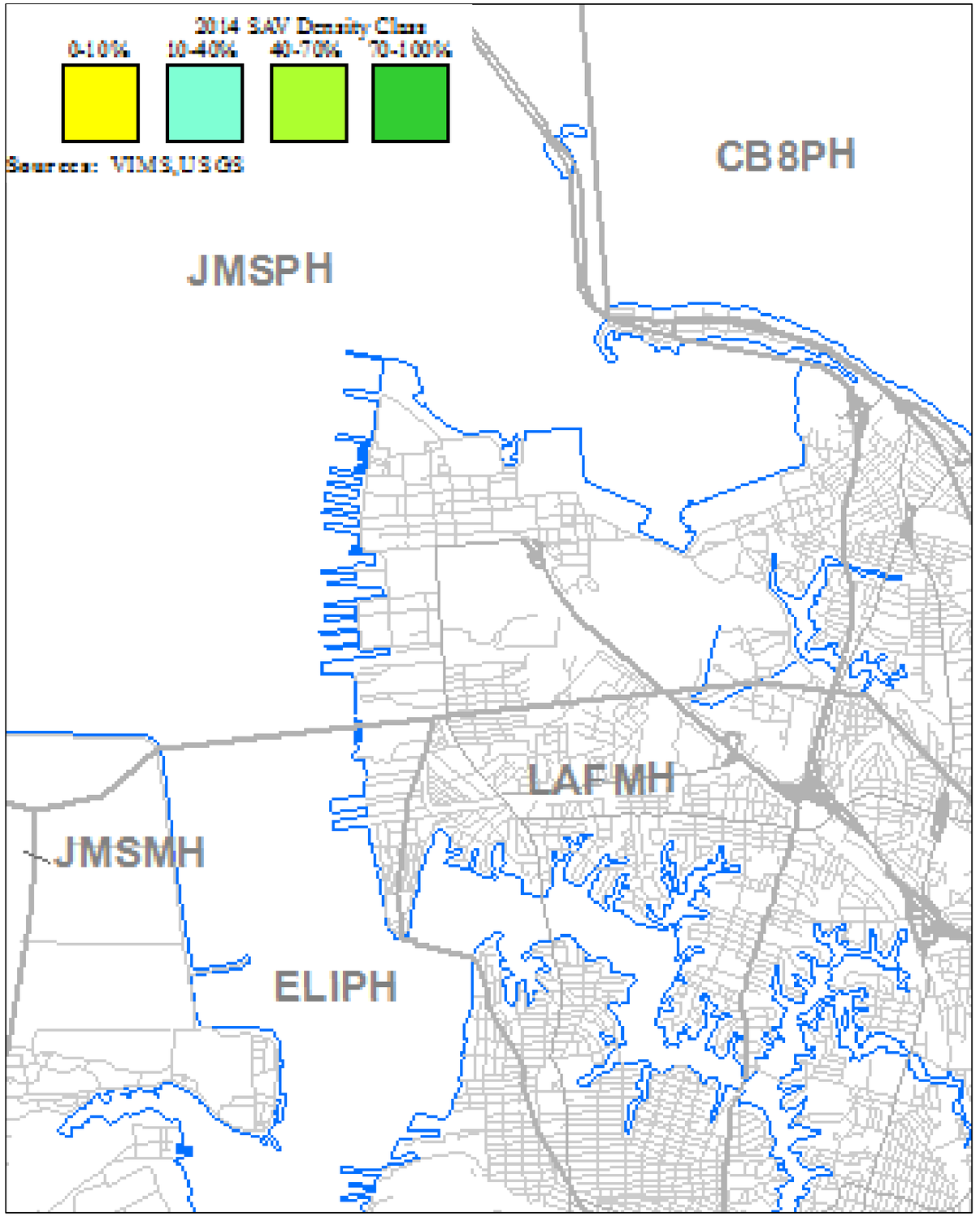
Elizabeth River - Western Branch

Elizabeth River - Eastern Branch



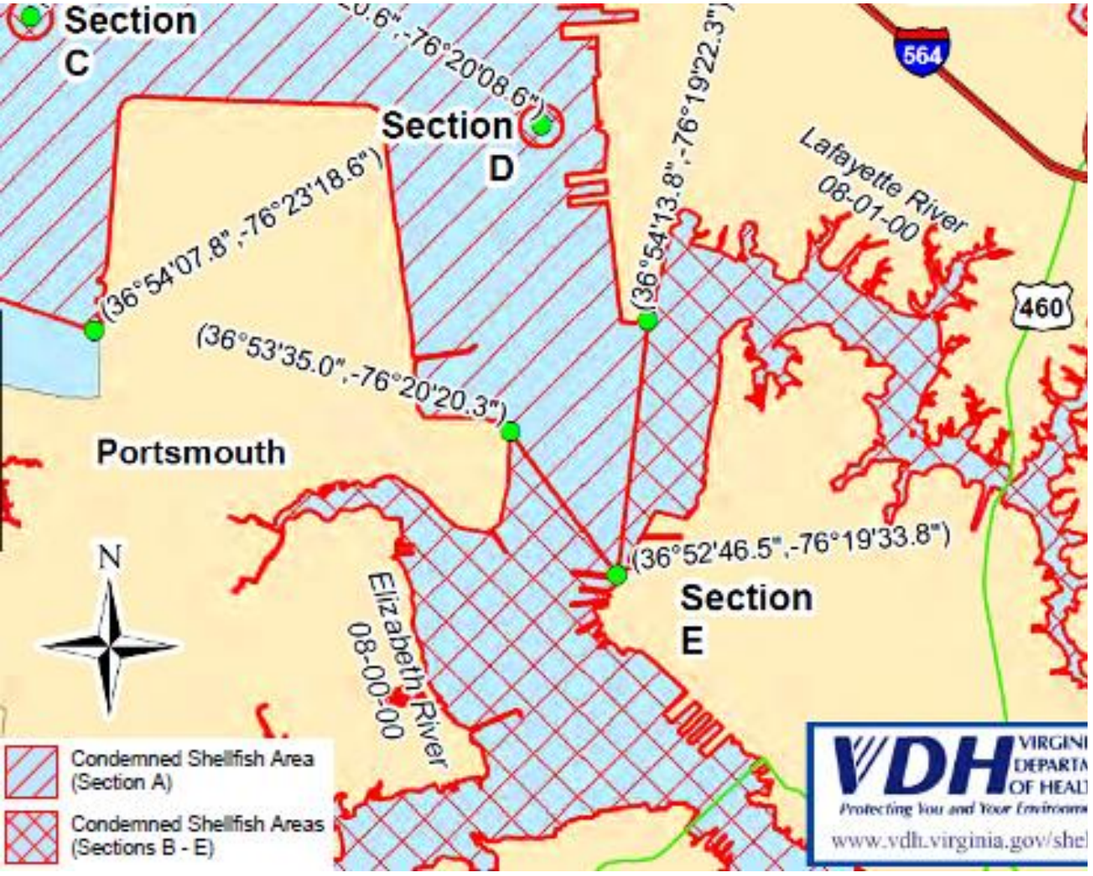
York River

Underwater Grasses



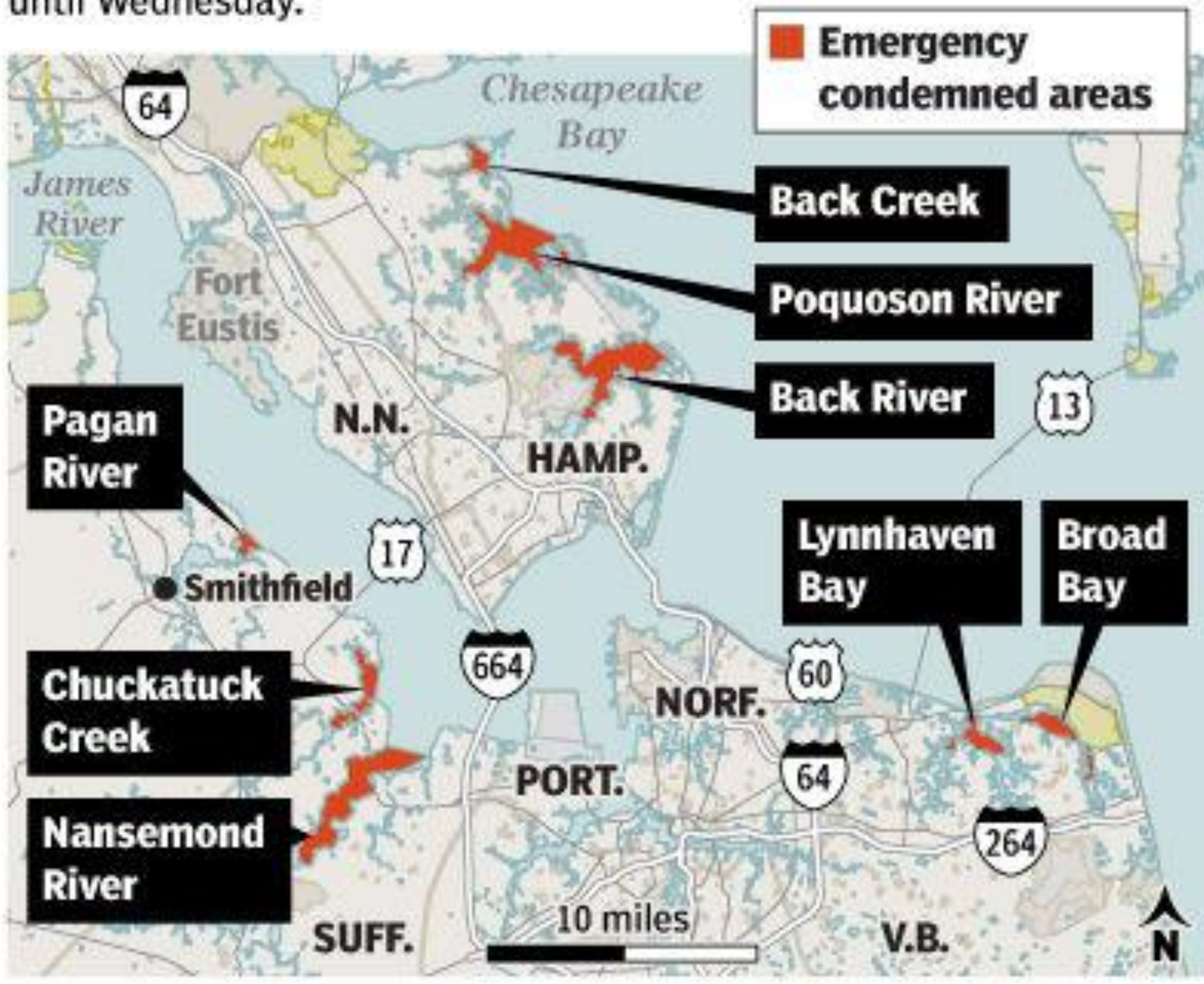
Beach Closures

Shellfish Closures



SOME CLOSED SHELLFISH WATERWAYS

State health officials closed numerous waterways to oyster and clam harvesting out of concern that torrential rains have washed bacteria and pollution onto shellfish beds. The closures, affecting the Lynnhaven River, Nansemond River, Pagan River and some creeks and rivers on the Peninsula, take effect today and last until Wednesday.



