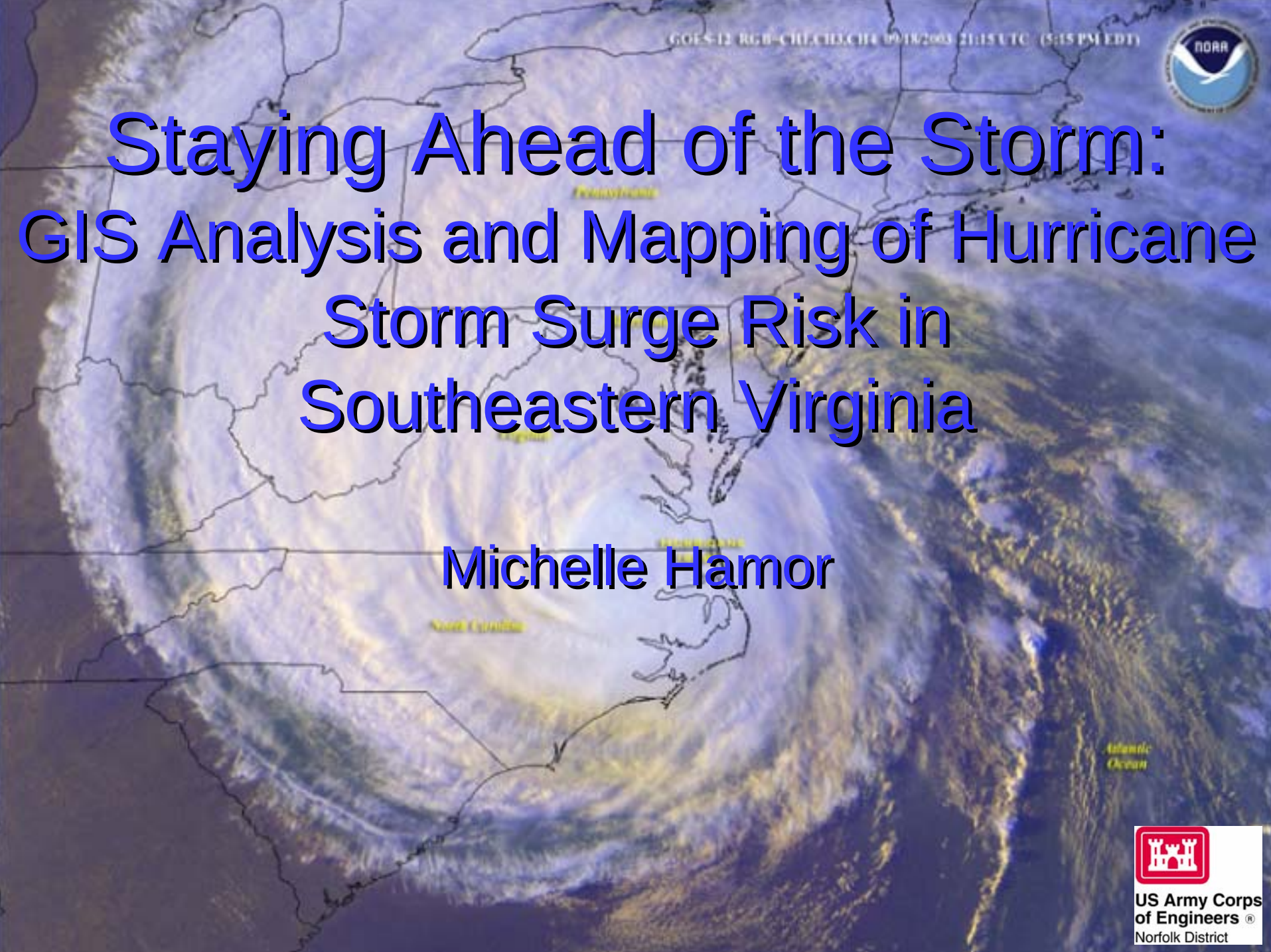
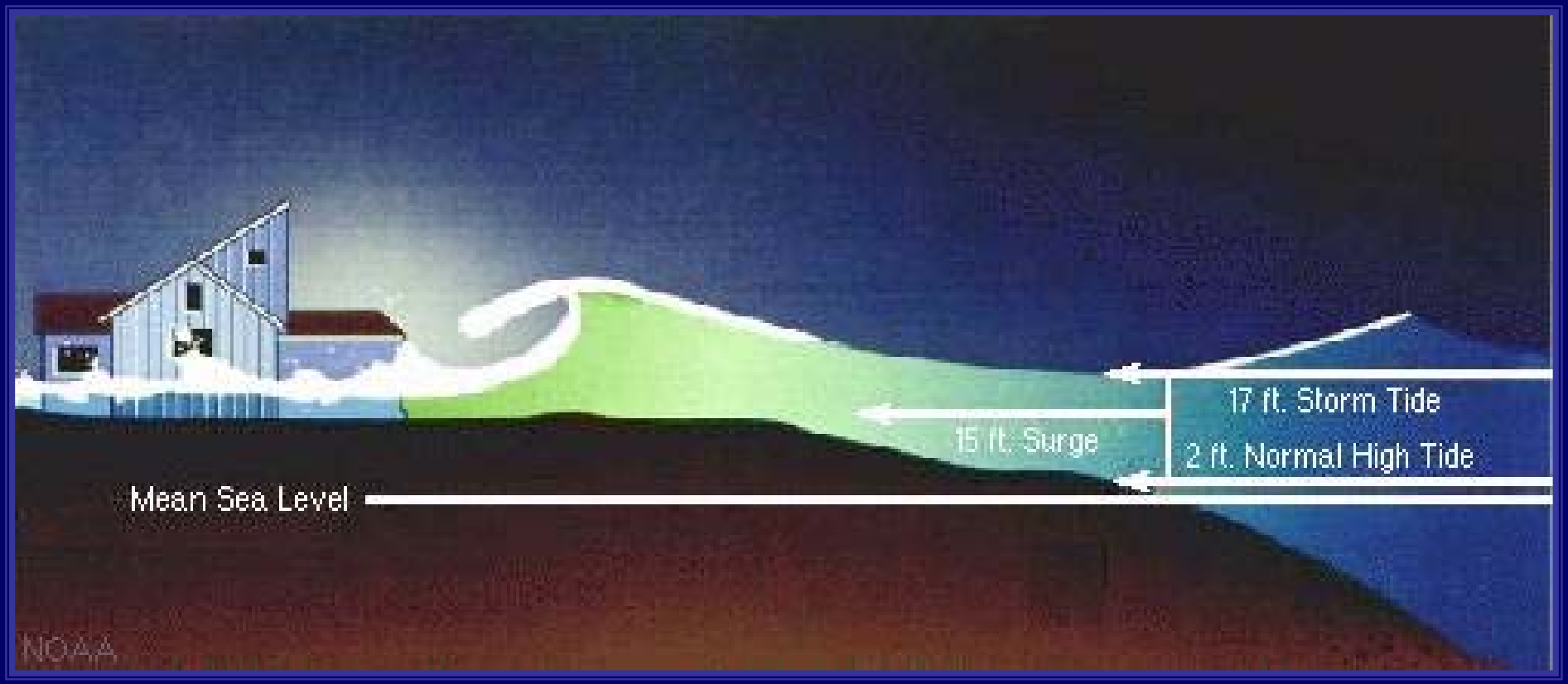


