The Role of Information Management in Coastal Hazard Analysis

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ADCIRC

➢**Advanced Circulation (ADCIRC) model grid contains wave height, still water elevation, and wave return period information**

➢**Methodology follows procedures used in 2006-2008 FEMA Mississippi and 2008-2010 Eastern Florida Panhandle Coastal Studies**

➢**Contains over 2 million nodes**

➢**Models predictions in the study area when compared against 5 historical hurricanes had a high degree of accuracy**
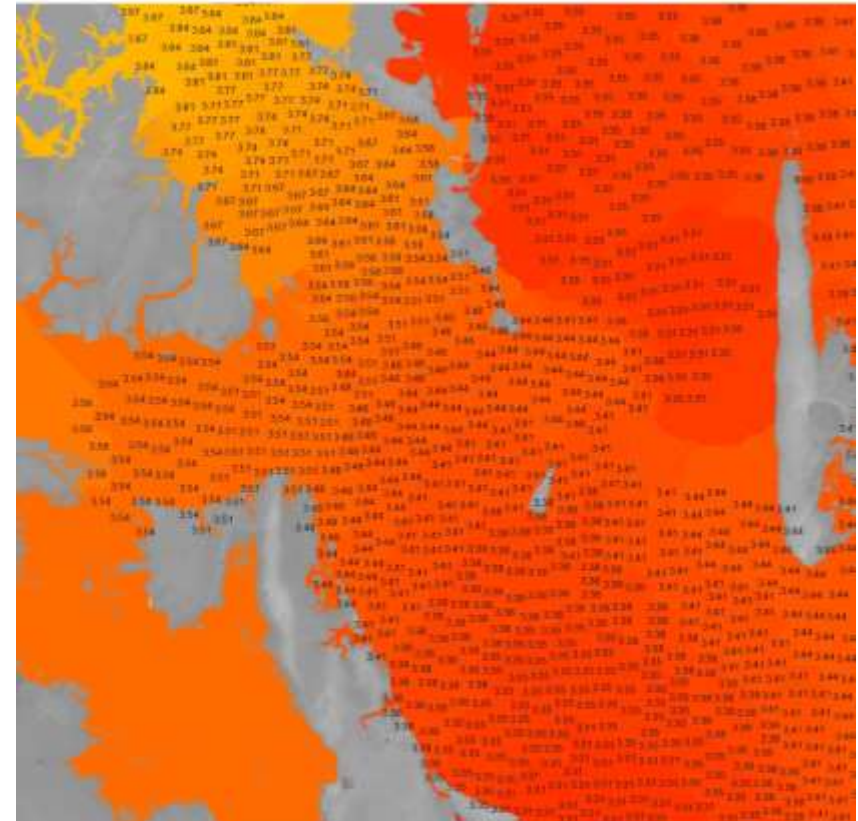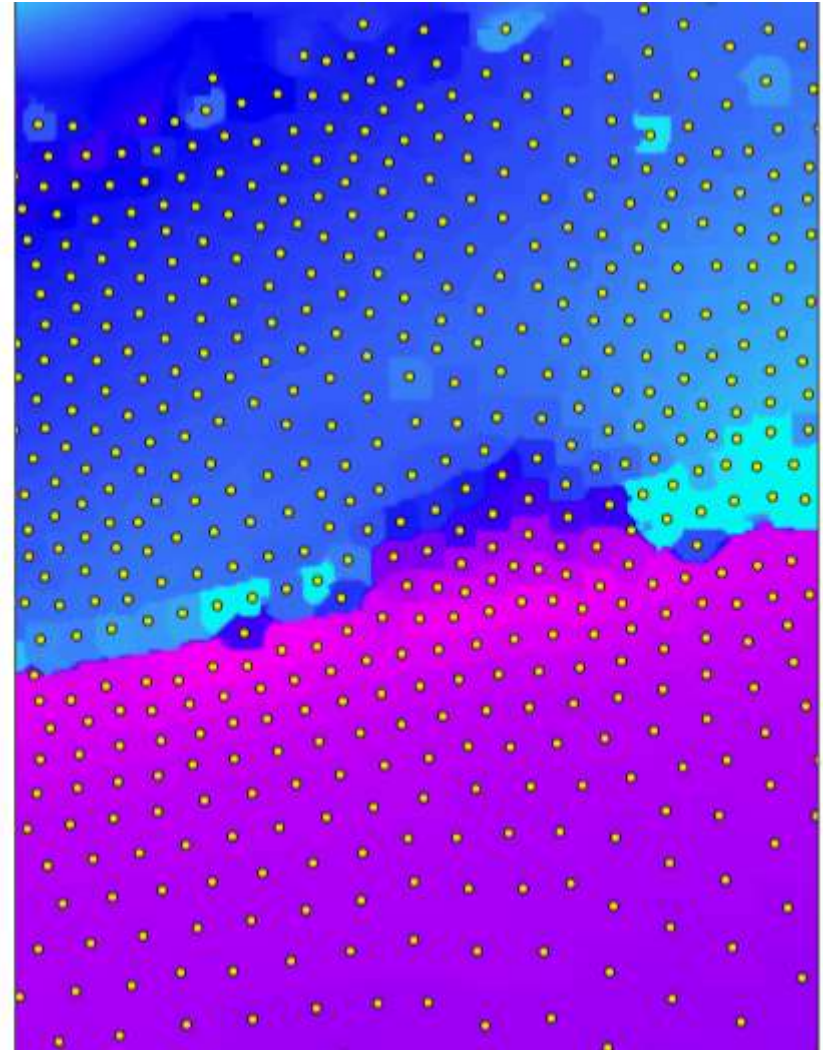
ADCIRC
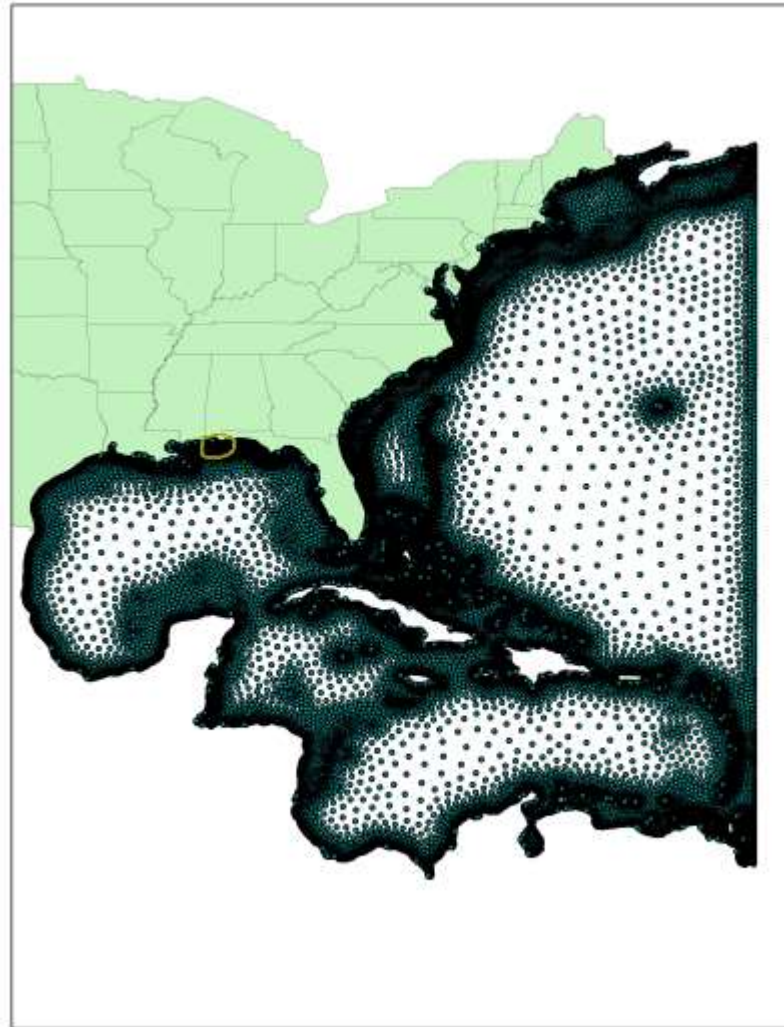
ADCIRC Gaps

➢ **ADCIRC point layer used with combined LiDAR/Bathymetry raster to develop a flood extent**

