GIS Tools used in Evacuation Planning and Climate Change Modeling

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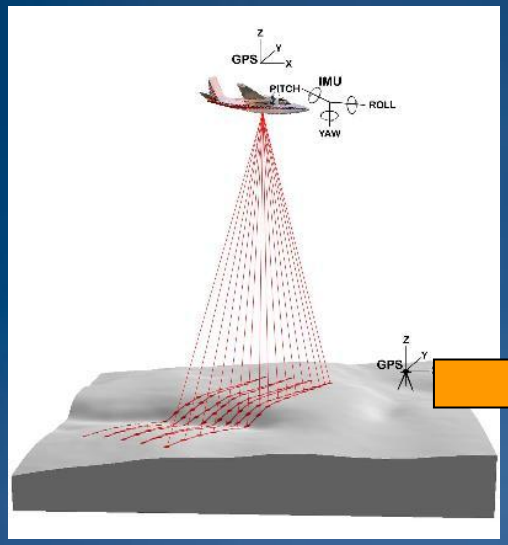
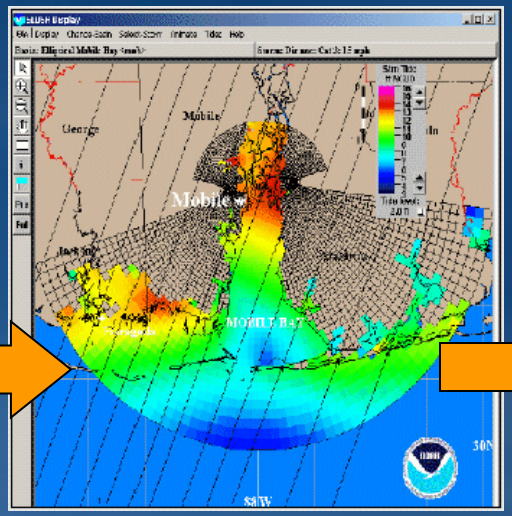
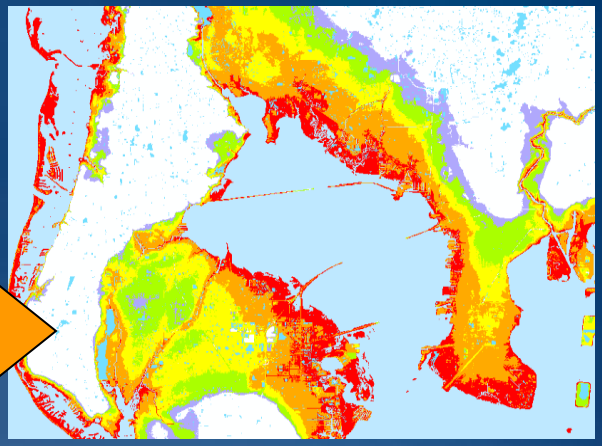
Types of Tools in the Toolshed:

- Surge Inundation Model (Maximum Storm Tide Extent)
- Surge Depth Model (Storm Tide Depth Over Land)
- Basin Bathtub Water Rise Model
- Approximate Surge and Sea Rise Model
- 3D Visualization Software





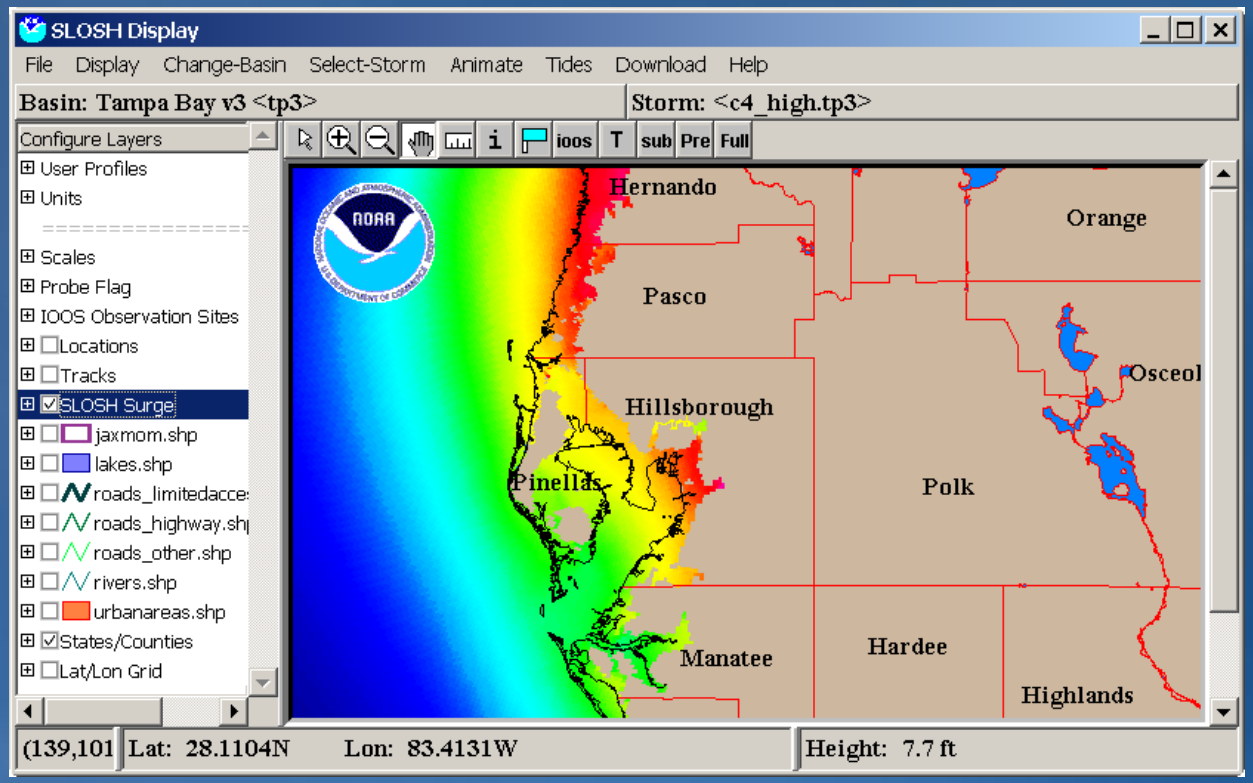


LIDAR to SLOSH Basin to Surge Zones

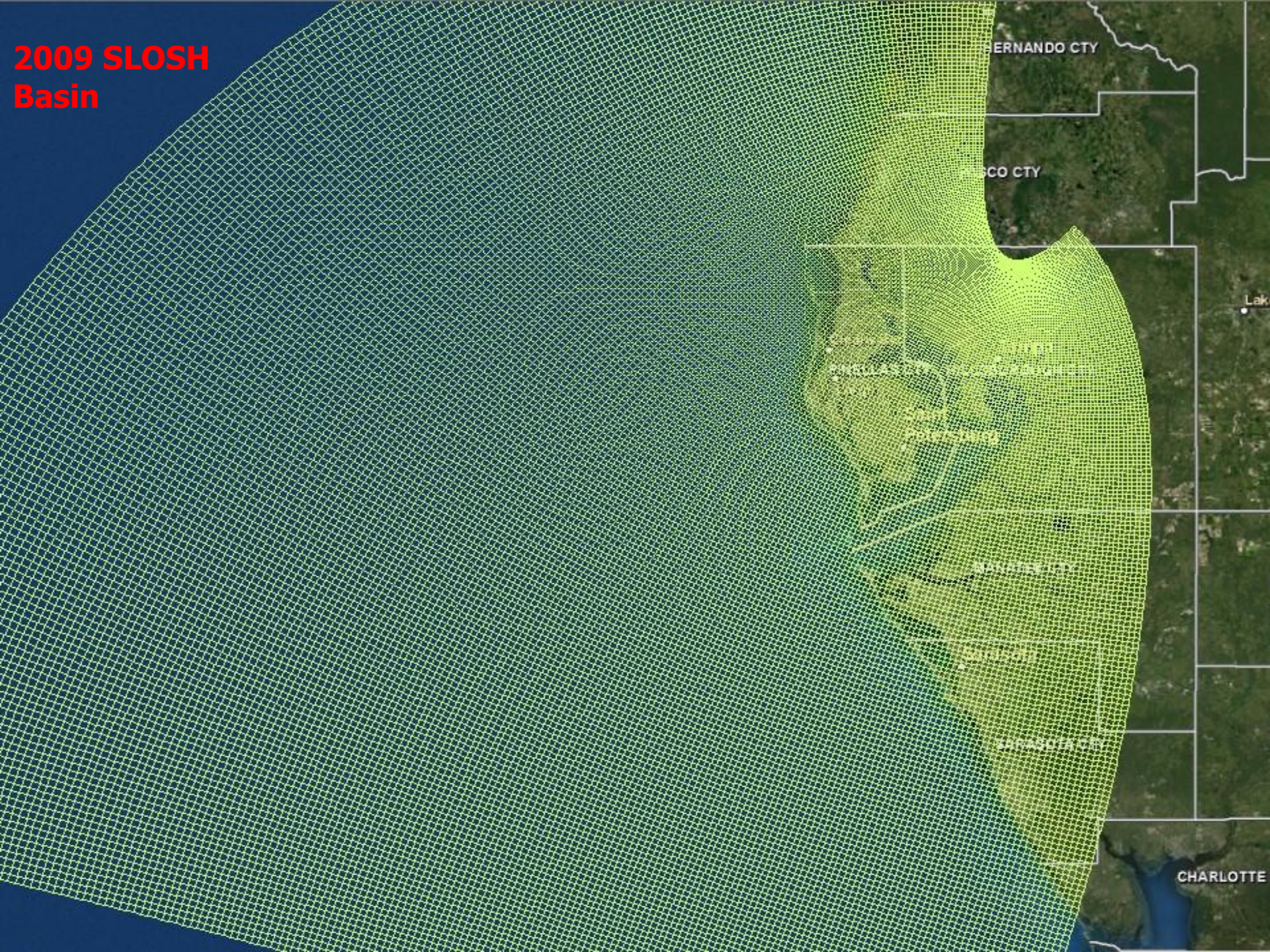
SURGE INUNDATION MODEL

What is SLOSH?