Staying Ahead of the Storm:
GIS Analysis and Mapping of Hurricane Storm Surge Risk in Southeastern Virginia

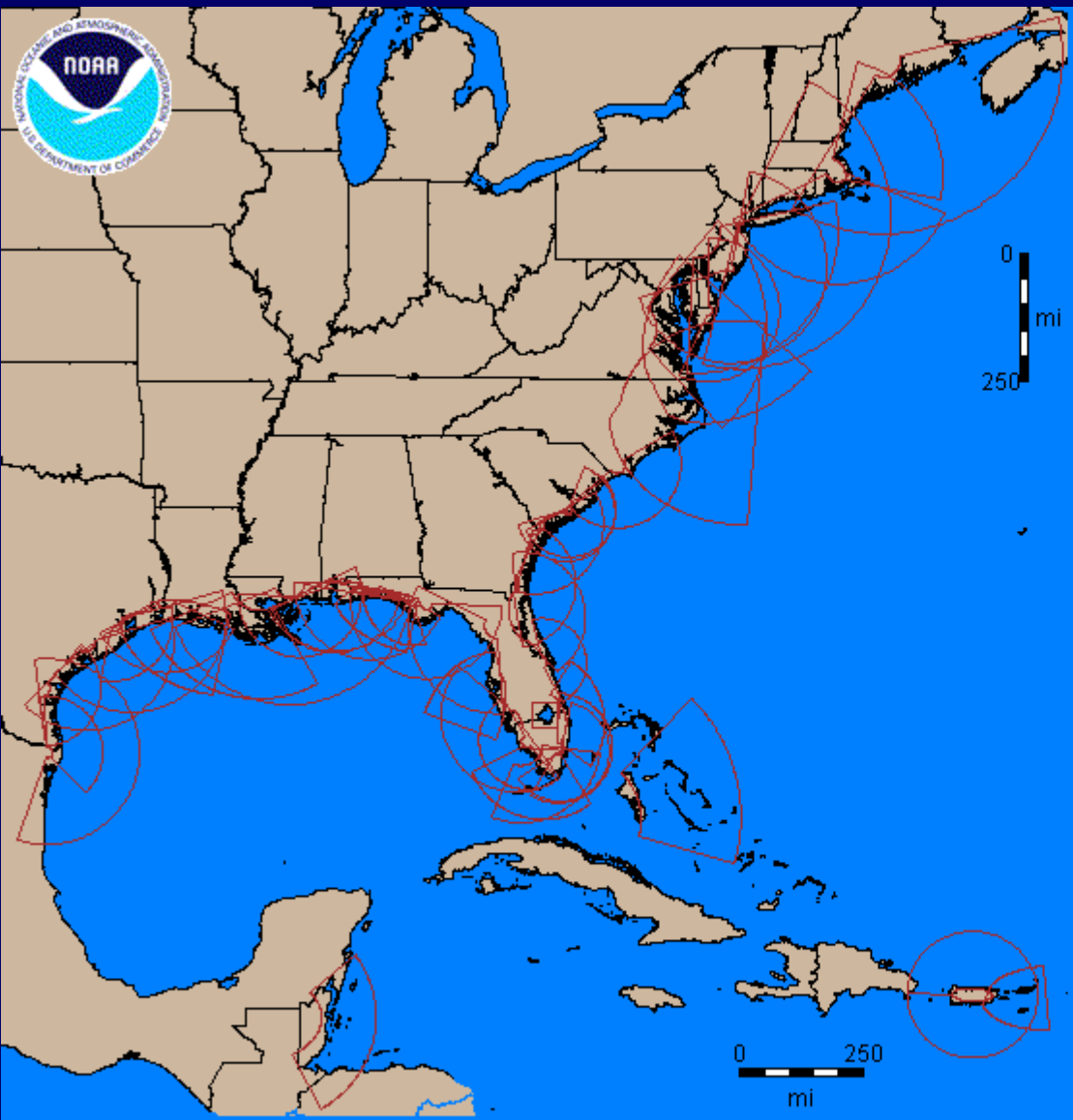
Michelle Hamor

US Army Corps of Engineers ®
Norfolk District

What is Storm Surge?