Oyster Restoration & Aquaculture

The Virginian-Pilot

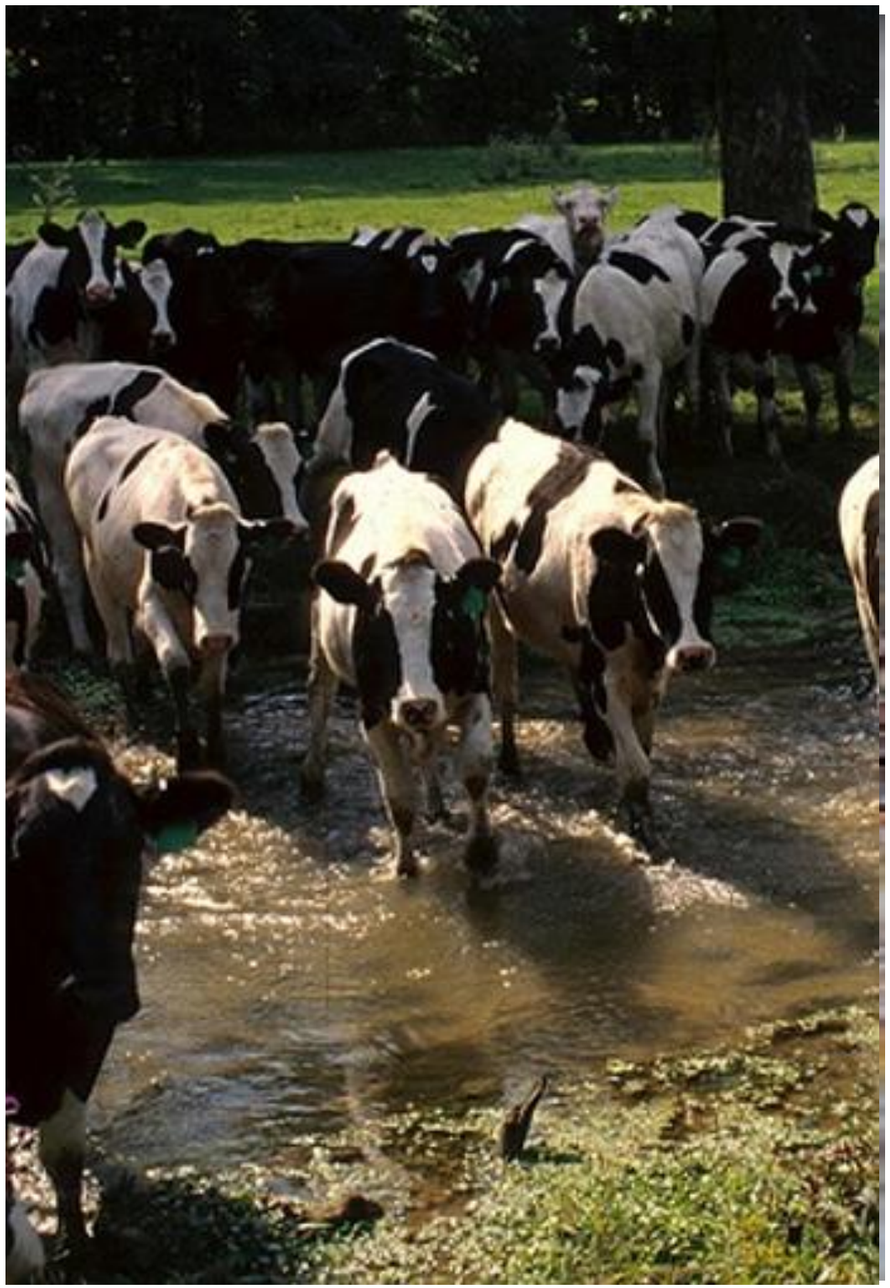
Our 151st year | SUNDAY | 12.13.15 | PILOTONLINE.COM | $2.50 in Hampton Roads

COMEBACK *and* CONFLICT

OYSTERS ARE THRIVING in the Lynnhaven River, but one oysterman's goal to revive a delicacy has hit opposition from landowners.

Pollutants: Sediment, Nitrogen, Phosphorus

Wastewater



Agriculture

Stormwater

Reducing Stormwater Pollution

RETENTION

CONSTRUCTED WETLANDS

SUBSURFACE STORAGE

DETENTION

GREEN ROOFS

RAINWATER HARVESTING

INFILTRATION

BIOSWALES

STORMWATER PLANTERS

SEA LEVELS HAVE RISEN

14 INCHES ⇧ SINCE 1930

NEIGHBORHOODS, ROADS, CHURCHES & MUSEUMS ARE AMONG THE 1st TO FEEL THE EFFECTS

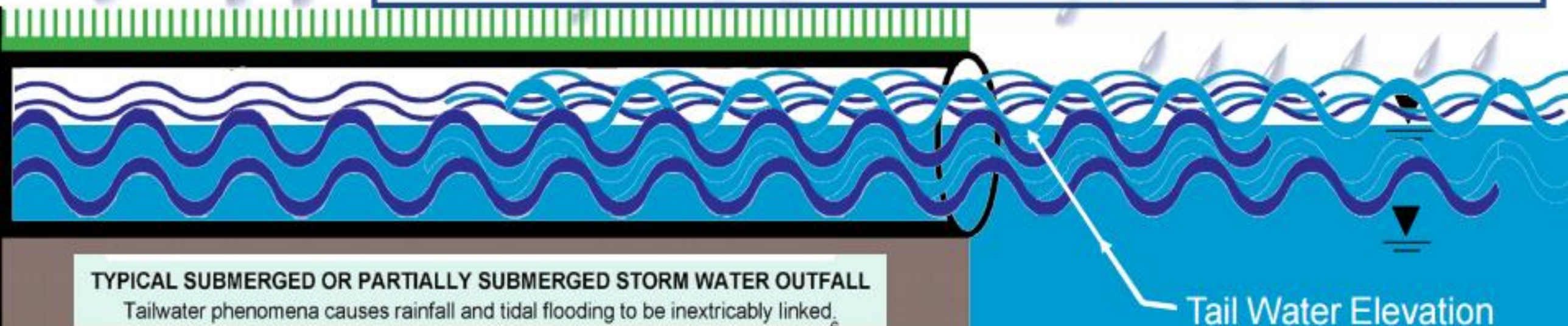
HAMPTON ROADS IS THE #2 LARGES

POPULATION CENTER AT RIS

In the Tidewater rainfall runoff is hindered by flat topography and old infrastructure