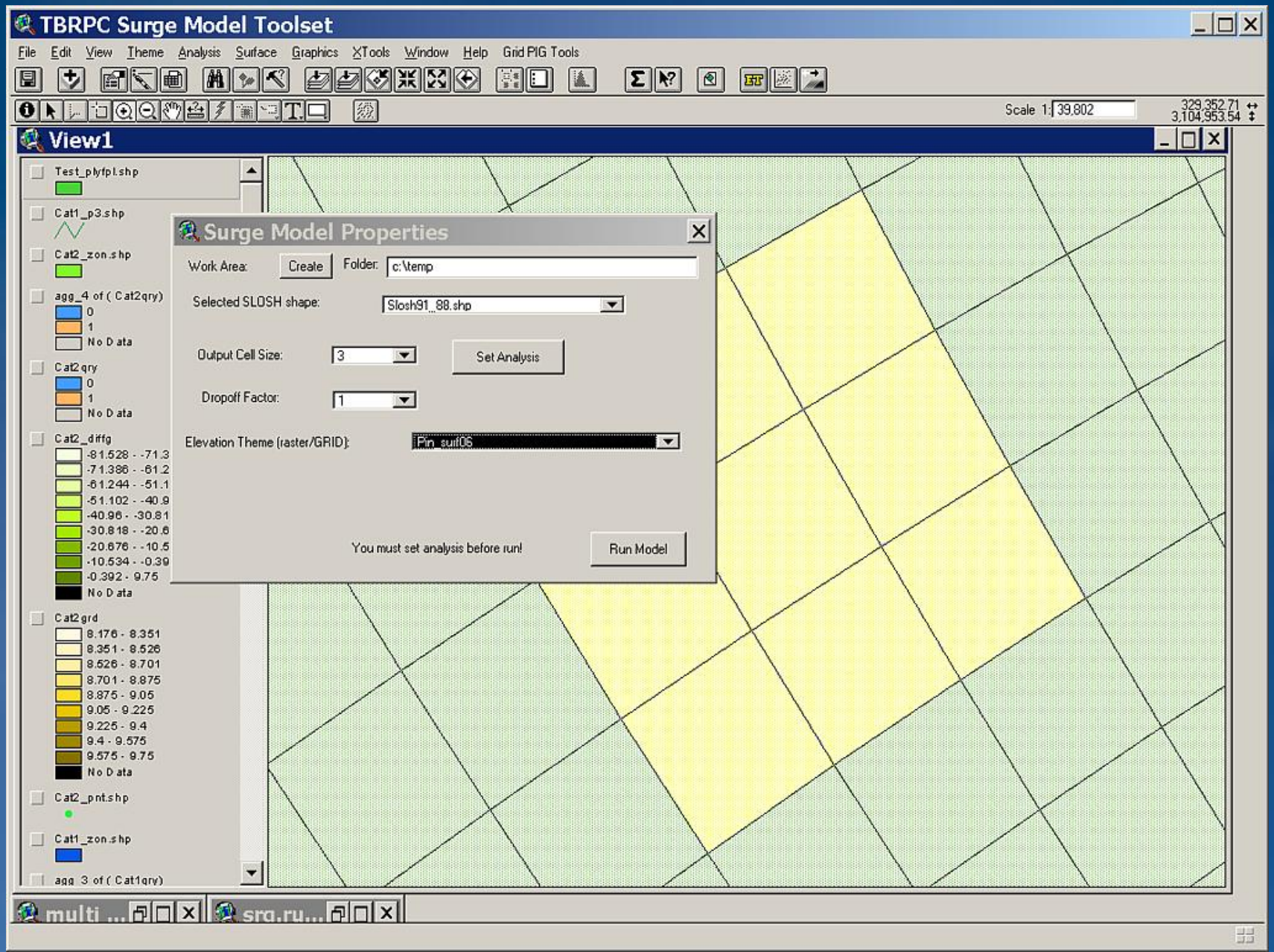
- Sea, Lake, and Overland Surge from Hurricanes
- A computerized model developed by the National Hurricane Center (NOAA) to estimate storm surge heights from winds resulting from historical, hypothetical, or predicted hurricanes.



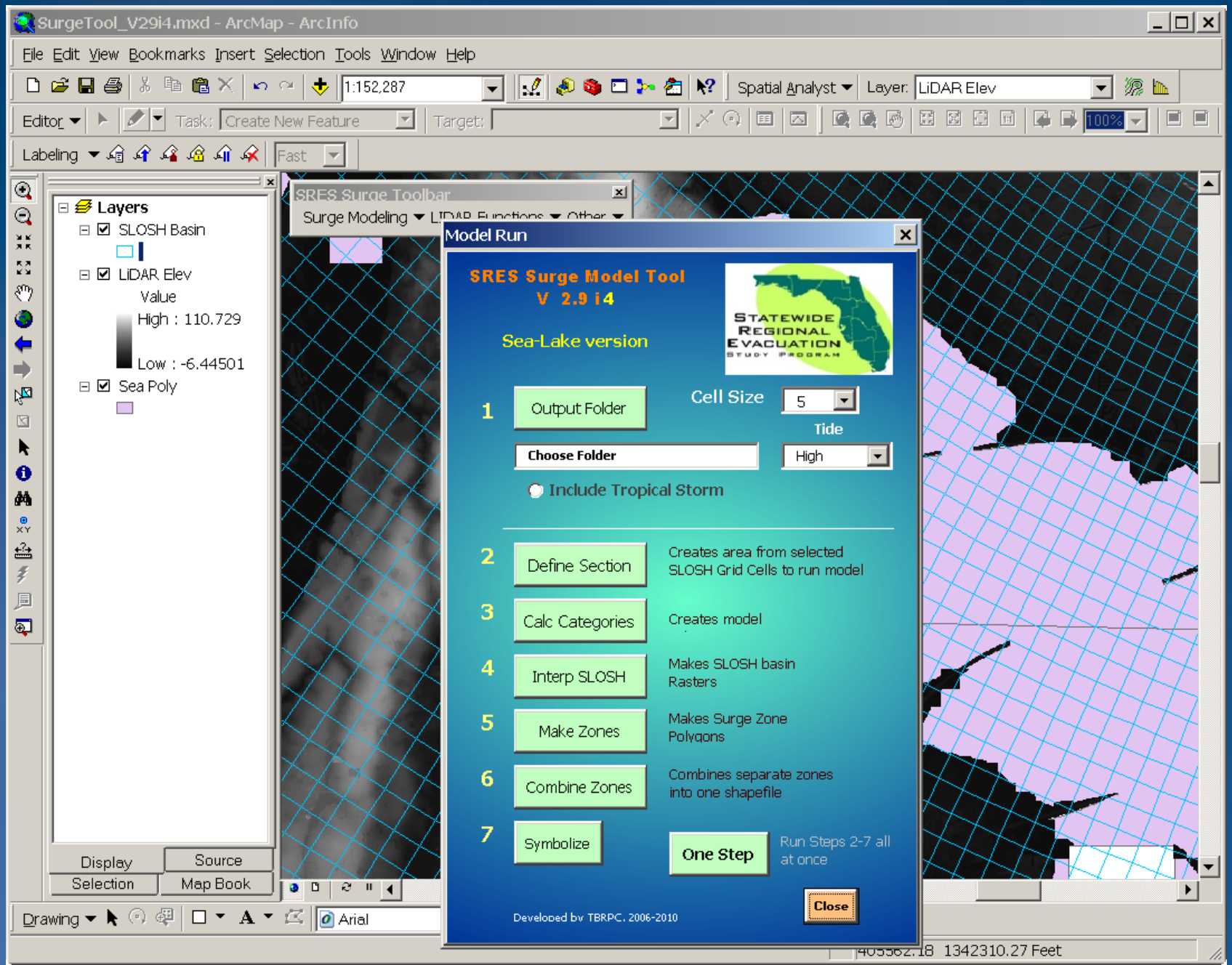
2009 SLOSH Basin



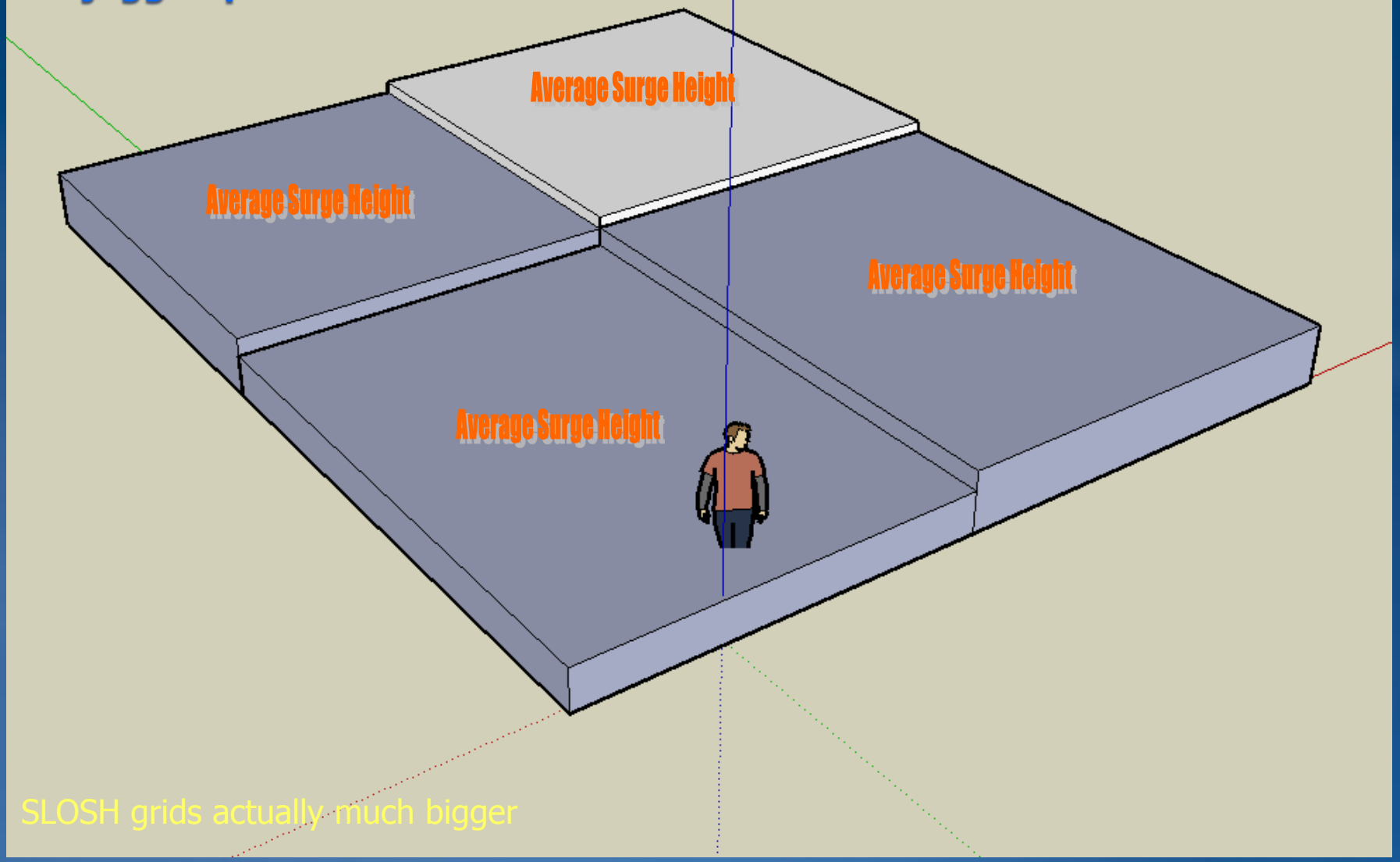
Toolset Has its Origin in ArcView 3.2 Using Avenue (2005)