Slosh Model Coverage

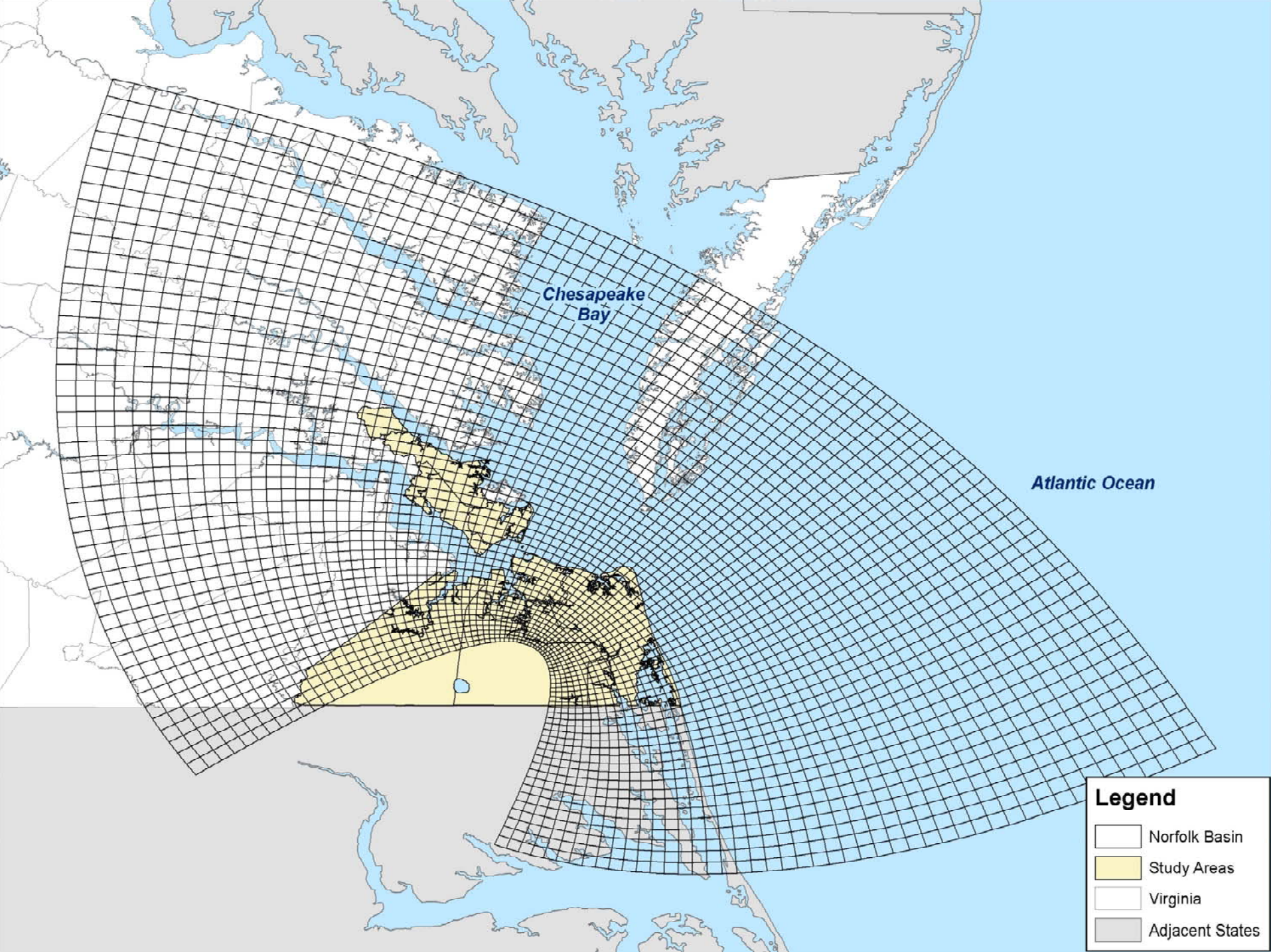


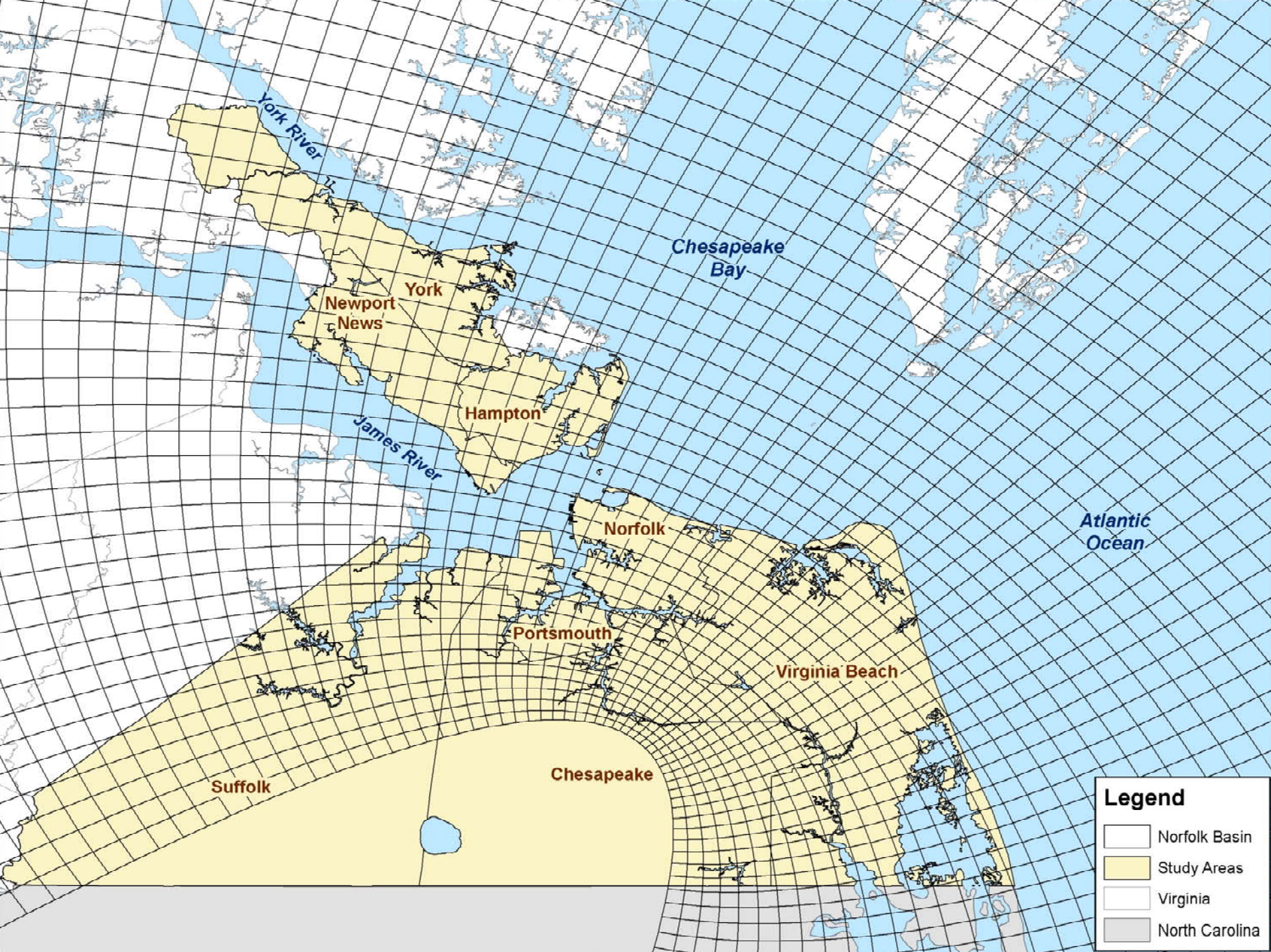