➢ **Product is a raster with gaps only at physical barriers**

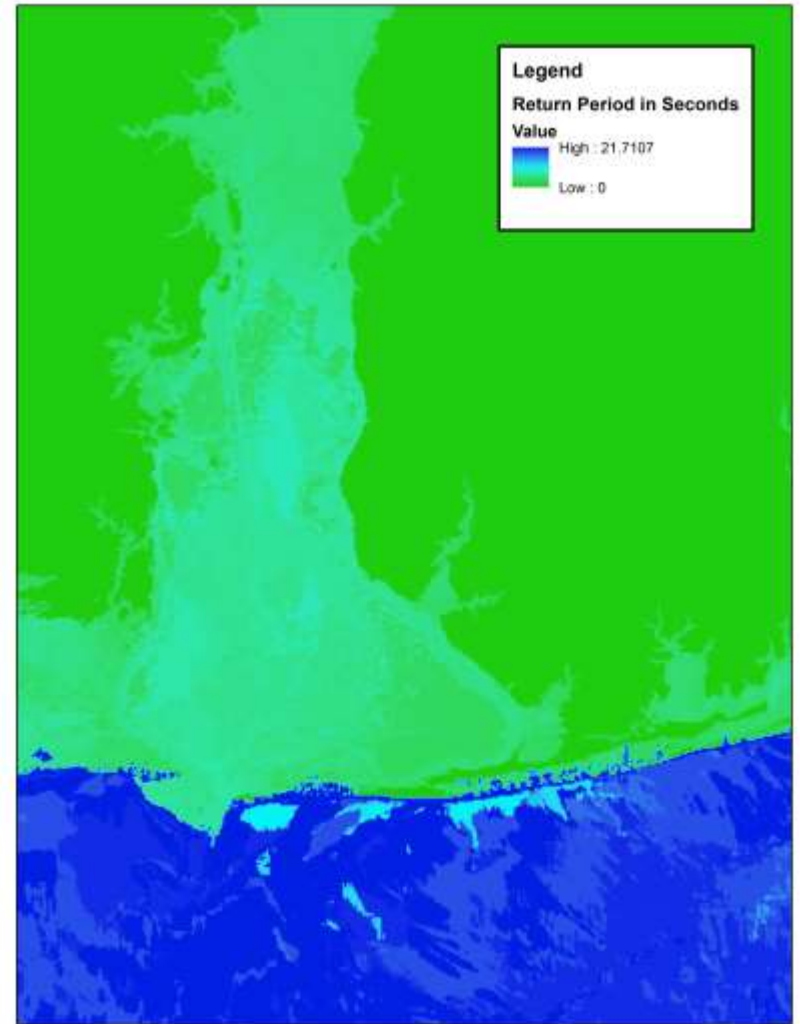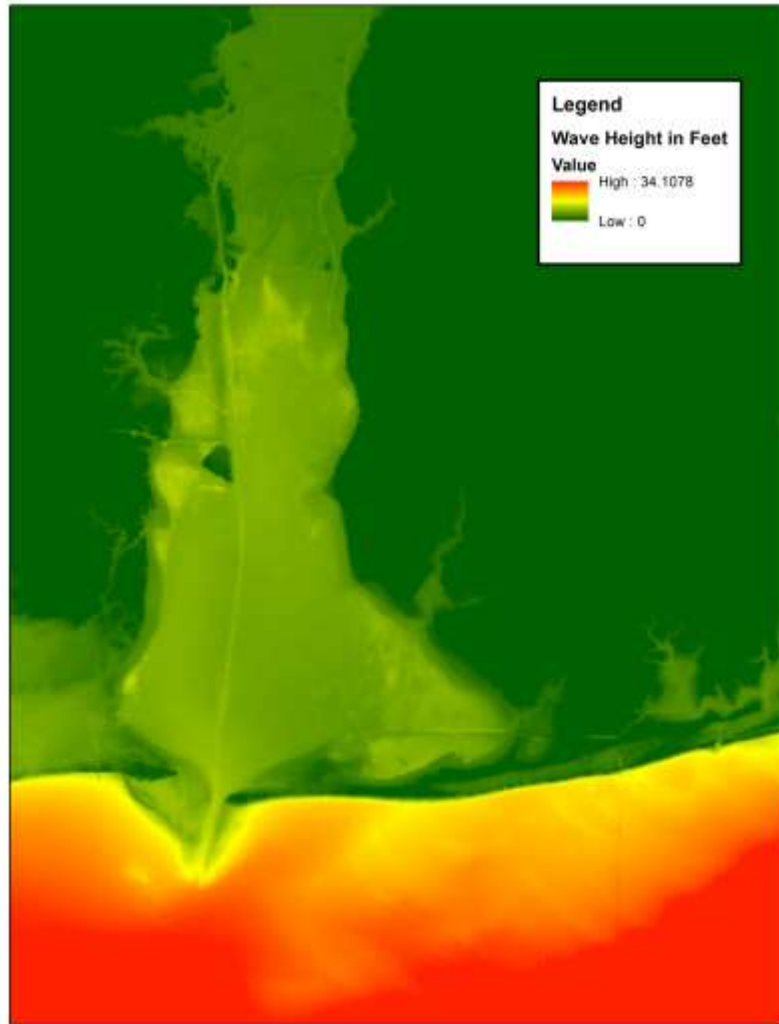➢ **Resulting raster reflects hydraulic connectivity**