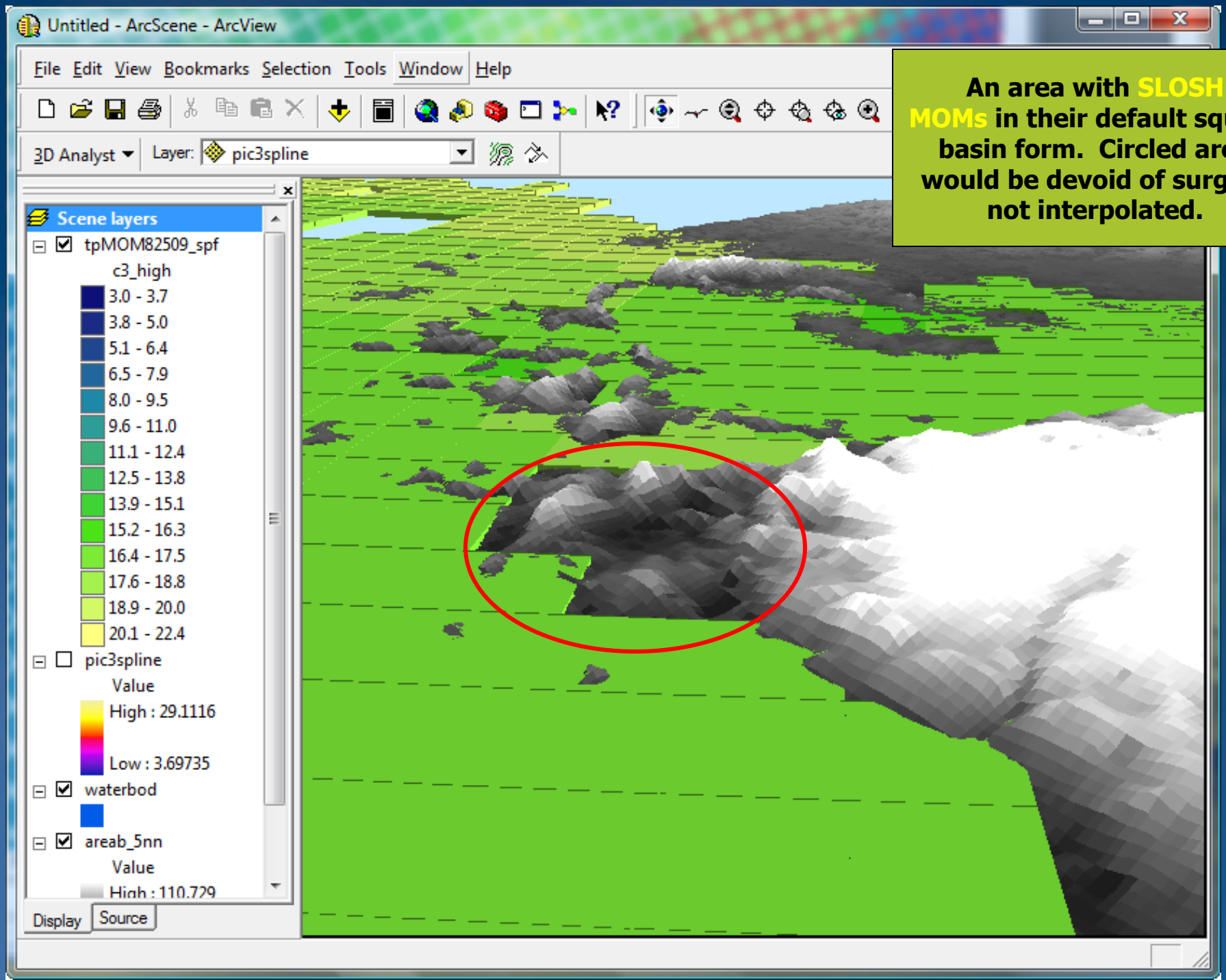
Evacuation Study Version (2008) Uses ArcObjects 9.3.1



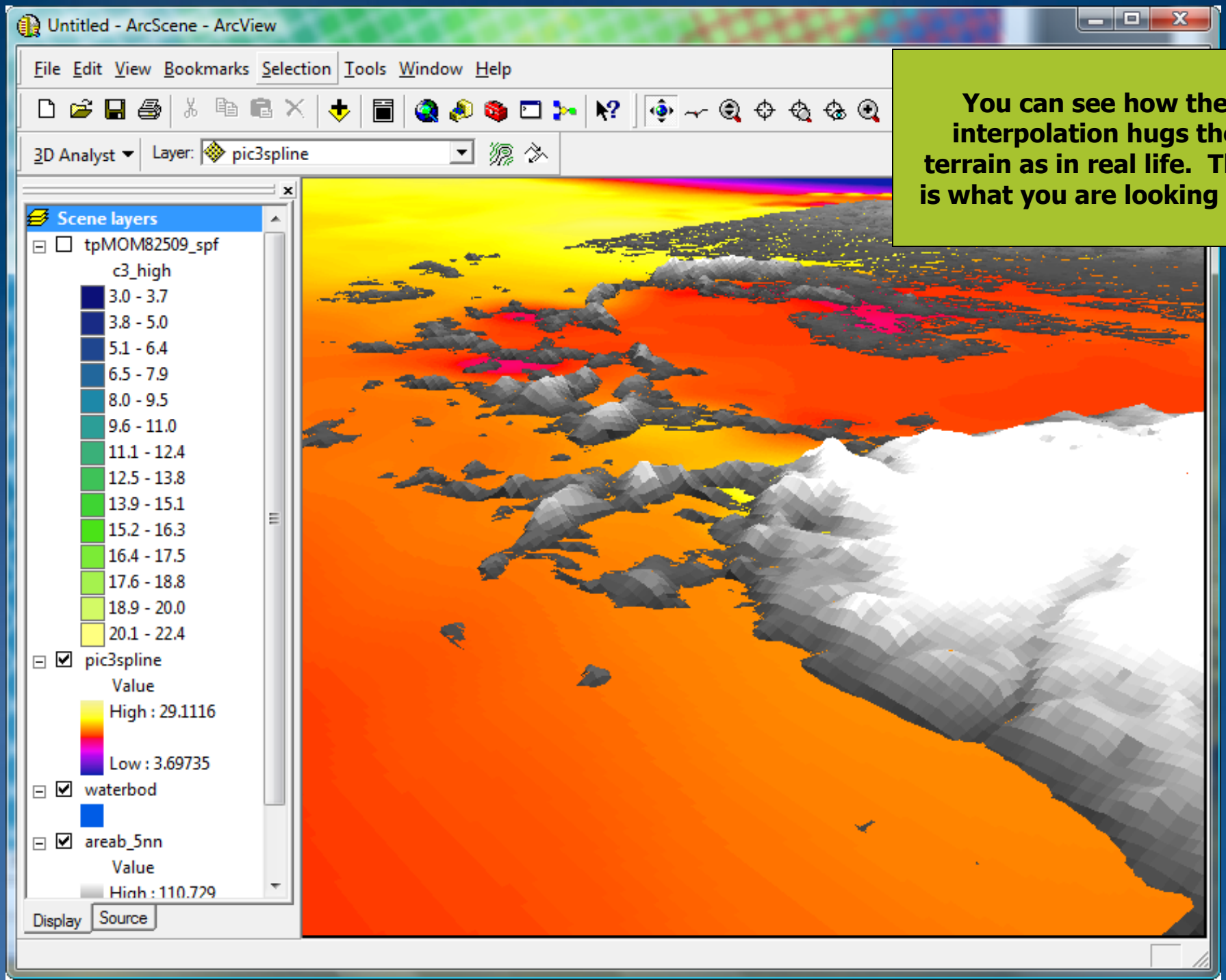
Water does not behave like what is depicted in SLOSH grids at the human scale. The Surge Model is meant to alleviate the jagged puzzle….