SLOSH BASINS

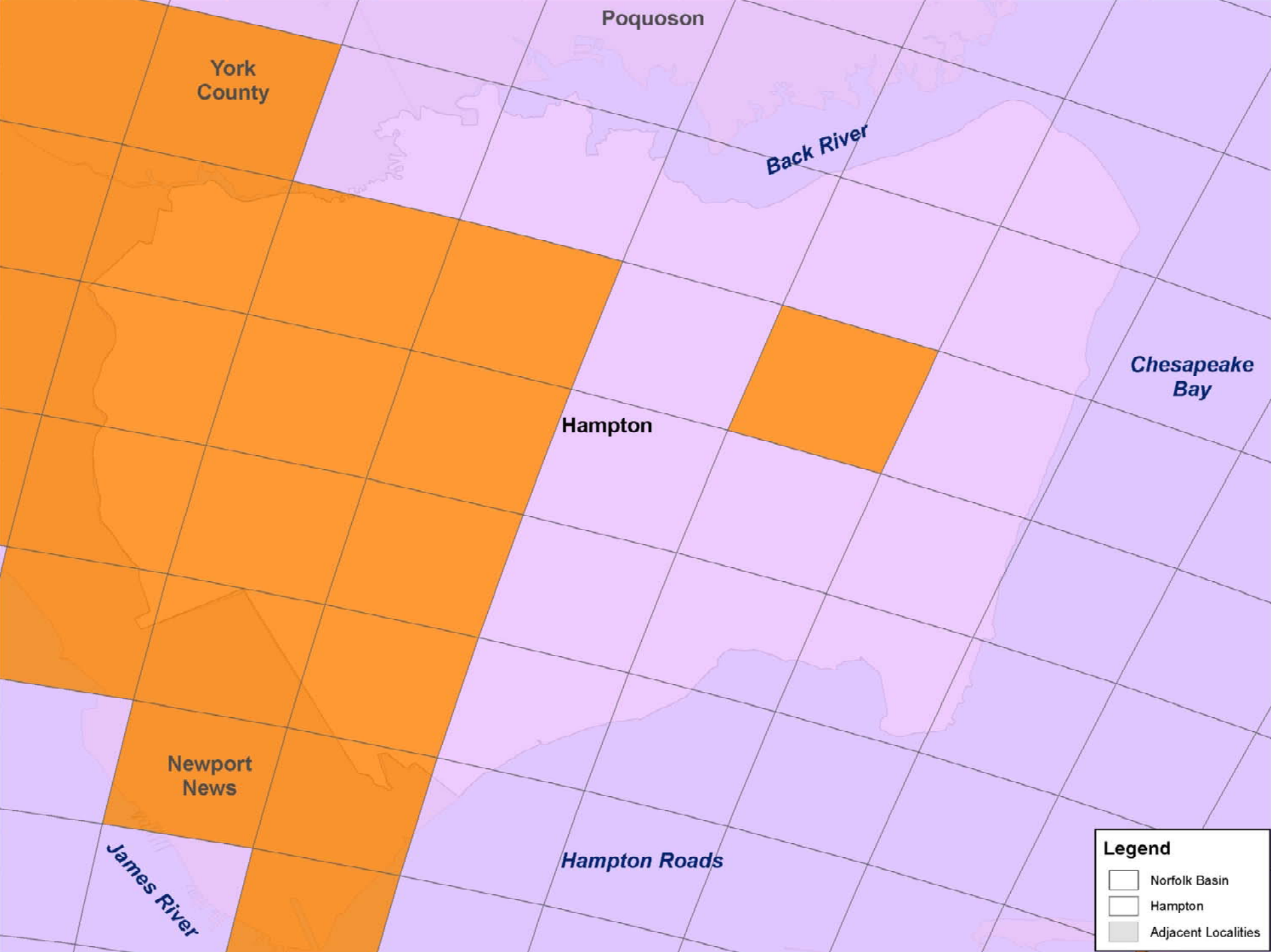
* Not Operational as of 4/19/99
^ Elliptical/Hyperbolic Grid