SWEL Raster

➤ **Stillwater Elevation (SWEL)**

➤ **Interpolated in GIS over gaps for modeling purposes**

➤ **Does not take into account wave height**

Wave Height/Return Period

Transects

➢ **Similar to riverine cross sections**

➢ **Should be representative of surrounding area**

➢ **Avoid topographical or geographical anomalies**

➢ **Evenly spaced through study area**

Vegetation

➢ **Modeling software (WHAFIS 4.0) from FEMA specifications requires additional inputs that can be represented in GIS**

- ➢ Vegetation
- ➢ Buildings

➢ **GAP national land cover data was used as a helpful tool in reclassifying land use into WHAFIS accepted values**

➢ **Pixel resolution was too low to be able to use in its current form**

➢ **Digitization had to be done to make smoother polygons that more effectively matched aerial photography**

Vegetation Classification

➢ **Marsh Vegetation**

  ➢ Herbaceous Wetlands

➢ **Rigid Vegetation**

  ➢ Deciduous Forest

  ➢ Evergreen Forest

  ➢ Mixed Forest

  ➢ Woody Wetlands

  ➢ Shrubland

➢ **Other**

  ➢ Agriculture

  ➢ Barren

  ➢ Urban

Vegetation Parameters

➢ **WHAFIS model input parameters for plant characteristics included:**

- ➢ Drag coefficient
- ➢ Mean wetted height
- ➢ Mean effective diameter
- ➢ Mean horizontal spacing

➢ **Spatial join was performed in GIS with Forest Inventory and Analysis (FIA) data to represent these values. Field visits were performed to verify and/or adjust these values.**