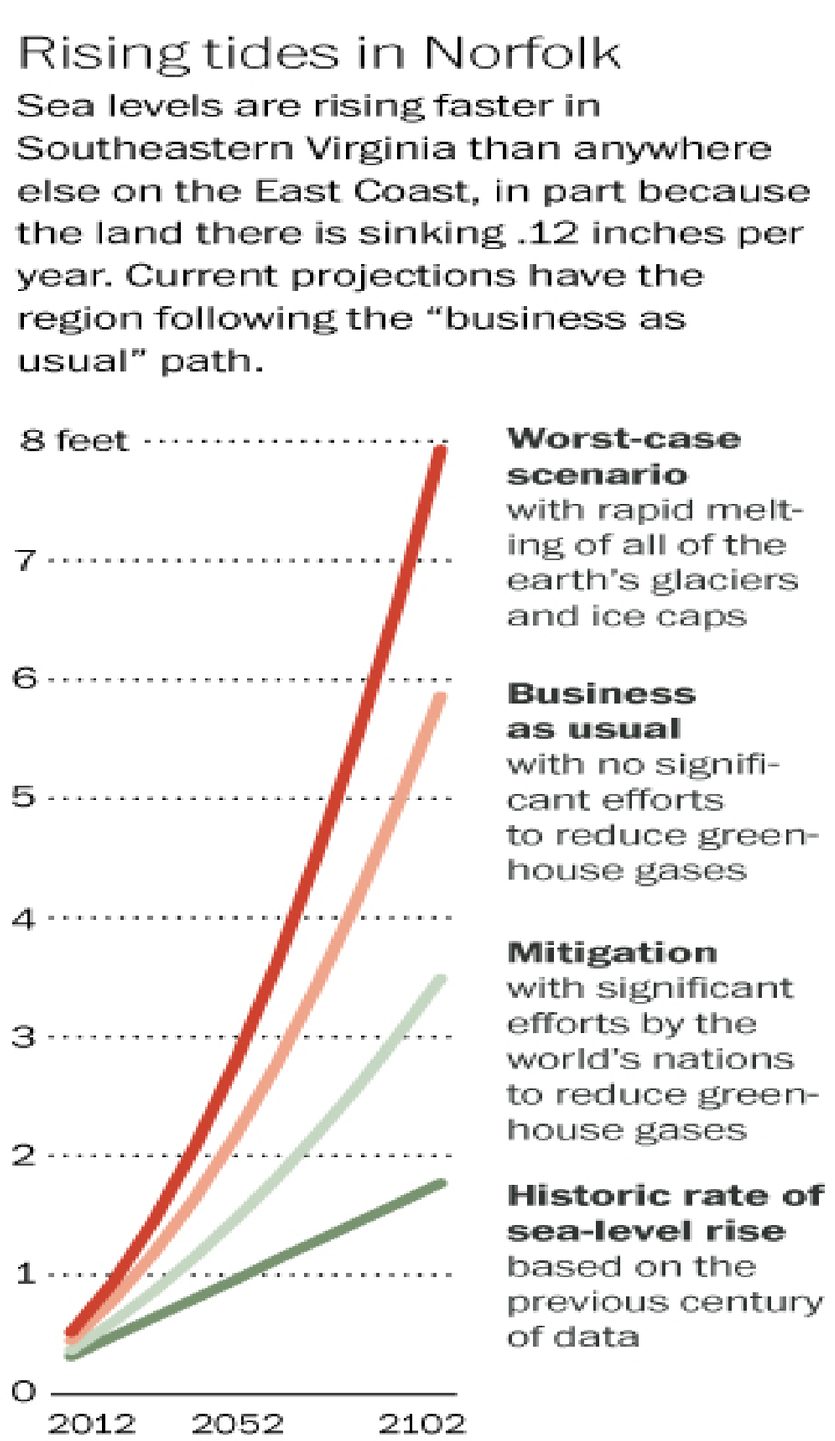
Tidal Surge (&/or future SLR) reduces the gradient and slows transport of runoff, worsening flooding

IMPLICATION: Tidal Surge (&/or future SLR) both directly cause inundation and delay runoff from rainfall - thus worsening & extending the duration of storm flooding.



TYPICAL SUBMERGED OR PARTIALLY SUBMERGED STORM WATER OUTFALL
Tailwater phenomena causes rainfall and tidal flooding to be inextricably linked.

- Global sea levels = 5-8” over the last century,
- Hampton Roads sea levels = 14” since 1930.
- combined effects:
  - sinking of a landmass:
    - groundwater withdrawal
    - fill settling
    - post-glacial rebound



- Nuisance flooding is increasing and
- Routinely occurs during extreme astronomical tides, and during minor storms.