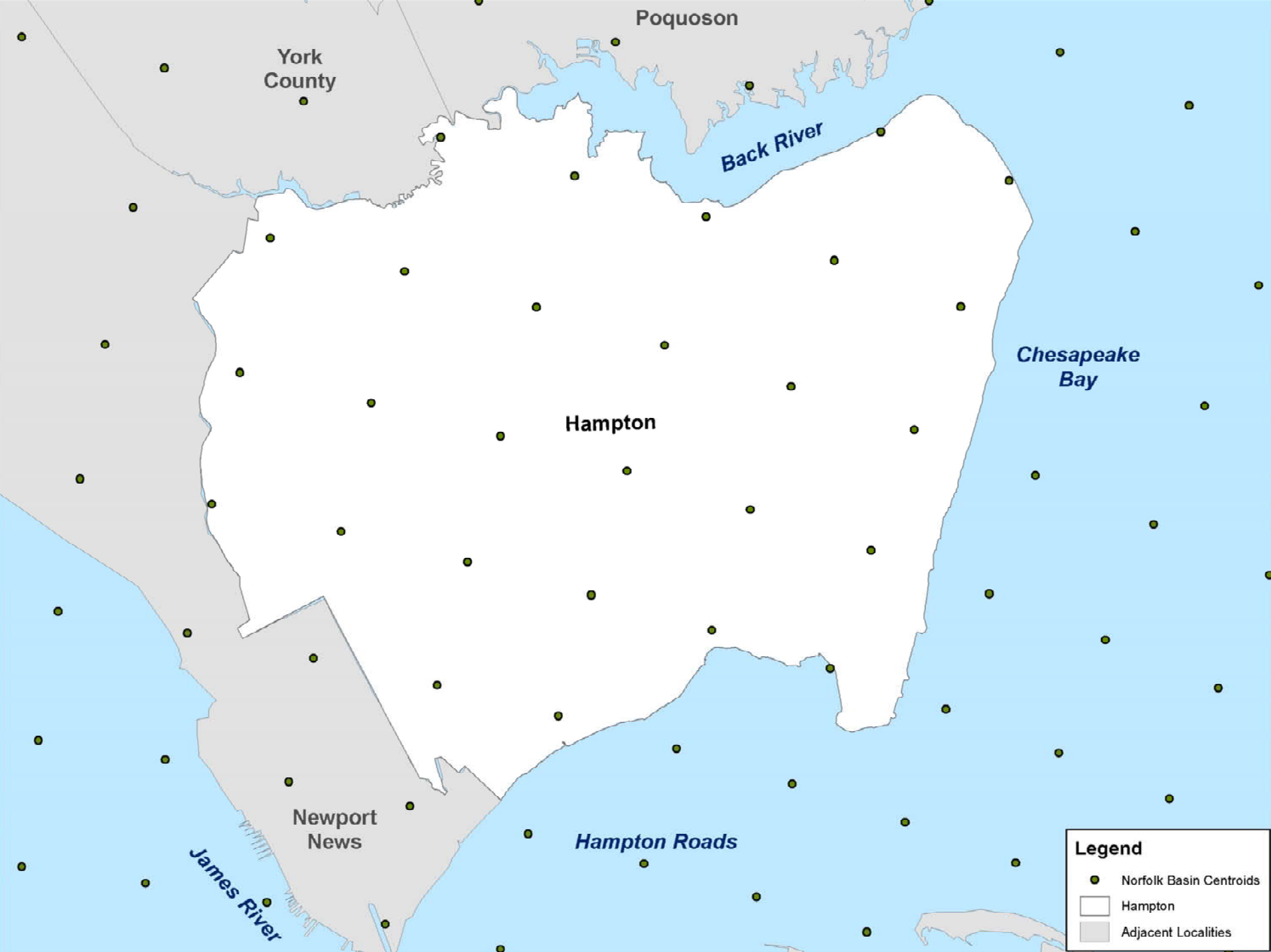
* Penobscot Bay
Boston Harbor
Narragansett / Buzzards Bays
New York / Long Island Sound
Delaware Bay
* Atlantic City
* Ocean City
Chesapeake Bay
*^Norfolk
^ Pamlico Sound
Wilmington NC / Myrtle Beach
Charleston Harbor
Savannah / Hilton Head
Brunswick
^ Jacksonville
Cape Canaveral
Palm Beach
^ Okeechobee
Biscayne Bay
* Miami
Florida Bay
^ Fort Myers
^ Tampa Bay
Cedar Key
Apalachicola Bay
Panama City
^ Pensacola Bay
^ Mobile Bay
* MS-Gulf Coast
Lake Pontchartrain / New Orleans
Vermilion Bay
^ Sabine Lake
^ Galveston Bay
Matagorda Bay Texas
Corpus Christi Bay
Laguna Madre
Bahamas
Puerto Rico
Virgin Islands
Oahu, Hawaii (not shown)

http://www.nws.noaa.gov/mdl/marine/Basin.htm

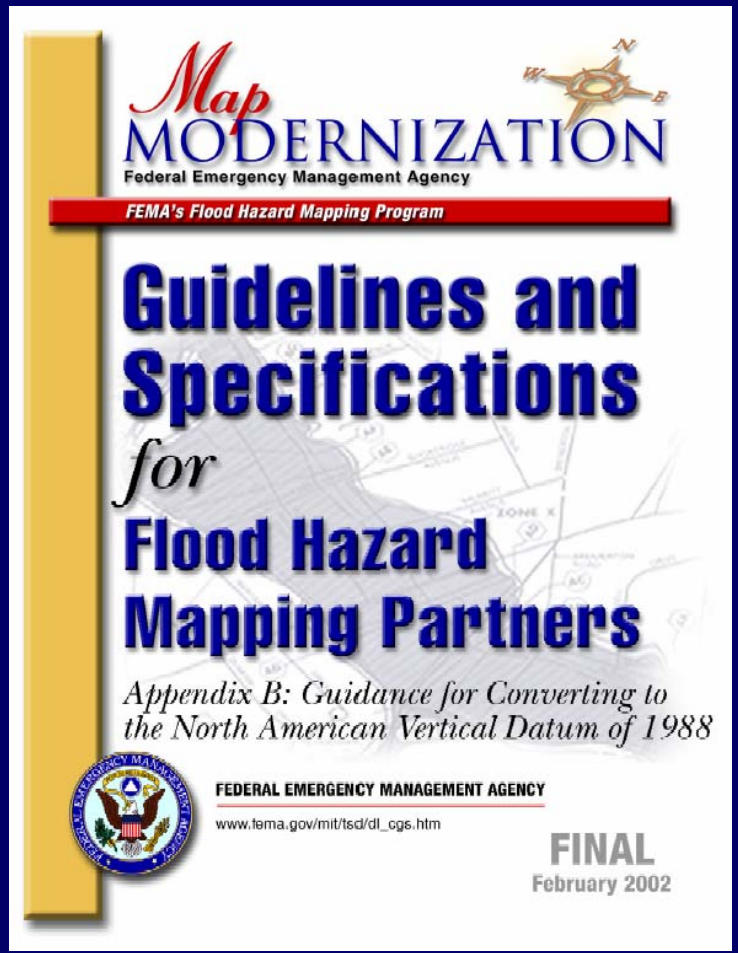

Chesapeake Bay
Atlantic Ocean
Legend
Norfolk Basin
Study Areas
Virginia
Adjacent States


York River
Chesapeake Bay
York
Newport News
Hampton
James River
Norfolk
Atlantic Ocean
Portsmouth
Virginia Beach
Chesapeake
Suffolk
Legend
Norfolk Basin
Study Areas
Virginia
North Carolina