➢ **National Wetland's Inventory (NWI) GIS layer was used as a reference to help delineate marsh grass areas**
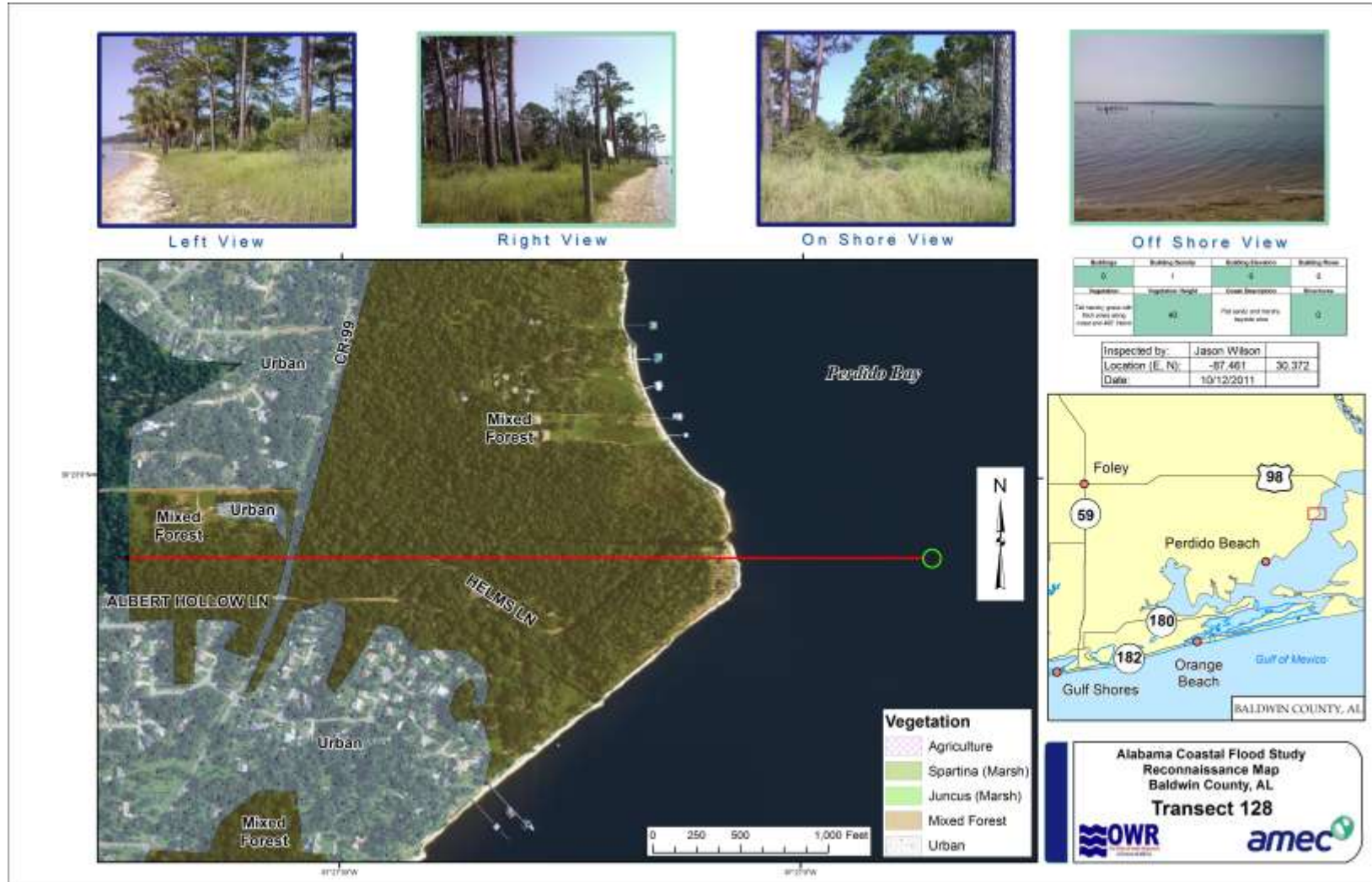
Buildings

➤ **Takes into account wave impedance caused by structures in the flood extent**

➤ **Placement should be representative of the area along the transect in regards to open space ratio**

➤ **Polygons should be drawn at average building depth and measured parallel to flow for the structures being taken into account**

Transect Layout Figures

Data QA/QC

➤ **Field visits were made to transect locations for data verification**

➤ **Data and photos were recorded from these locations using a smart phone application**