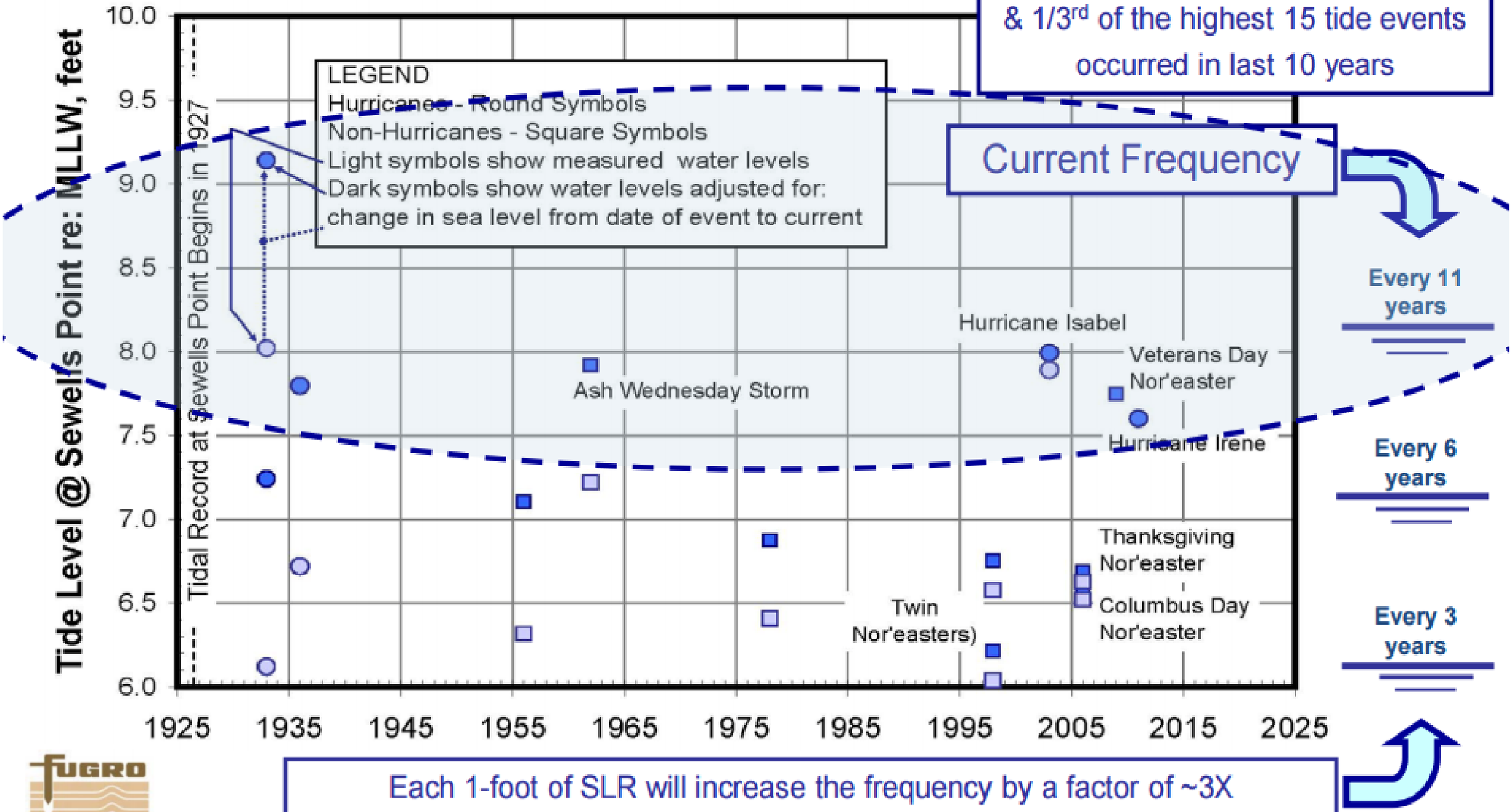
Eastern end of the Hague with Chrysler Museum in background April 23, 2013 @1900 hours. Tide is ~El +4.5 ft (re: MLLW) and ~1 to 1.5 ft above MHHW

Implication – Over the last 9 decades there has been > 10-fold increase in the hours tides in the Hague have flooded the adjacent streets, and currently averages 2 - 6 hours per week.

Of highest tidal events since 1927:

3 of the highest 6 tide events

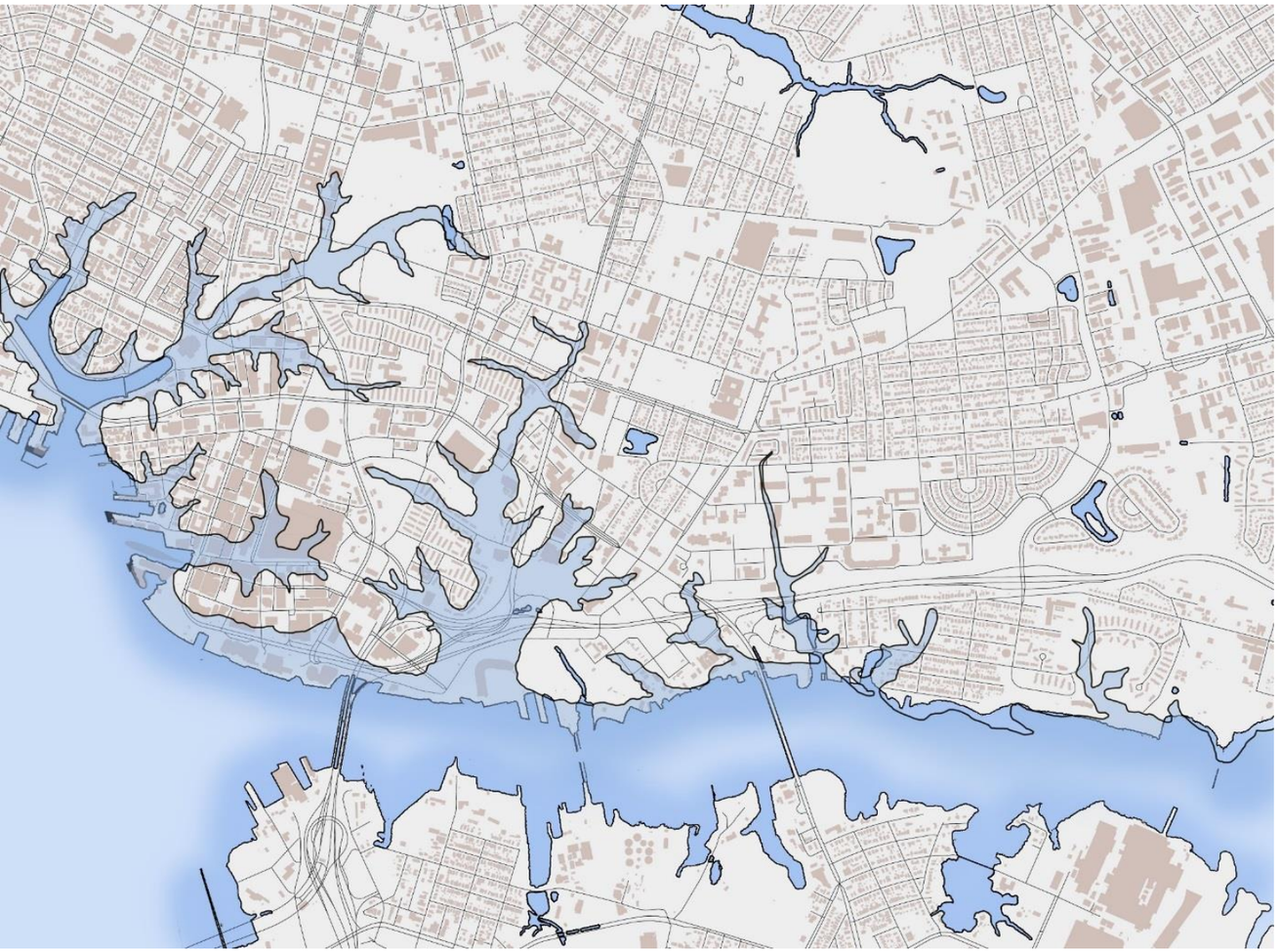
& 1/3rd of the highest 15 tide events occurred in last 10 years