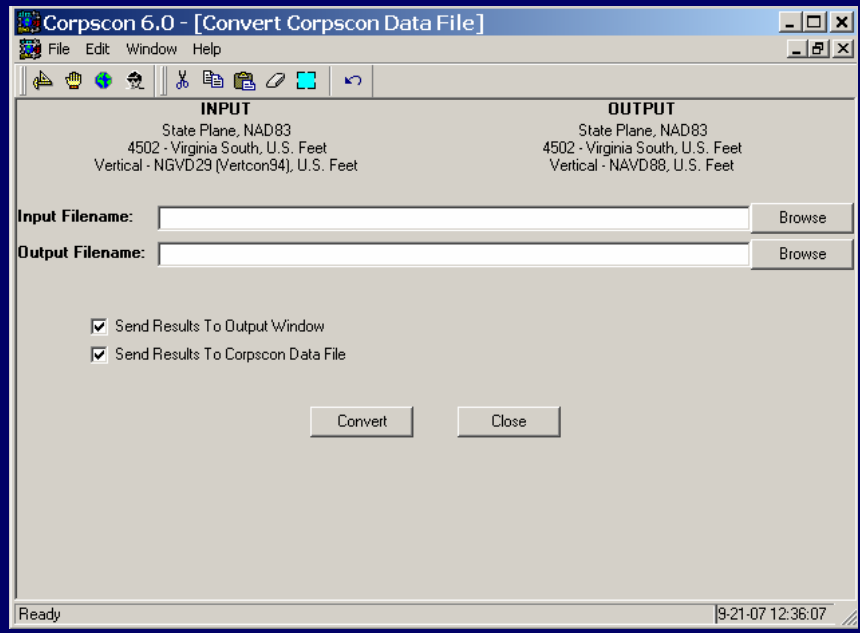

Poquoson
York County
Back River
Chesapeake Bay
Hampton
Newport News
James River
Hampton Roads
Legend
Norfolk Basin
Hampton
Adjacent Localities


Poquoson
York
County
Back River
Chesapeake
Bay
Hampton
Newport
News
James River
Hampton Roads
Legend
Norfolk Basin Centroids
Hampton
Adjacent Localities