SLOSH grids actually much bigger

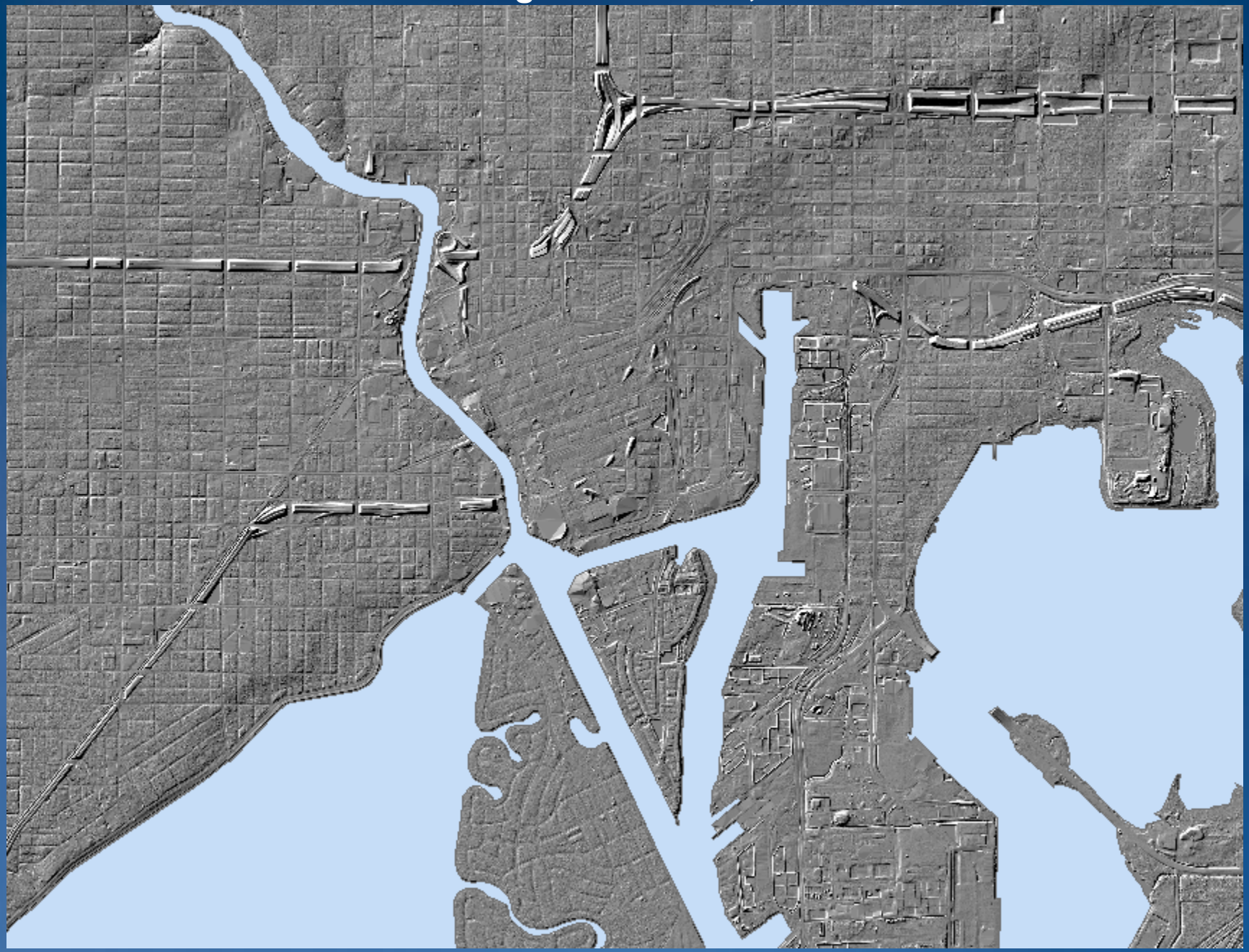


An area with SLOSH MOMs in their default square basin form. Circled area would be devoid of surge if not interpolated.

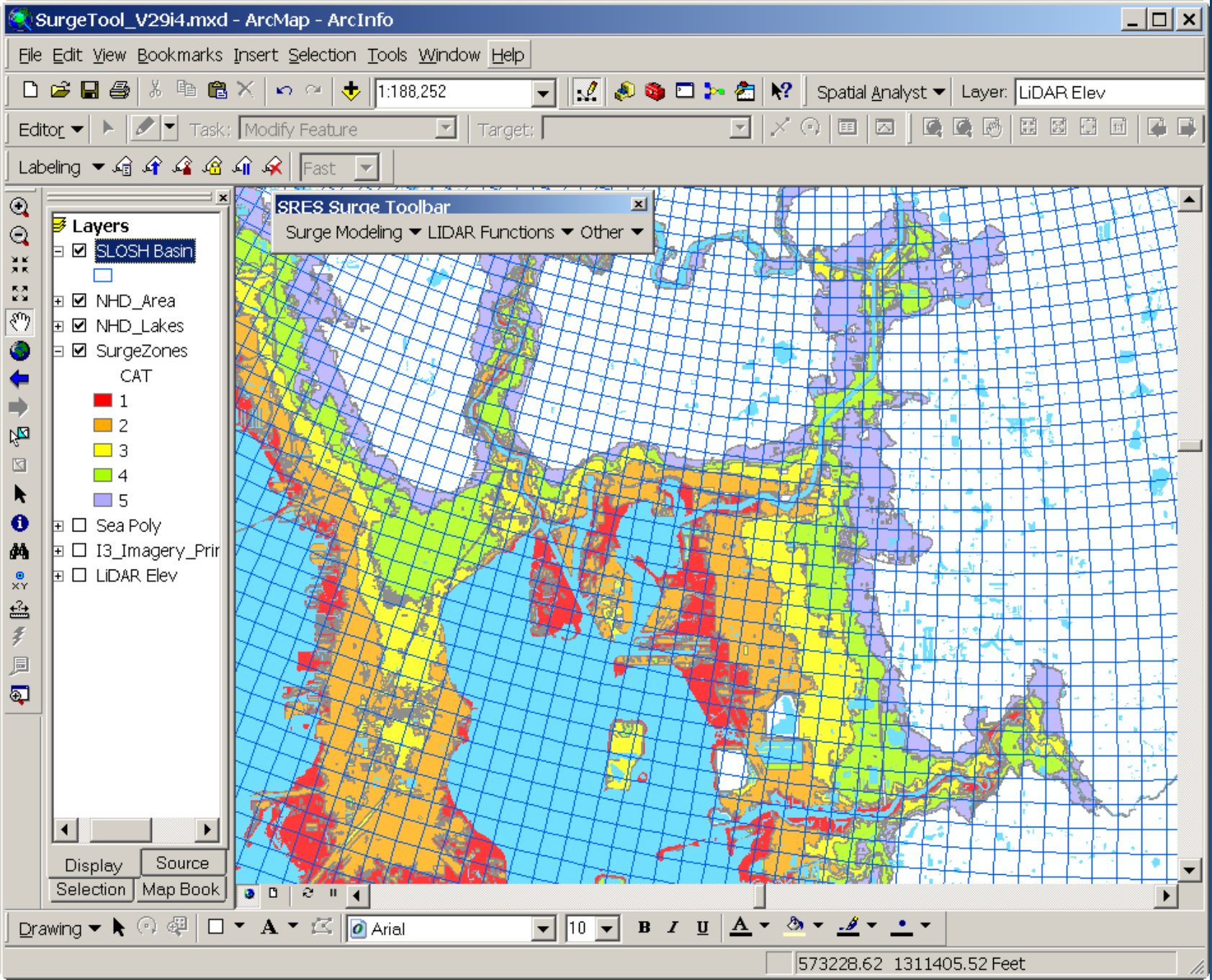


You can see how the interpolation hugs the terrain as in real life. That is what you are looking for.

Shows the relief detail of Digital Elevation, if shaded and shadowed…

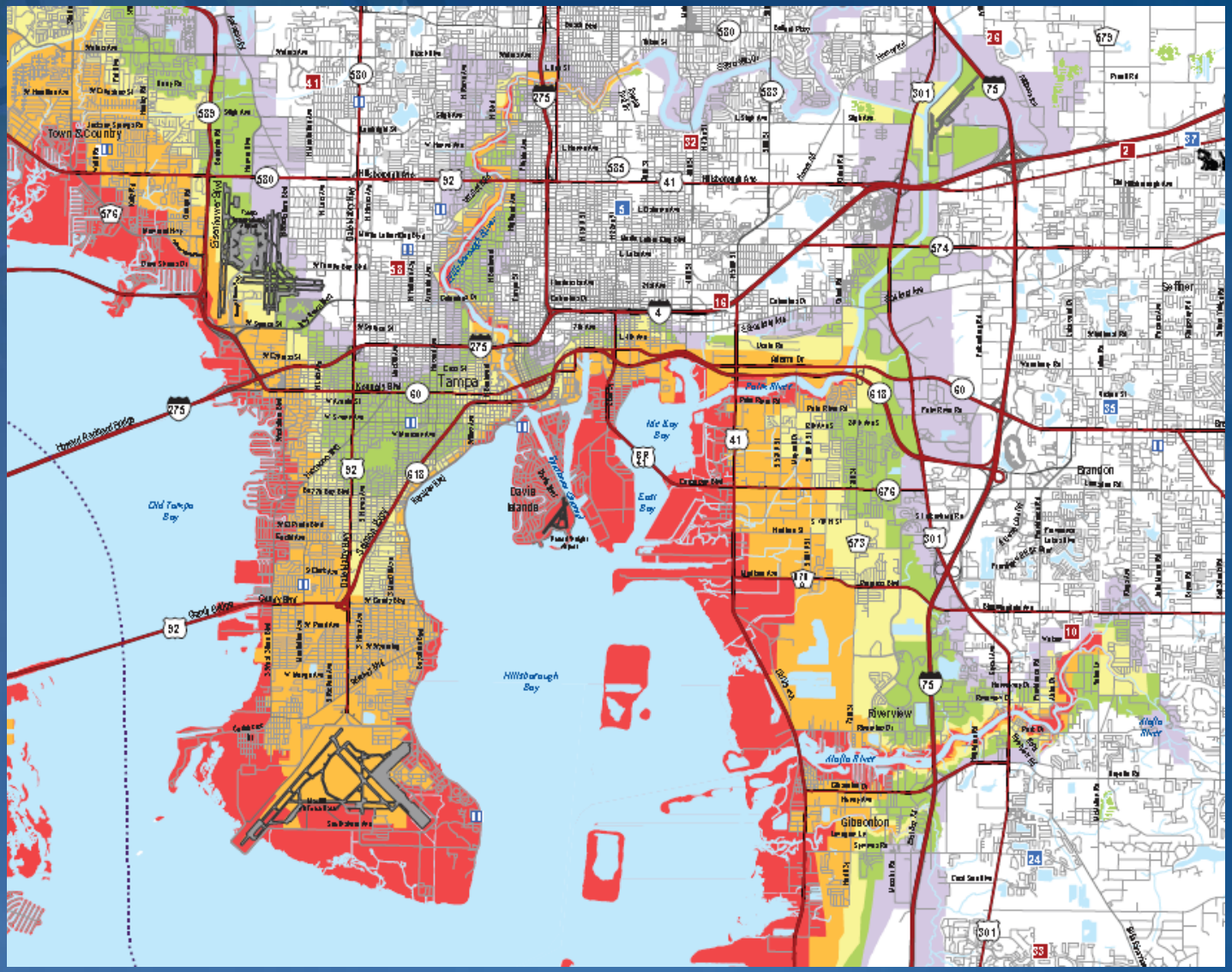


The Result From a Surge Model Run:



Surge Zones Are Used For Evacuation Zone Choices

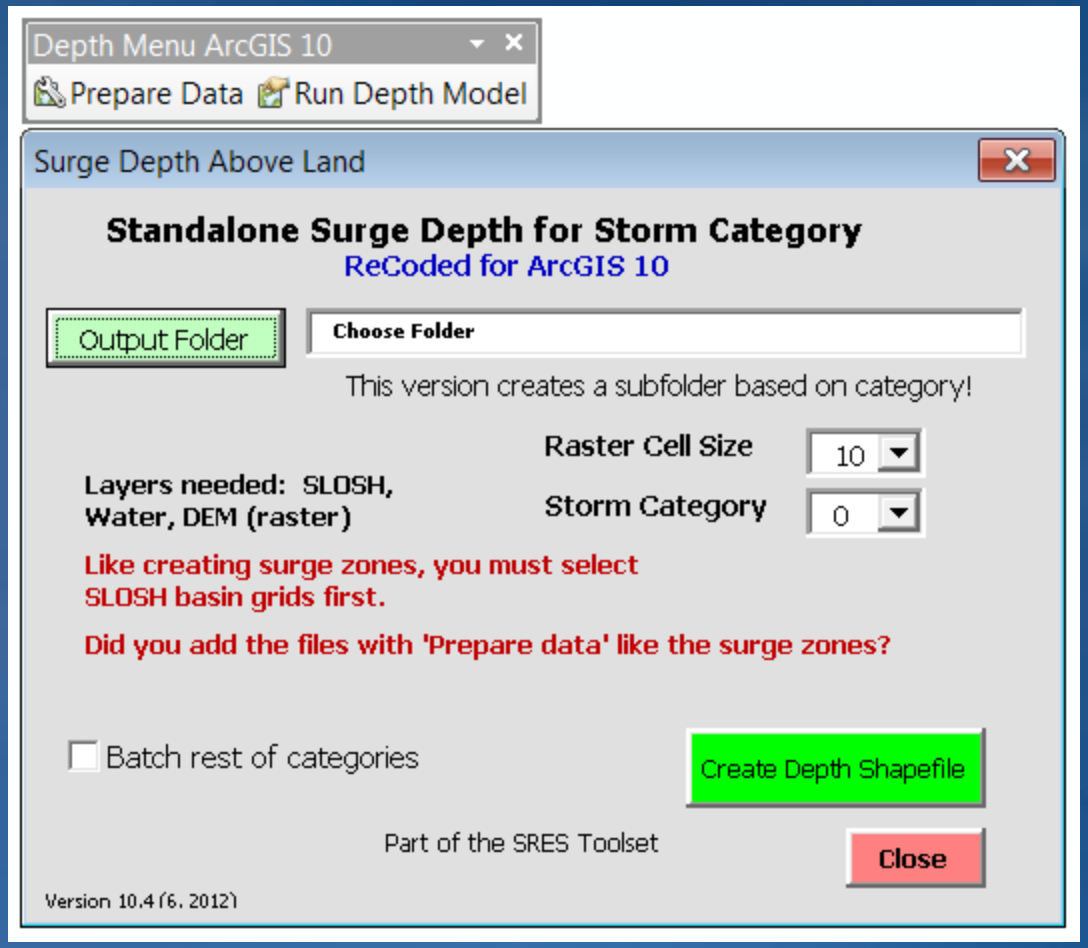
How a County May Delineate the Evacuation Zones



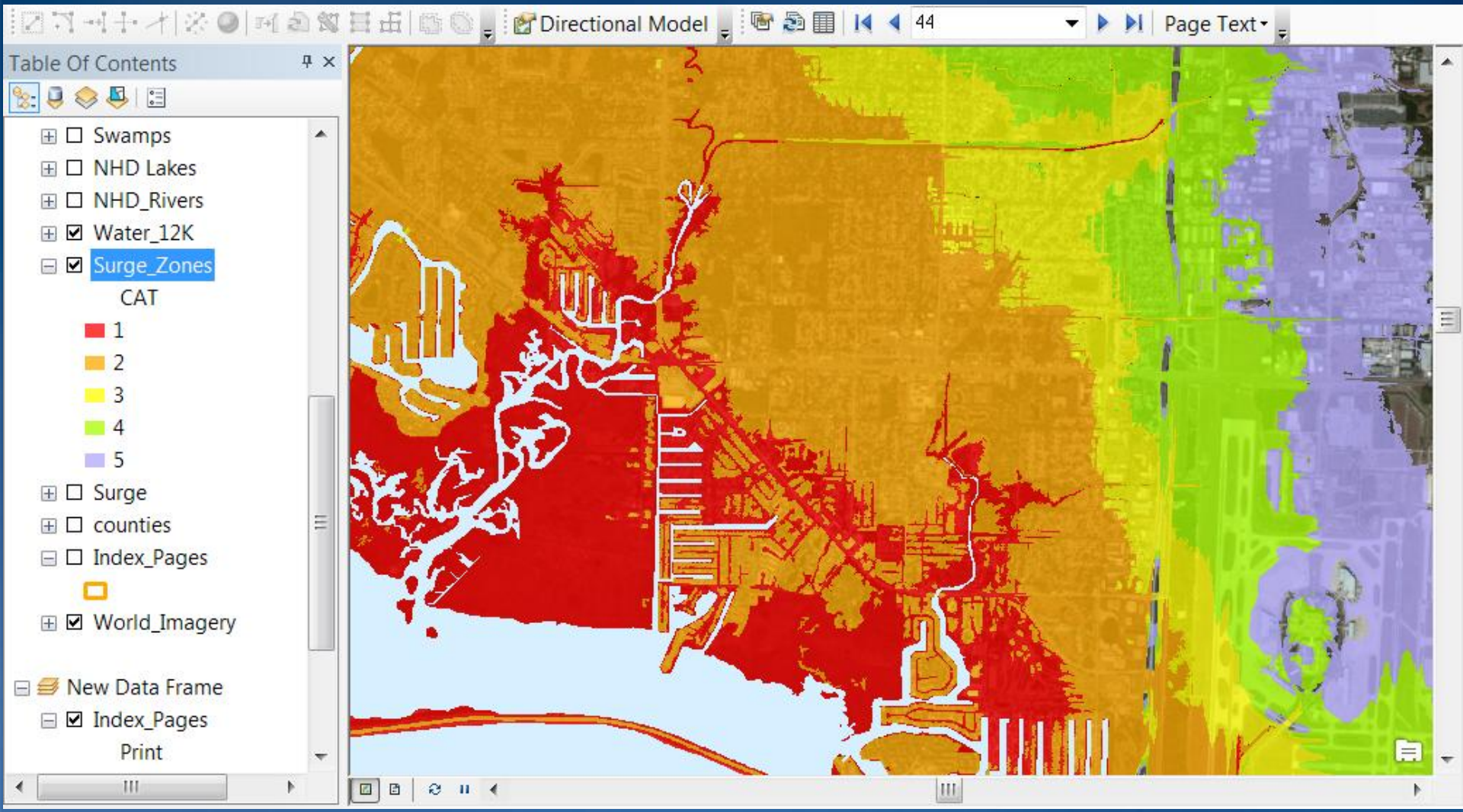
Surge Depth Model

- Based on Inundation Model
- Derives Depth Ranges for each Category Storm
- Uses Maximum of Maximums SLOSH Basin
- Fine-Grained Decision-Making per Storm Category
- Also Displayed in Atlas Format in State Study