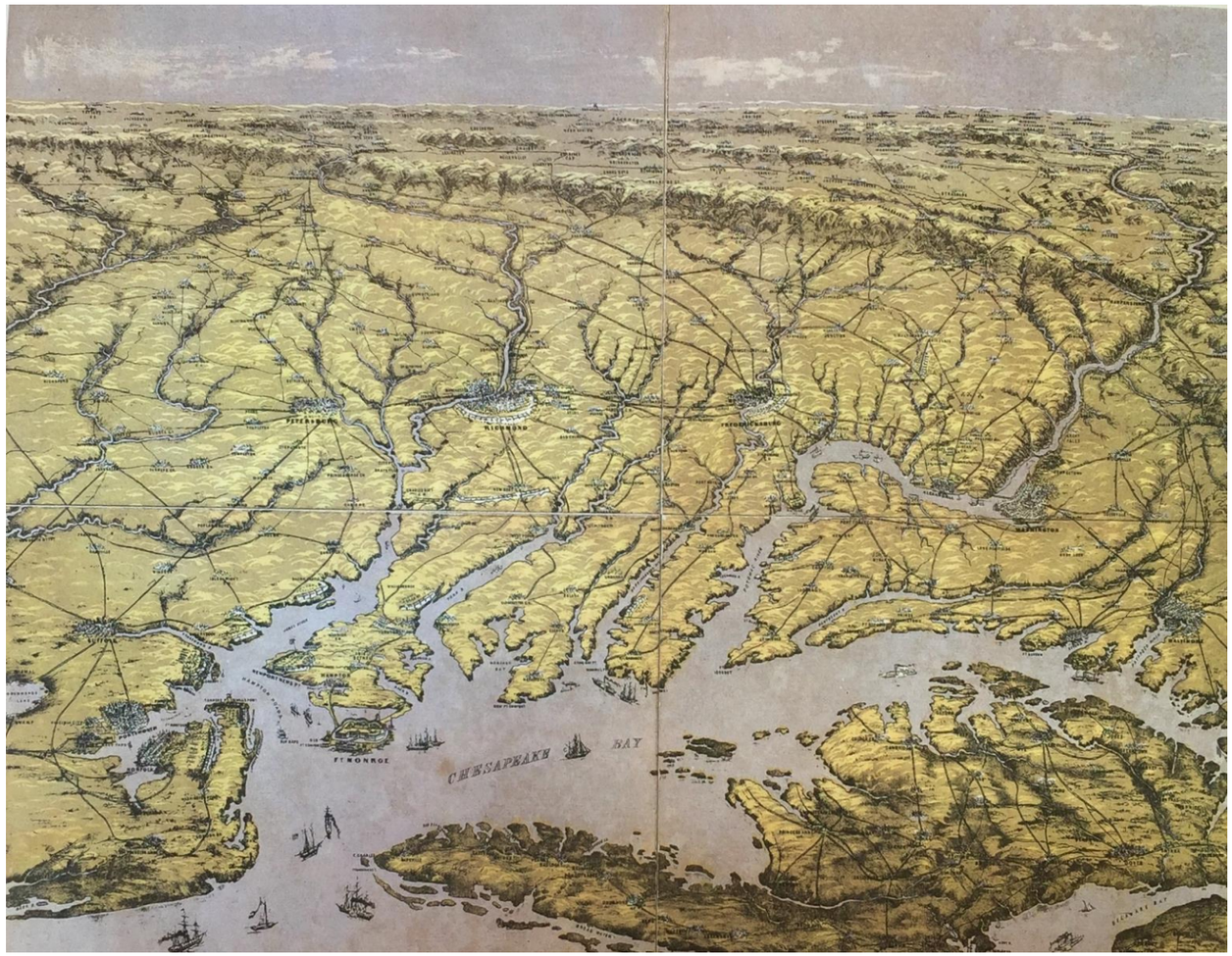


Each 1-foot of SLR will increase the frequency by a factor of ~3X

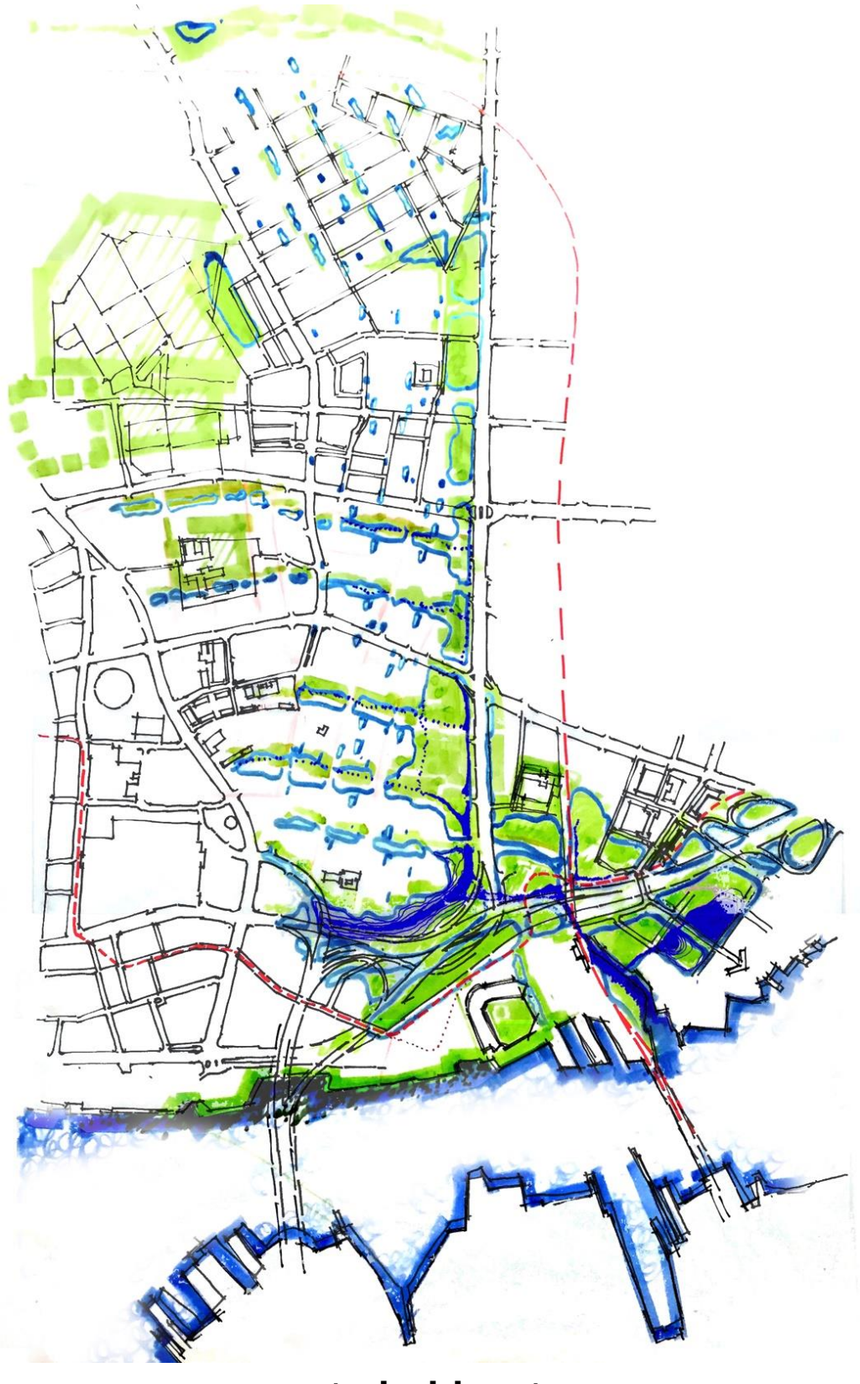
Every 6 years will become every 2 years & every 3 years will become every year

Where Water Goes





Where the Water Will Flow

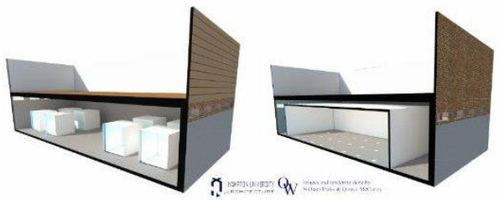


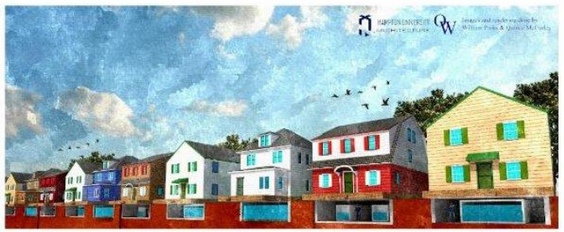
Green—open space to hold water
Blue—reintroduced creeks and new higher ground