➤ **Numerous transect locations required coordination with other local and state agencies in order to record field data**
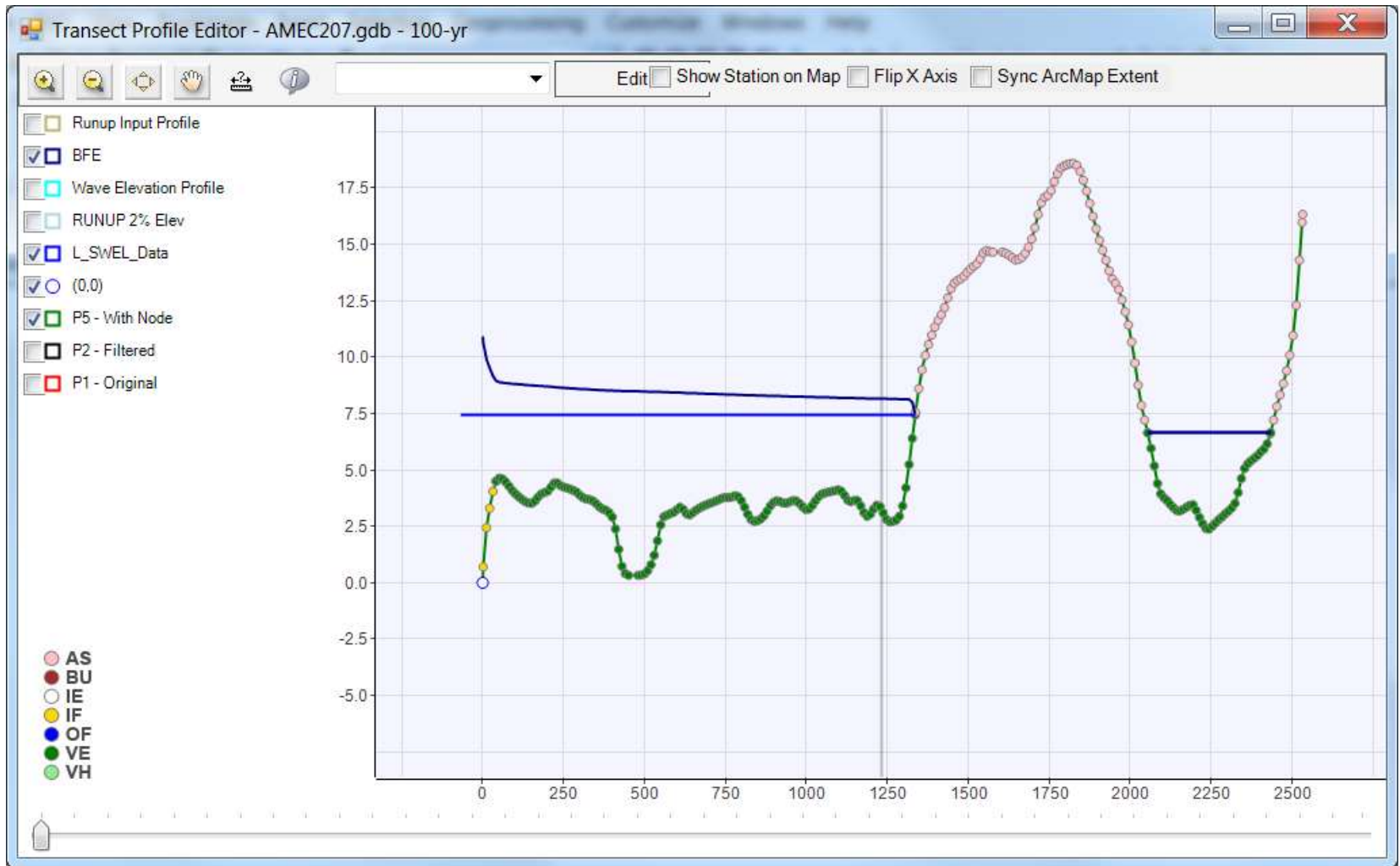
WHAFIS

➢ **Wave Height Analysis for Flood Insurance Studies**

➢ **DOS-based program that utilizes representative transects to compute wave crest elevations in a given study area**