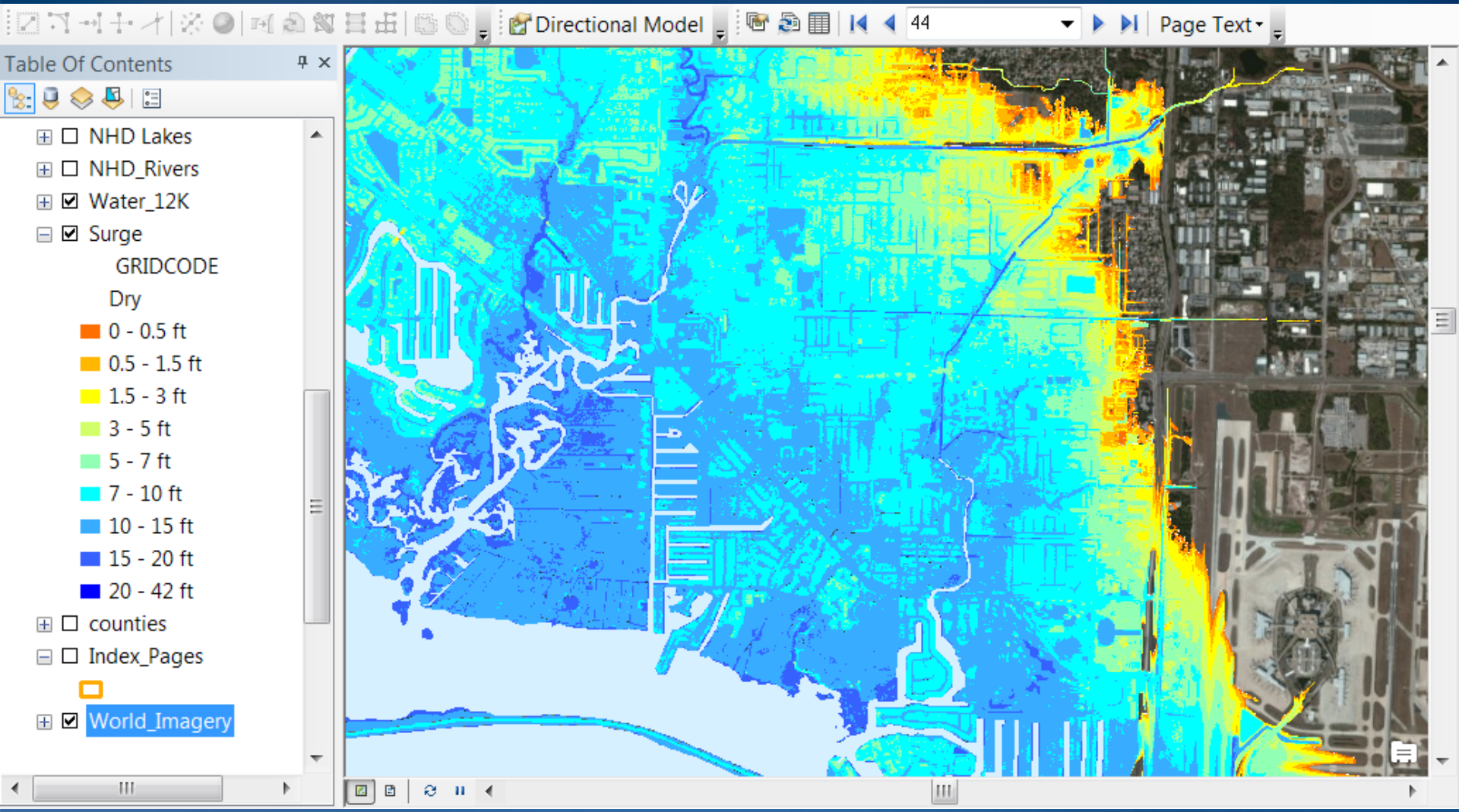
Simplified Interface Compared to Original Surge Tool