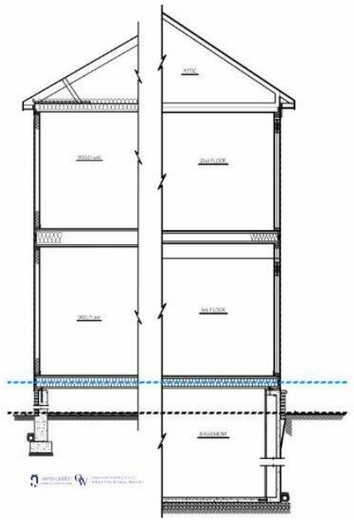
Reintroducing Historic Creeks

SOLUTION #4

Base-tern System

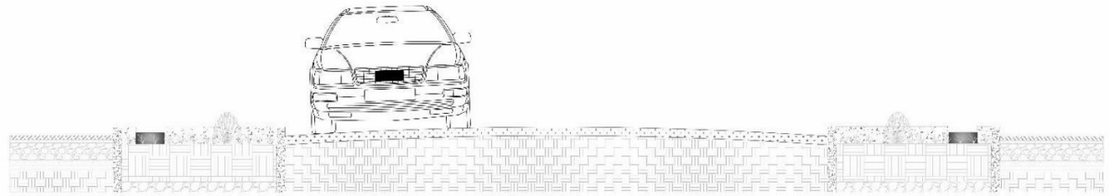


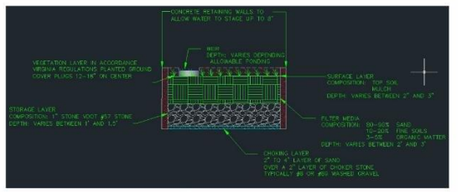




SOLUTION #3

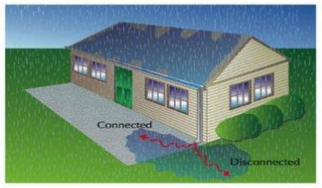
Urban Bio-Retention

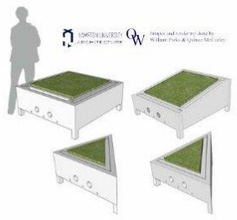


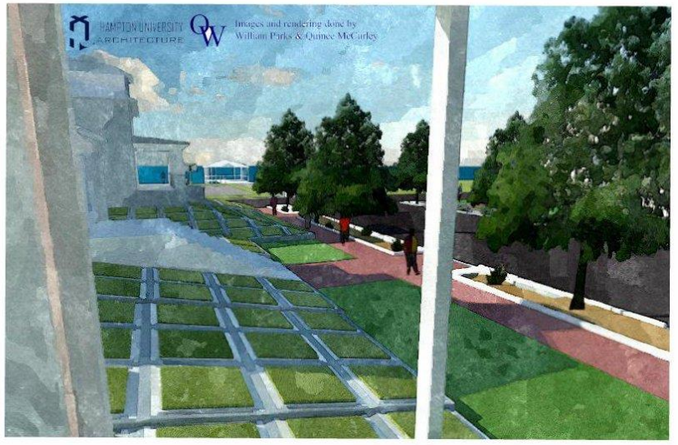


SOLUTION #5

Rooftop Disconnect

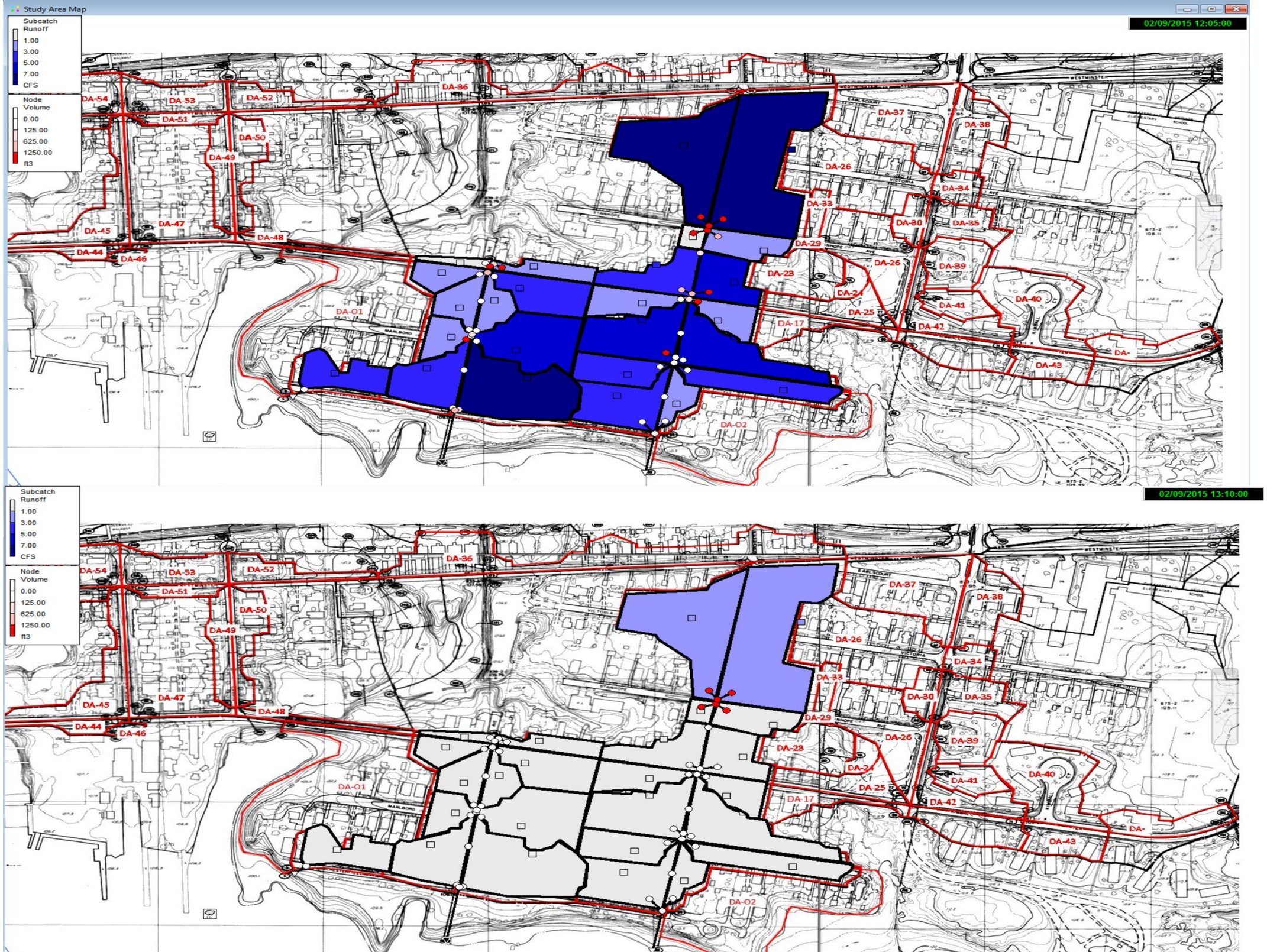






WETLANDS WATCH

WWW.WETLANDSWATCH.ORG



WETLANDS WATCH

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Designing the Coastal Community of the Future

Questions?