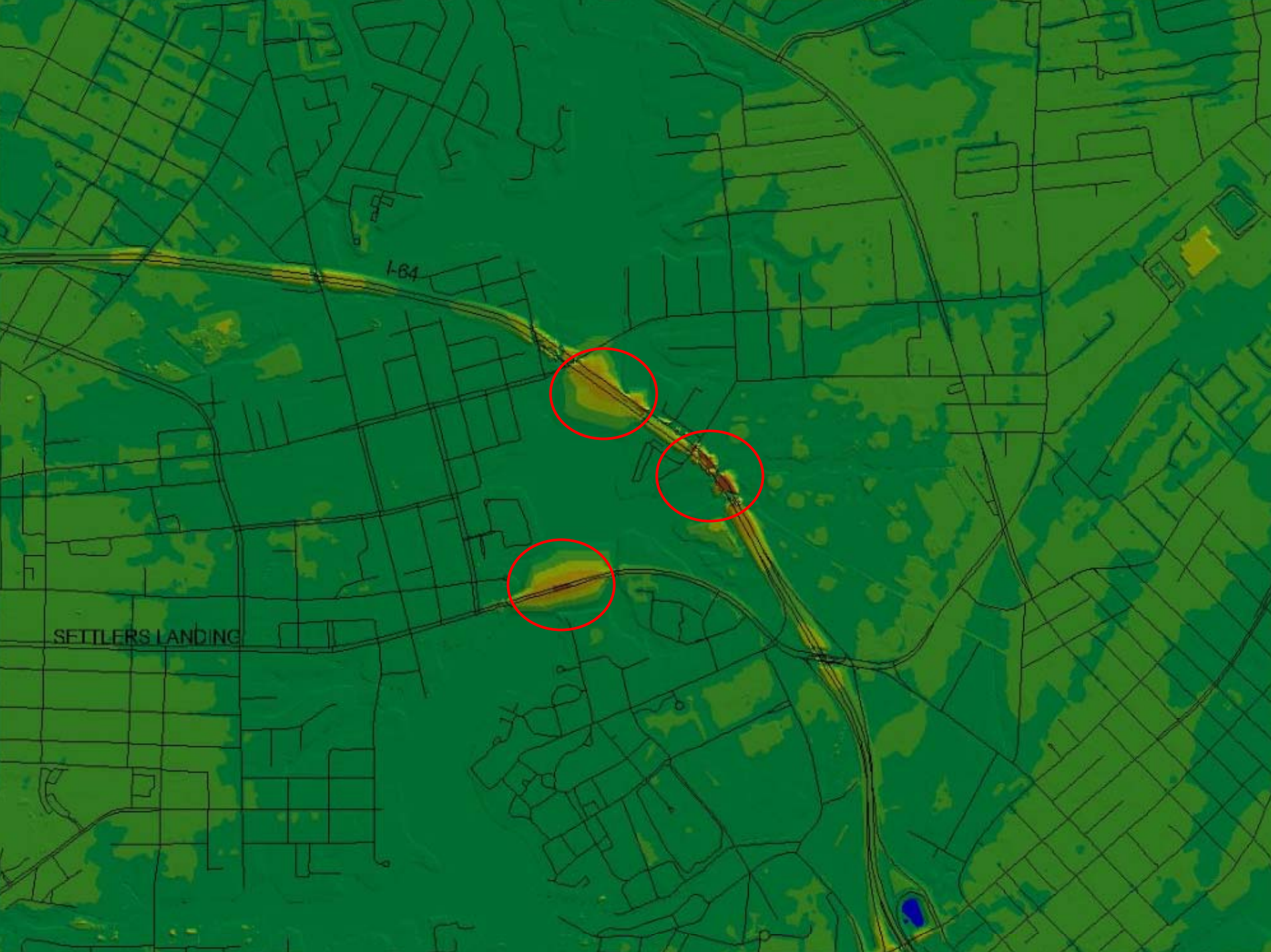
Vertical Datum Conversion Processes



http://www.fema.gov/pdf/fhm/frm_gsab02.pdf

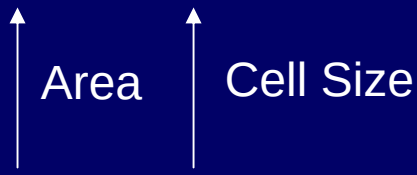


http://crunch.tec.army.mil/software/corpscon/corpscon.html

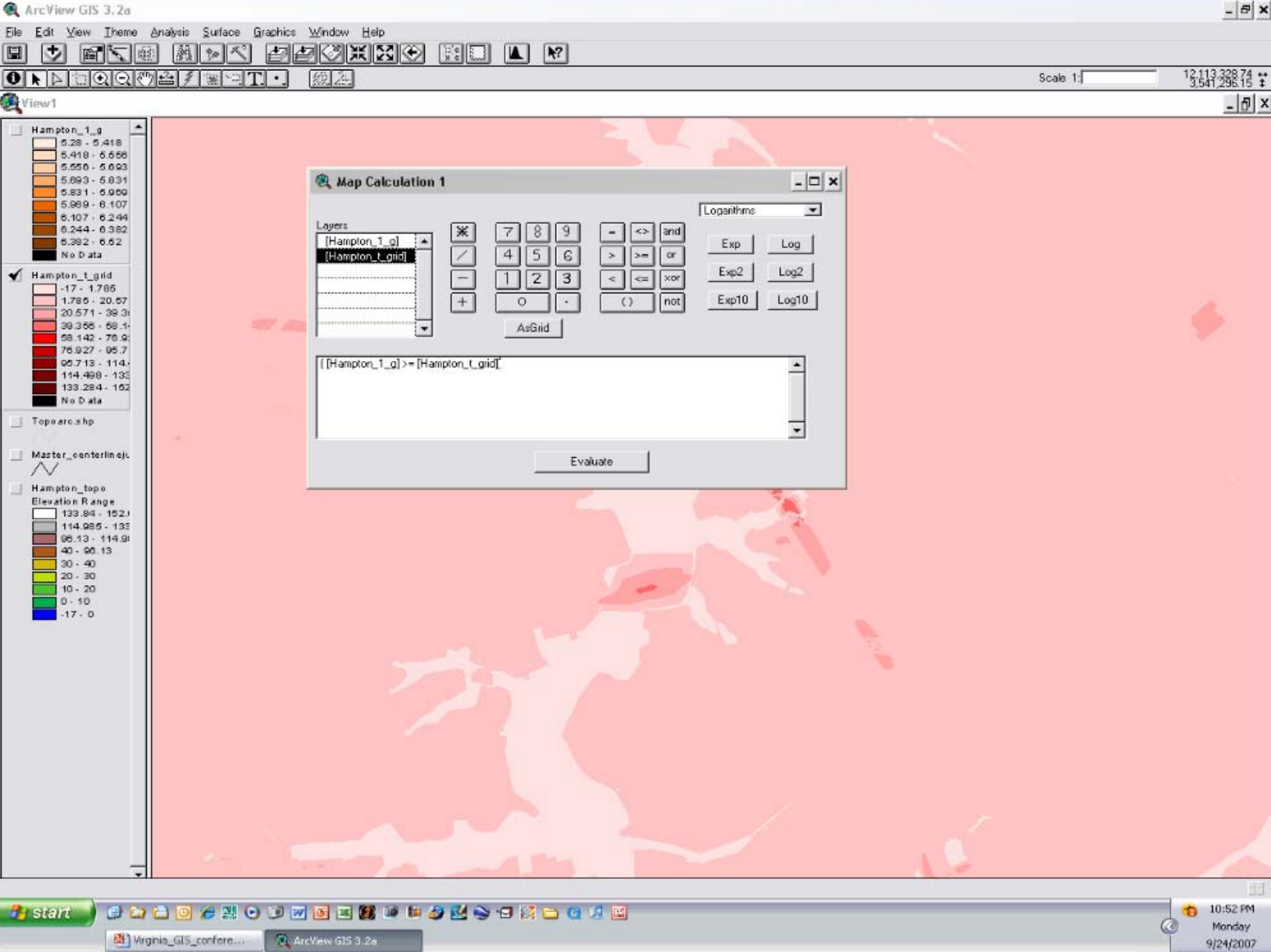

I-64
SETTLERS LANDING

TIN / GRID Challenges

- File size limitations



- Grid cell size vs. following contours
- Controlling interpolation

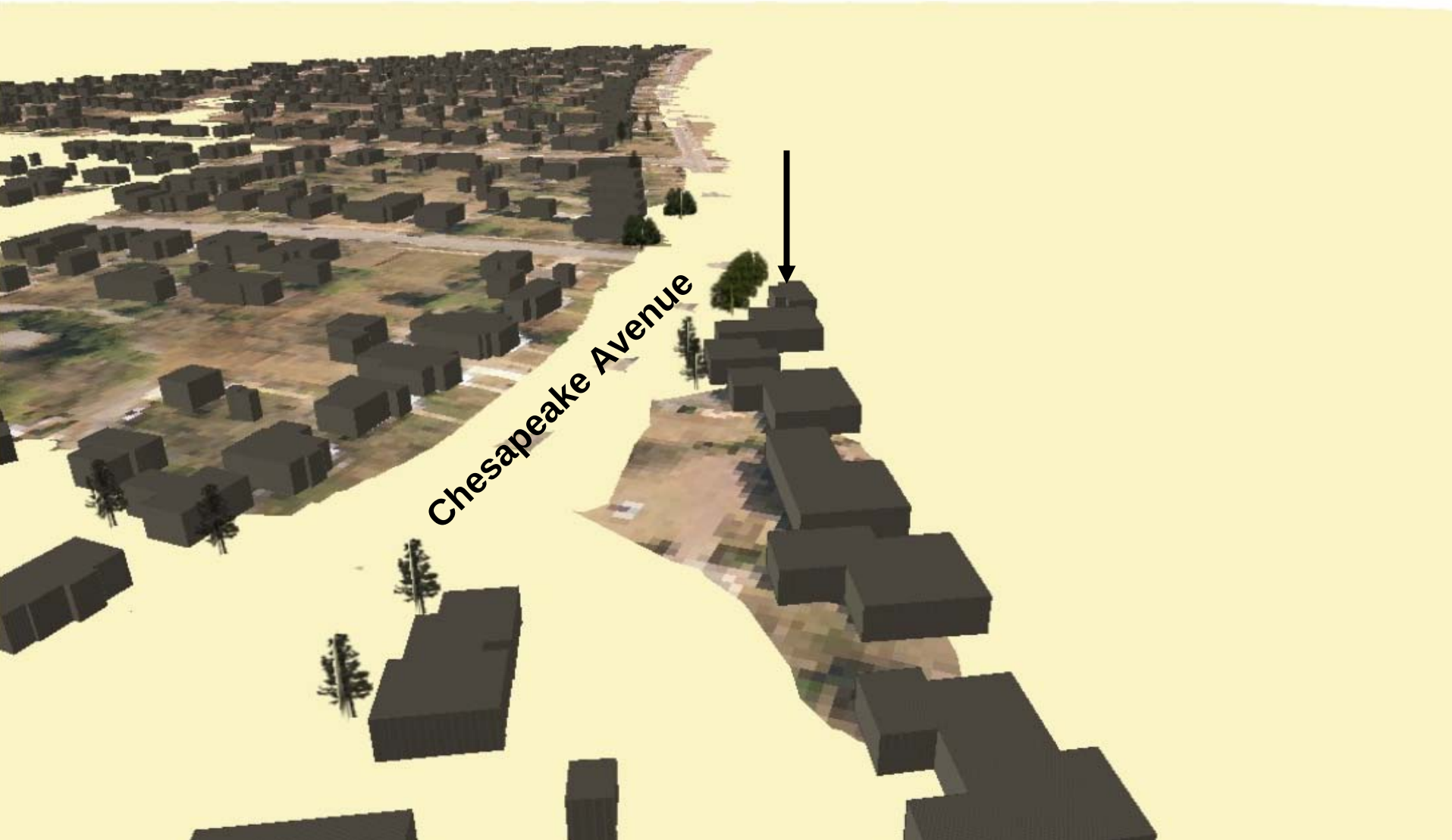

ArcView GIS 3.2a
File Edit View Theme Analysis Surface Graphics Window Help
Scale 1:
View1
Hampton_1_g
5.28 - 5.418
5.418 - 5.556
5.556 - 5.693
5.693 - 5.831
5.831 - 5.969
5.969 - 6.107
6.107 - 6.244
6.244 - 6.382
6.382 - 6.52
No Data
Hampton_t_grid
-17 - 1.785
1.785 - 20.57
20.571 - 39.3
39.356 - 58.1
58.142 - 76.9
76.927 - 95.7
95.713 - 114.
114.498 - 133
133.284 - 152