➢ **Our tool works with WHAFIS within GIS interface that can use our GIS layers as compatible inputs then also produce GIS outputs from the models**
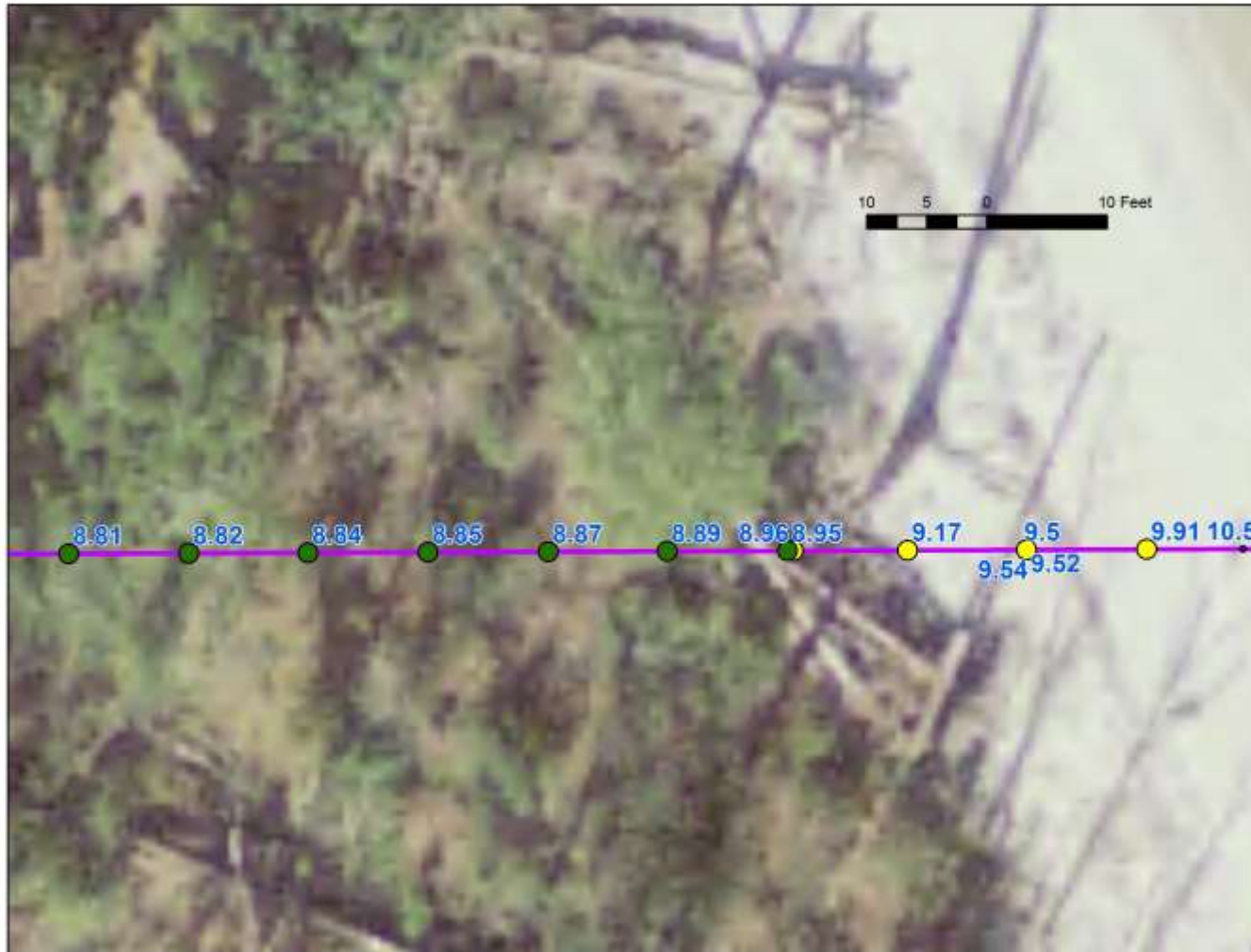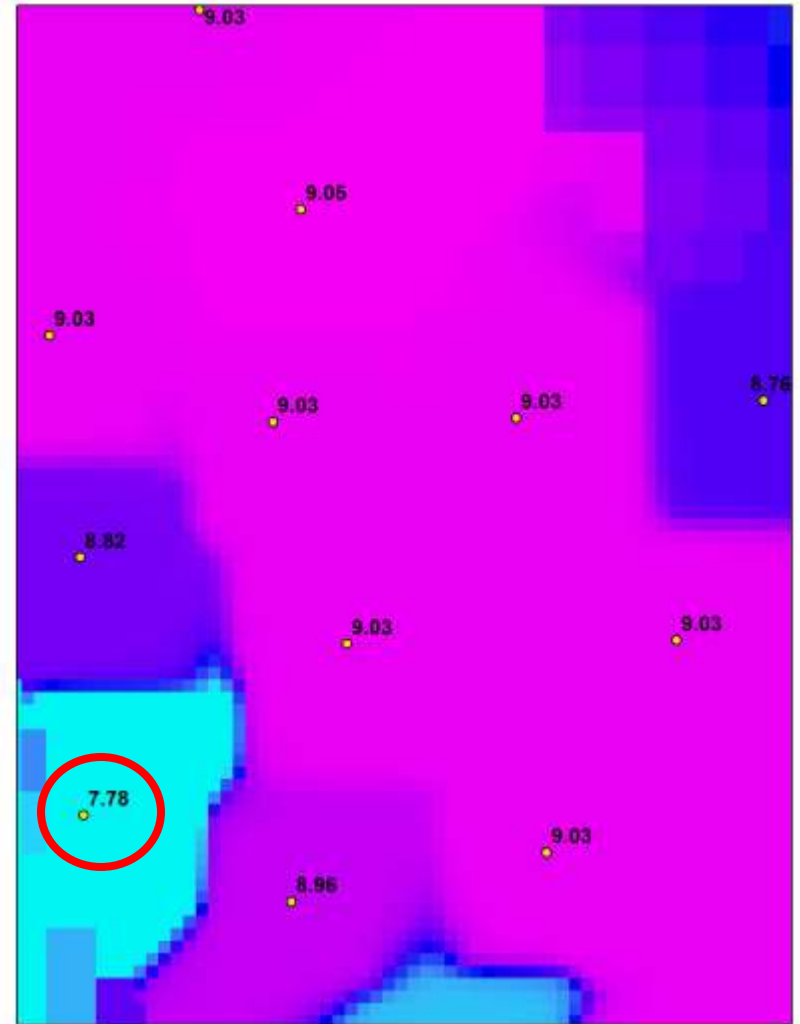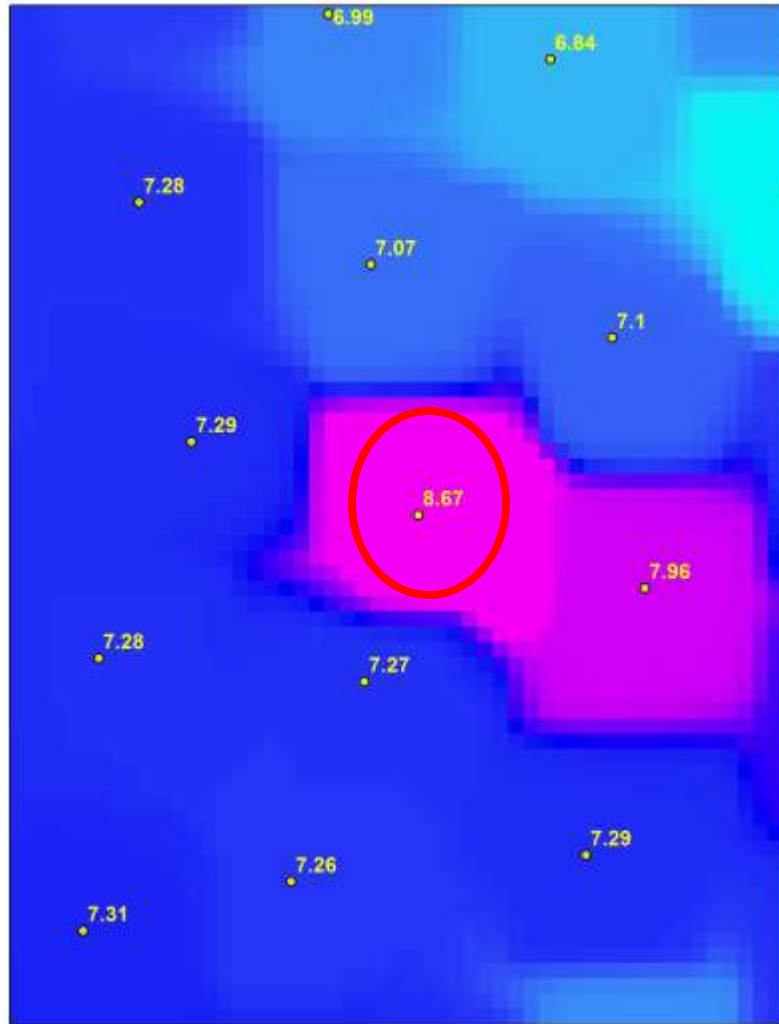
Transect Profile

GIS Profile Display

BFE Display

Lessons Learned

➢**Large datasets require large amounts of processing time**

➢**Some outlier values in the ADCIRC points should be filtered out in order to avoid extreme high and low SWEL values**

➢**Sensitivity tests on the Building layer changed how we initially shaped the features**

➢**Double checking against local storm BFEs to verify proper elevations**

Outlier ADCIRCs

Questions

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