Surge Inundation from Original Surge Model

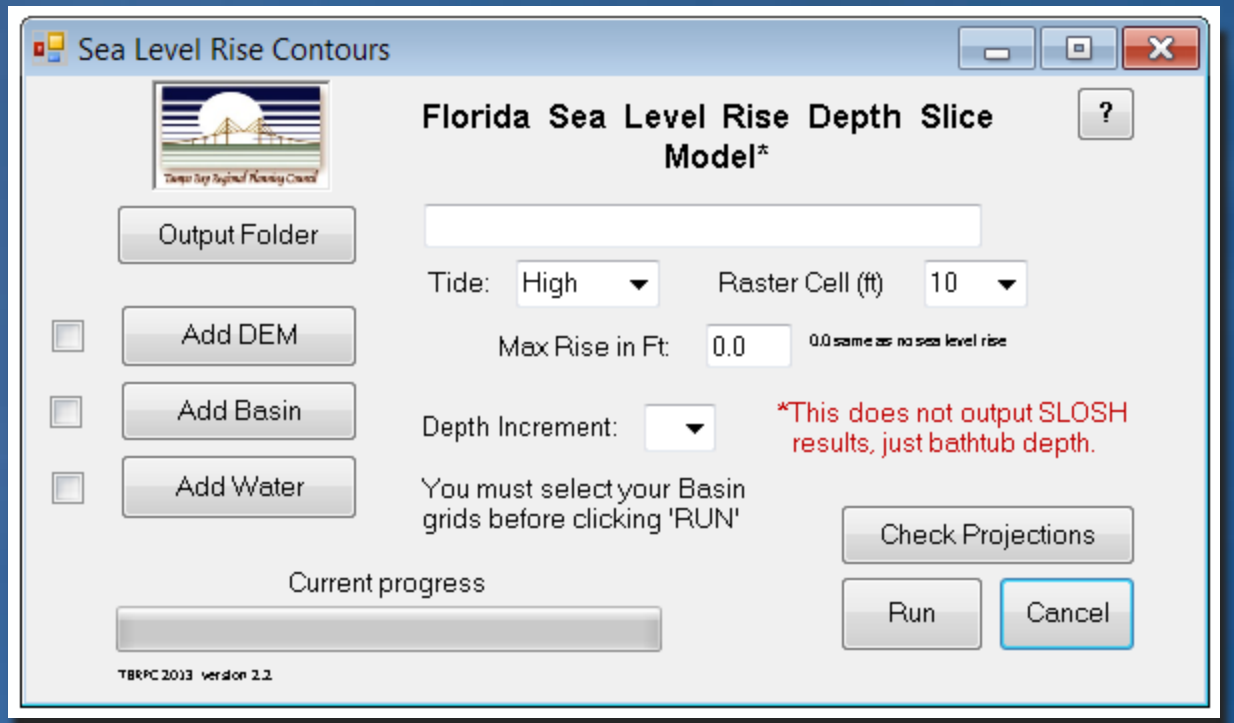


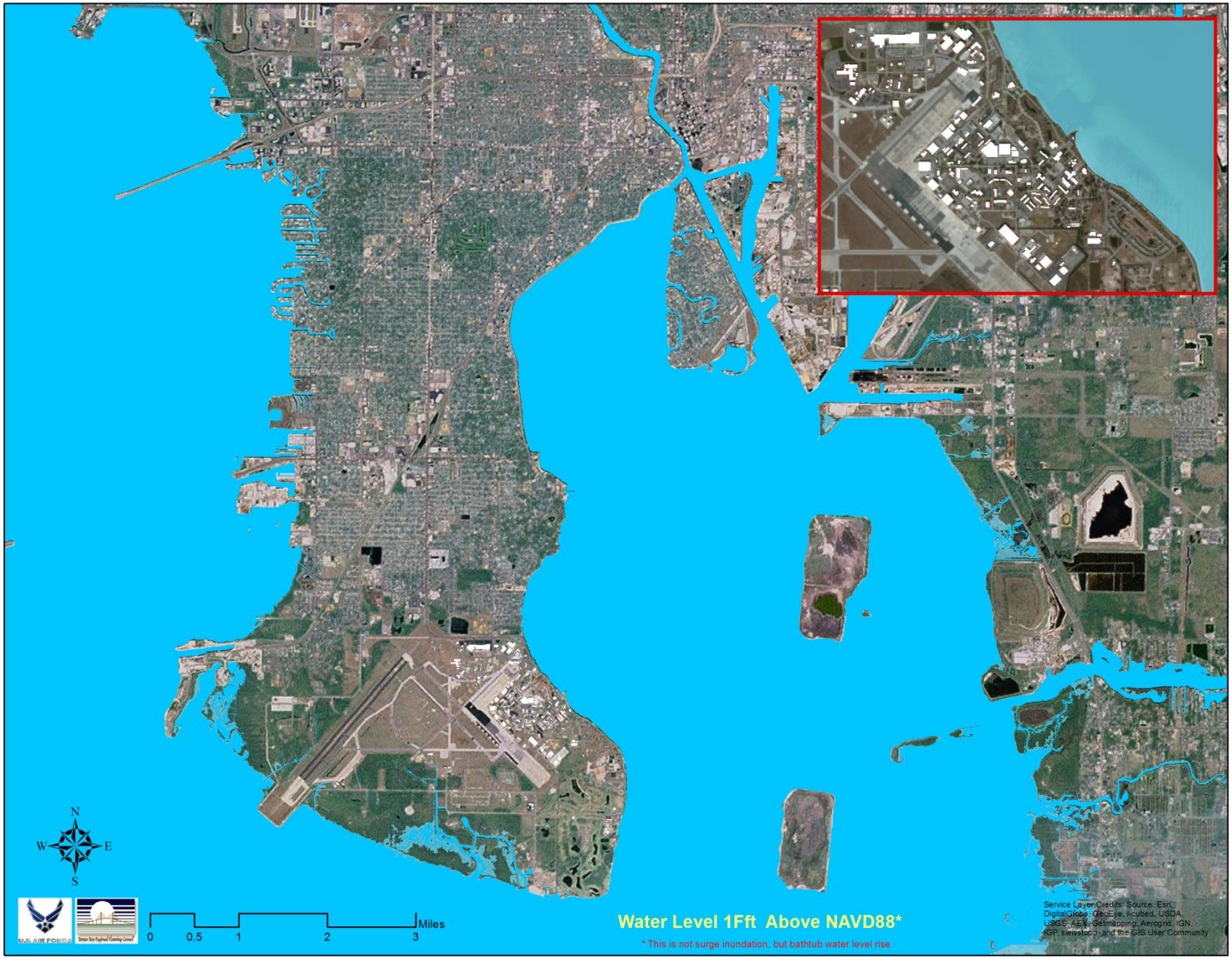
Depth Ranges From Depth Model

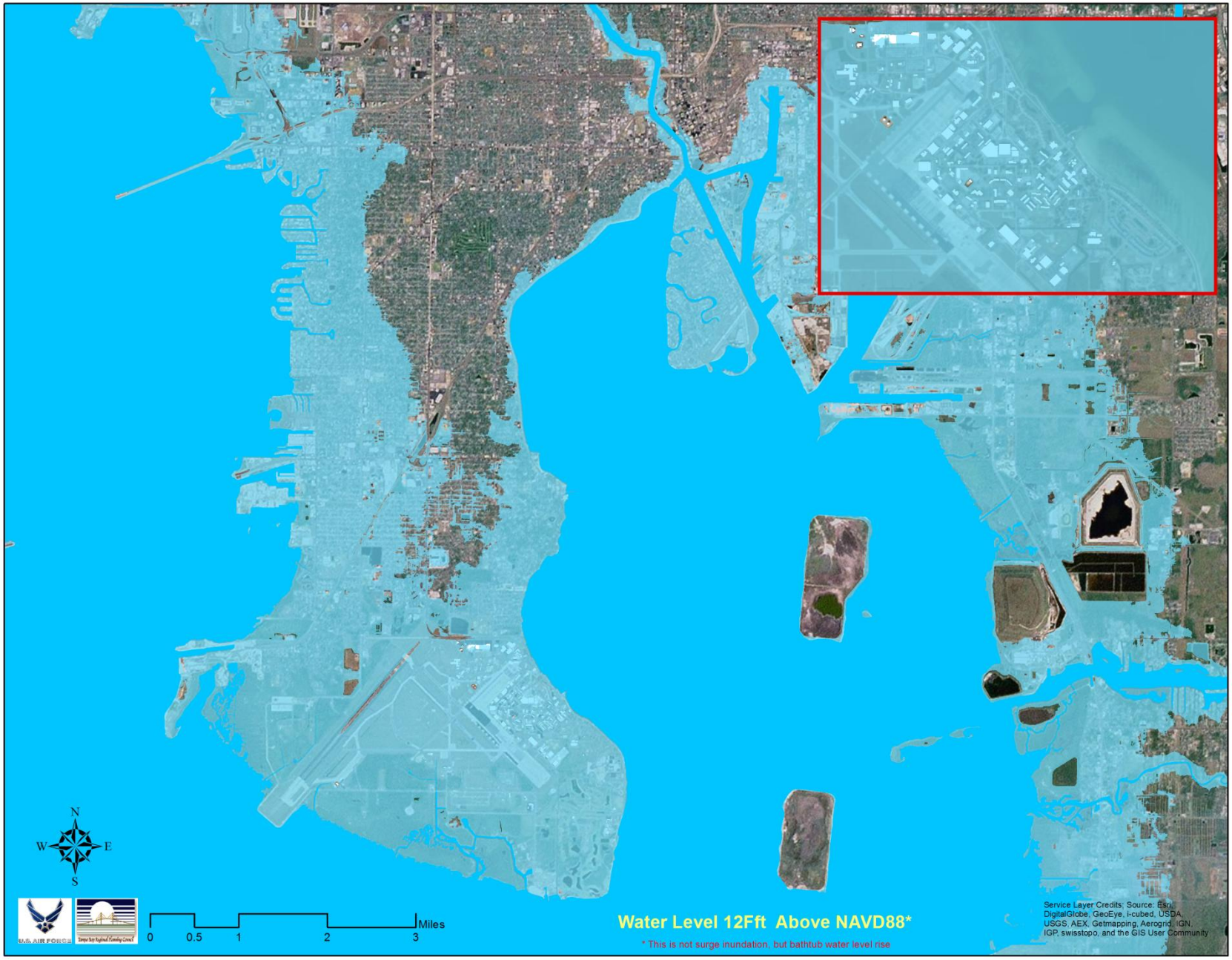


Basin Bathtub Water Rise Model

- Simplified Non-SLOSH Water Rise
- Created for Need Request by MacDill AFB
- Allows Water Rise Depths with No Wind Influence

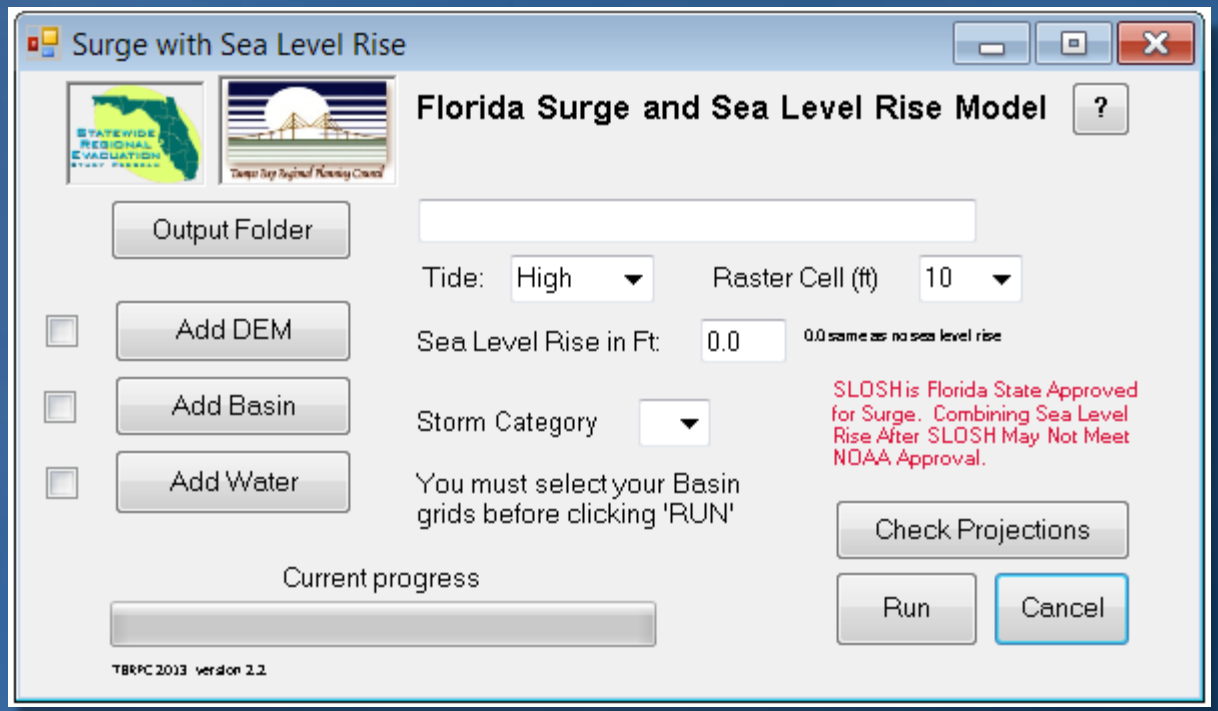



N
W
E
S
0
0.5
1
2
3
Miles
Water Level 1Fft Above NAVD88*
* This is not surge inundation, but bathtub water level rise
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

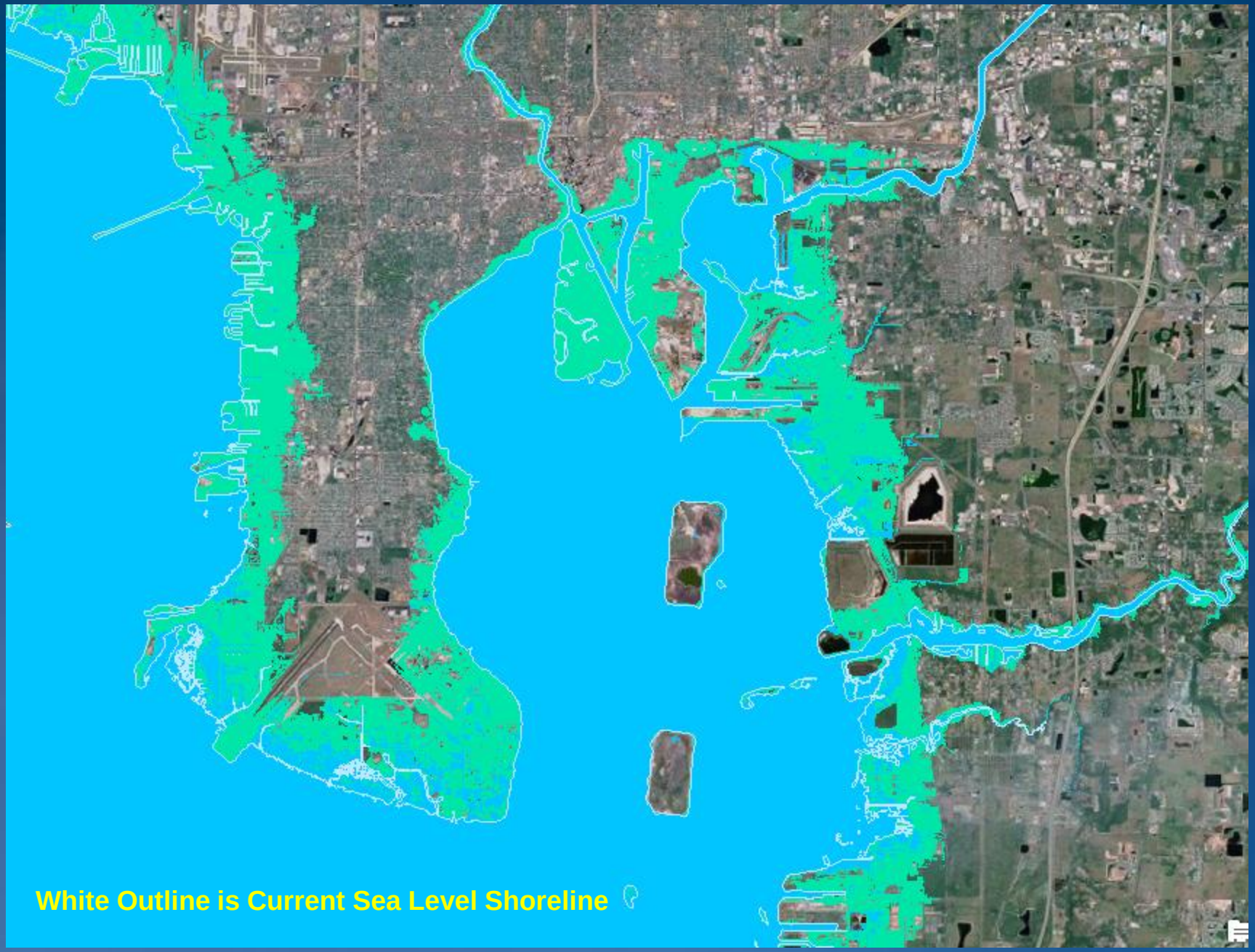

N
W
E
S
0
0.5
1
2
3
Miles
Water Level 12Fft Above NAVD88*
* This is not surge inundation, but bathtub water level rise
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

Estimated Surge and Sea Level Rise Model

- Approximates Storm Tide with Base Sea Level Changes
- Best Method using SLOSH without NHC Re-Running
- Based on Previous Surge Model Tools