No Data
Topoarc.shp
Master_centerlineju
Hampton_topo
Elevation Range
133.84 - 152.
114.985 - 133
96.13 - 114.9
40 - 96.13
30 - 40
20 - 30
10 - 20
0 - 10
-17 - 0
Map Calculation 1
Logarithms
Layers
[Hampton_1_g]
[Hampton_t_grid]
7 8 9
4 5 6
1 2 3
0 .
and
or
xor
not
Exp
Log
Exp2
Log2
Exp10
Log10
AsGrid
[[Hampton_1_g] >= [Hampton_t_grid]
Evaluate
start
Virginia_GIS_confere...
ArcView GIS 3.2a
10:52 PM
Monday
9/24/2007

Clean-up

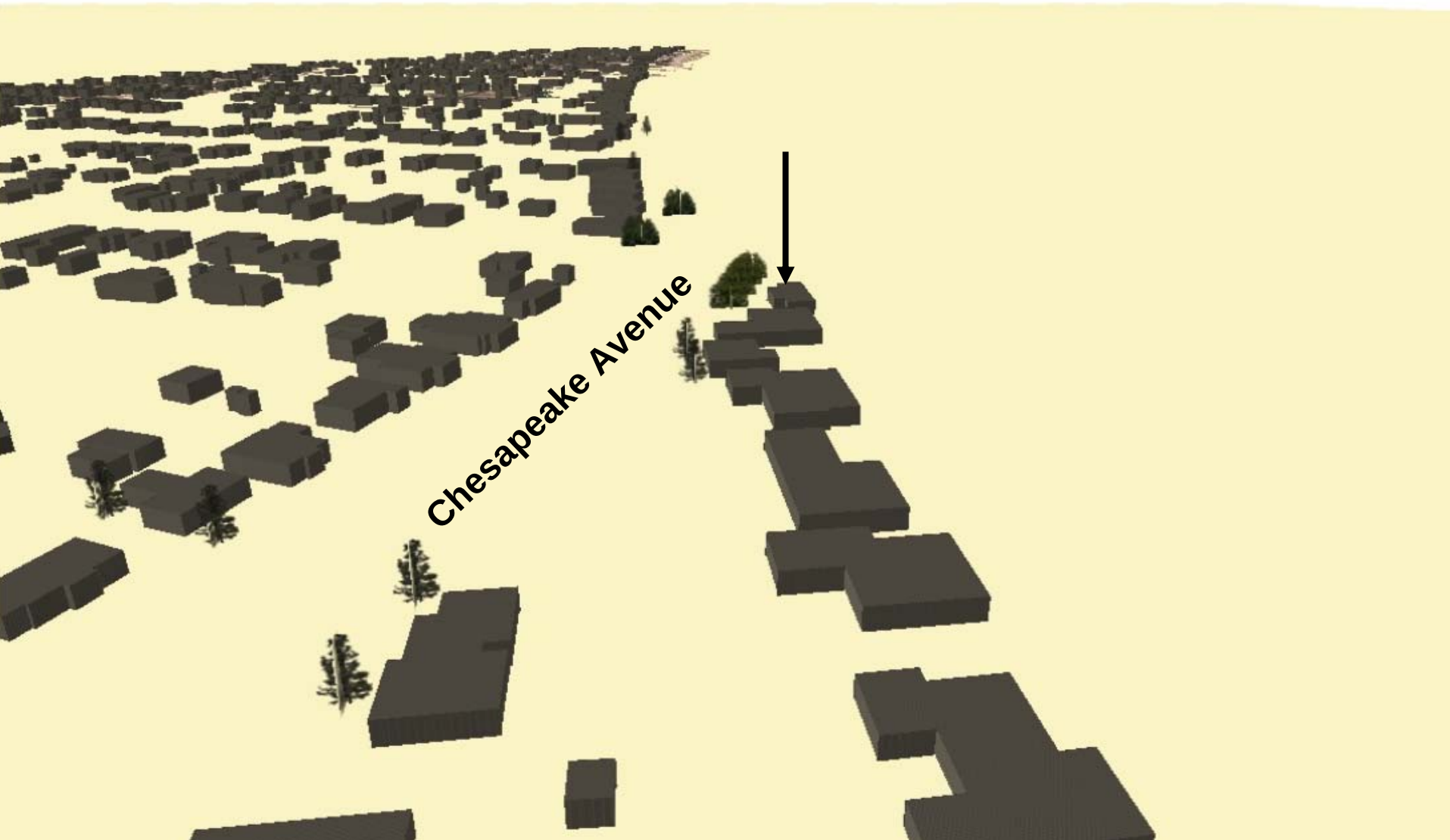
TERRACE RD
MANTEO AVE
HAMPTON ROADS AVE
POWHATAN PKWY
Indian River
CHESAPEAKE AVE
Hampton Roads

Before Storm Arrival

Category 1 Hurricane ~ 6ft



Category 2 Hurricane ~ 10ft



Category 3 Hurricane ~ 14ft

Category 4 Hurricane ~ 18ft

Local Data

- Contours
- Elevation points
- Boundary
- Water Bodies
- Transportation Centerlines
- Buildings

Road Ahead