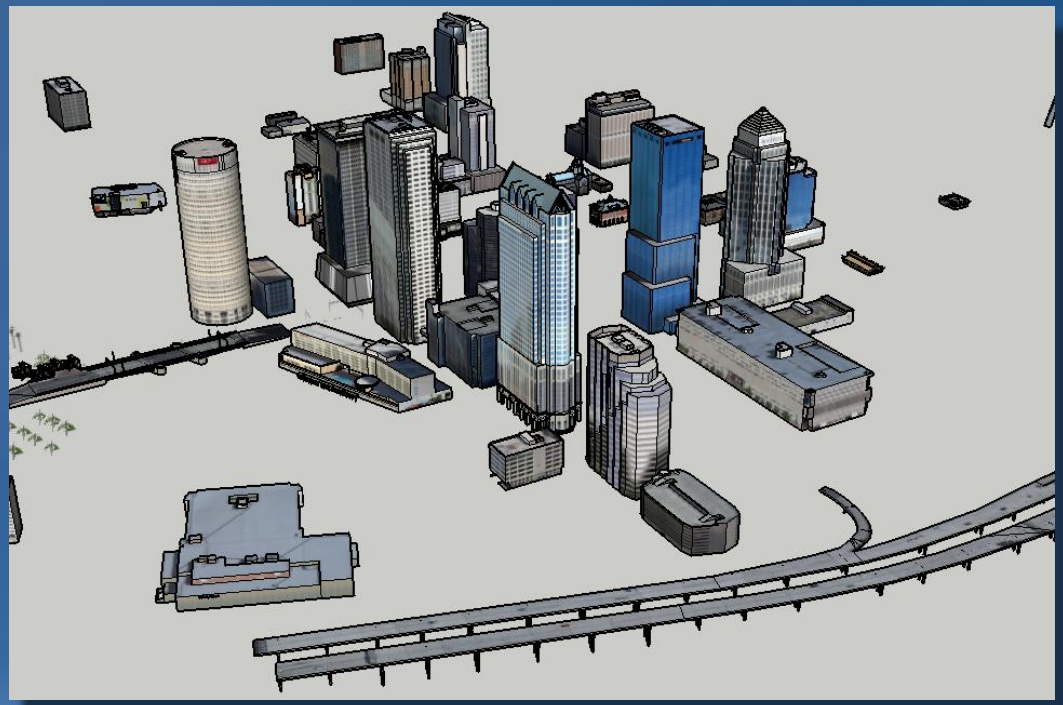


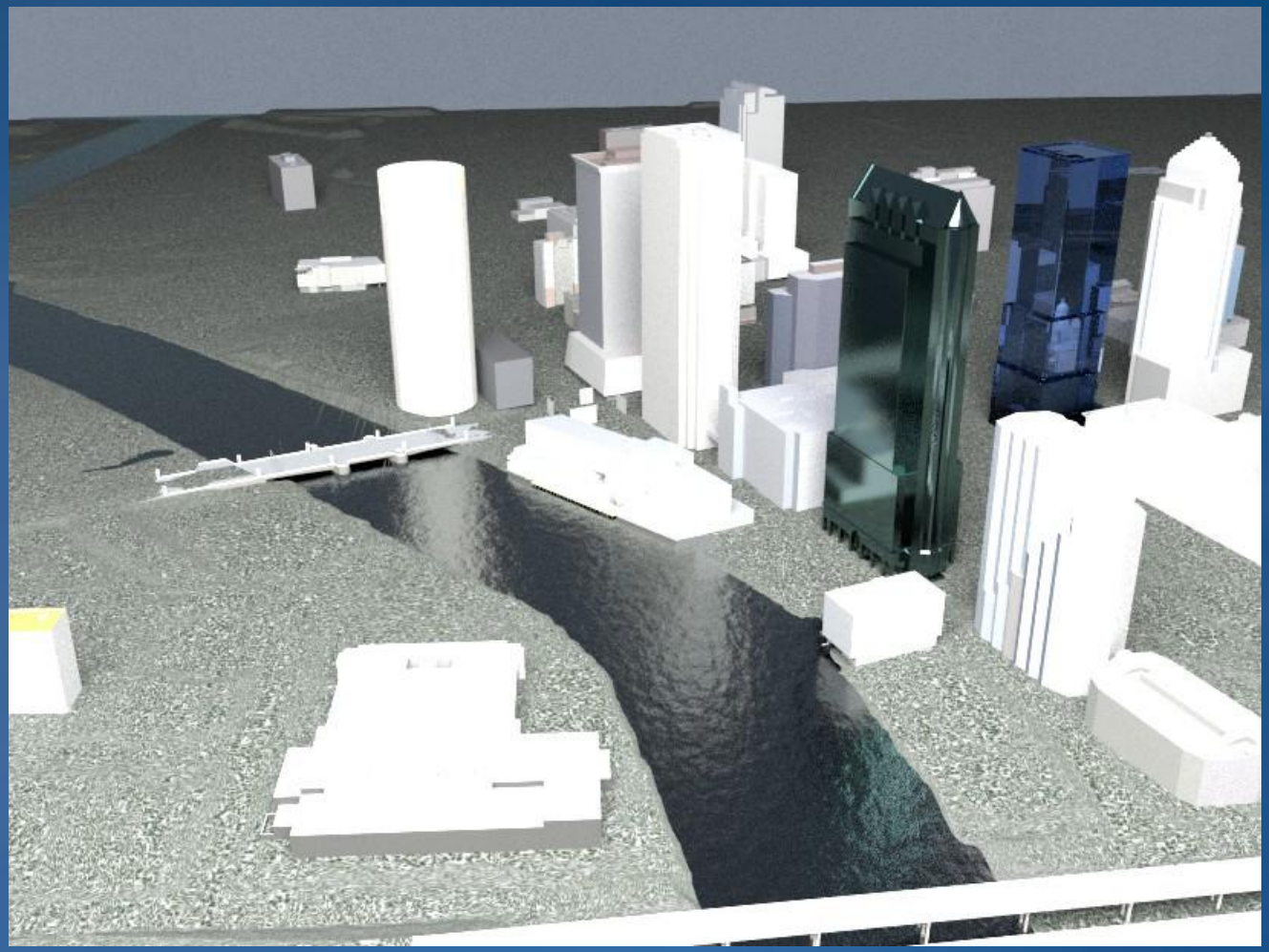
30 Inch SLR Base with Repeat 1921 Storm

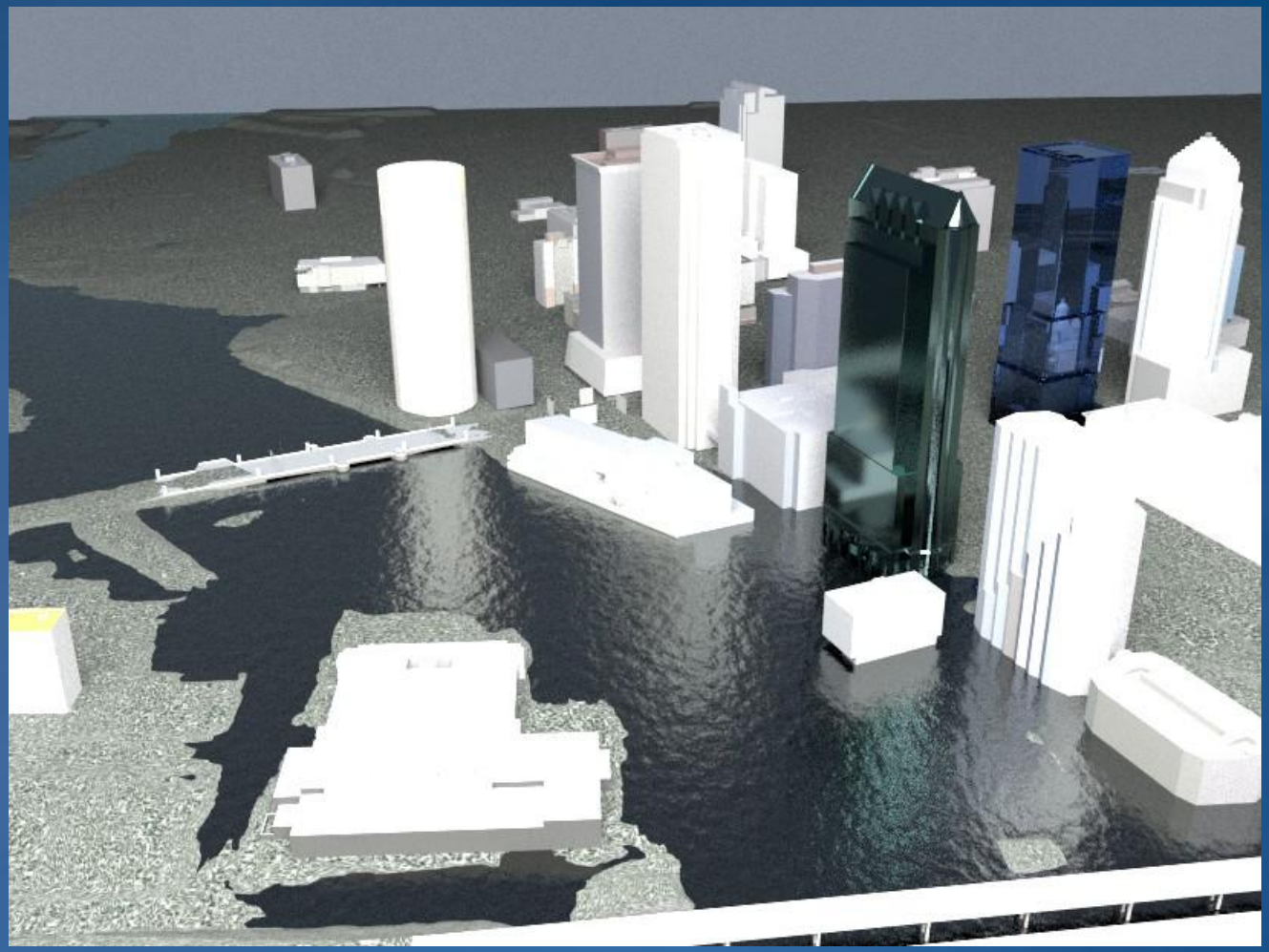


3D Visualization

- Allows Some Perspective Views of 2D GIS Inundation Scenarios
- Some Applications Have Hydrodynamics Built-in
- What-if Impacts Can Have Real World Feel







Thanks, and Have a Great Day!

TBRPC GIS

Tampa Bay, 2014

Florida

Statewide Regional Evacuation Study Program