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Saint Charles Parish

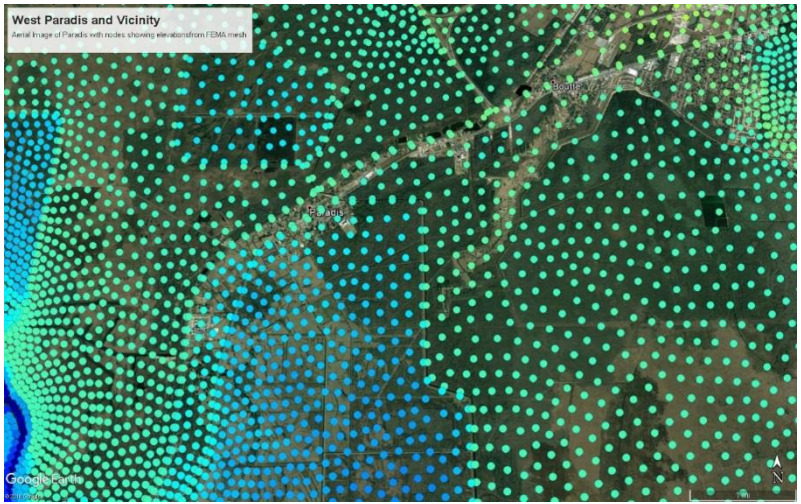
WHAFIS Modeling and Flood Zone Mapping

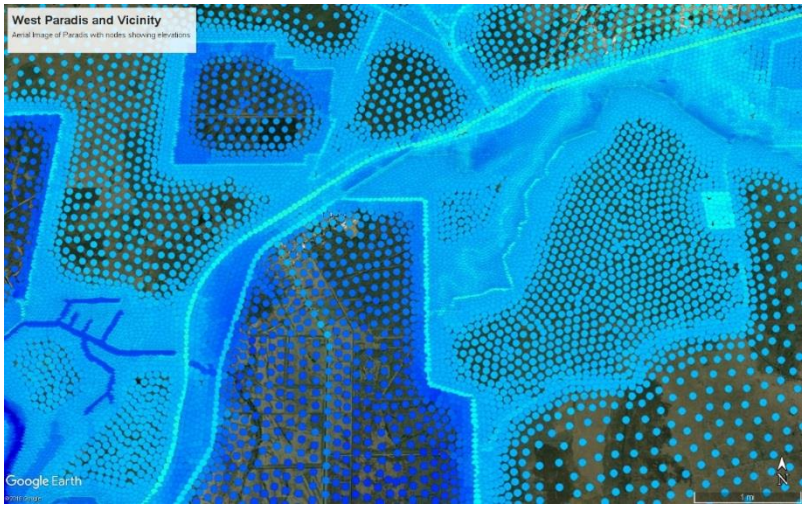
01/22/2018

Saint Charles Parish Flood Zone Study: Overview

- In general, reductions in the Base Flood Elevations (BFEs) of a foot or more
- A more physically robust storm characterization
- The model bathymetry is highly resolved specifically to the Parsish, and the West Bank in particular
- The storm set more accurately replicates the distribution of naturally occurring storms
- Model has been validated against more recent storms
- BFE's developed from a wider variety of FEMA wave propagation (WHAFIS) model transects

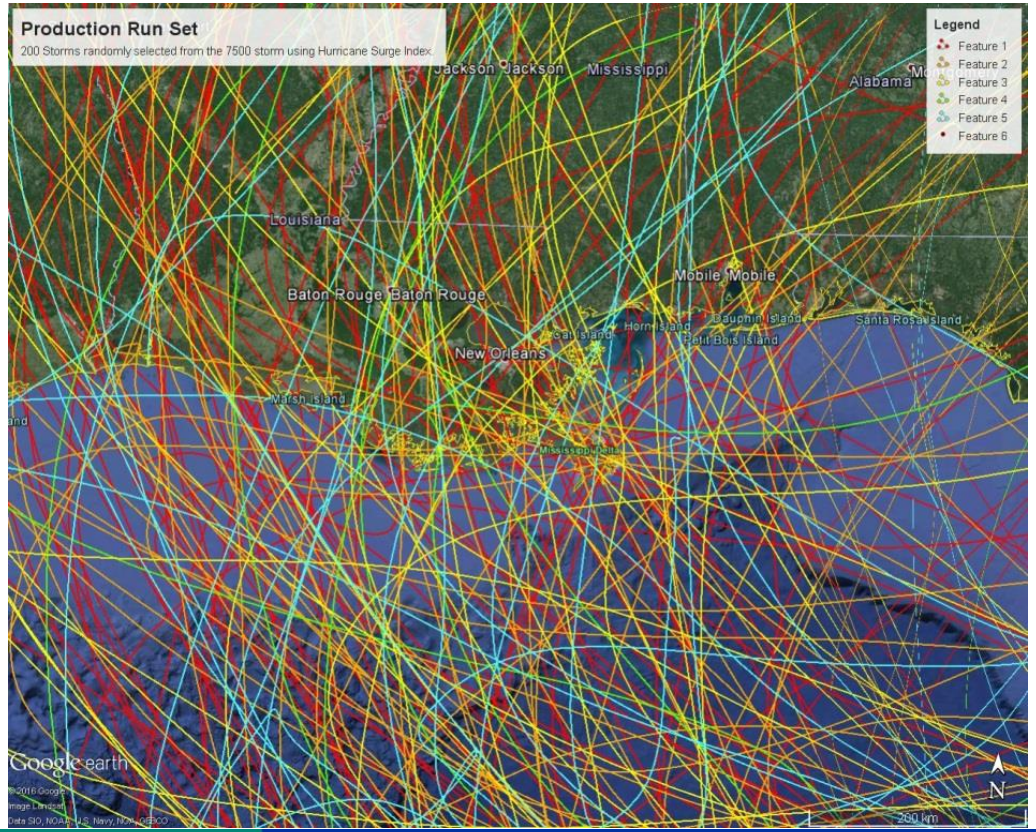
Comparison FEMA Grid vs Updated Grid



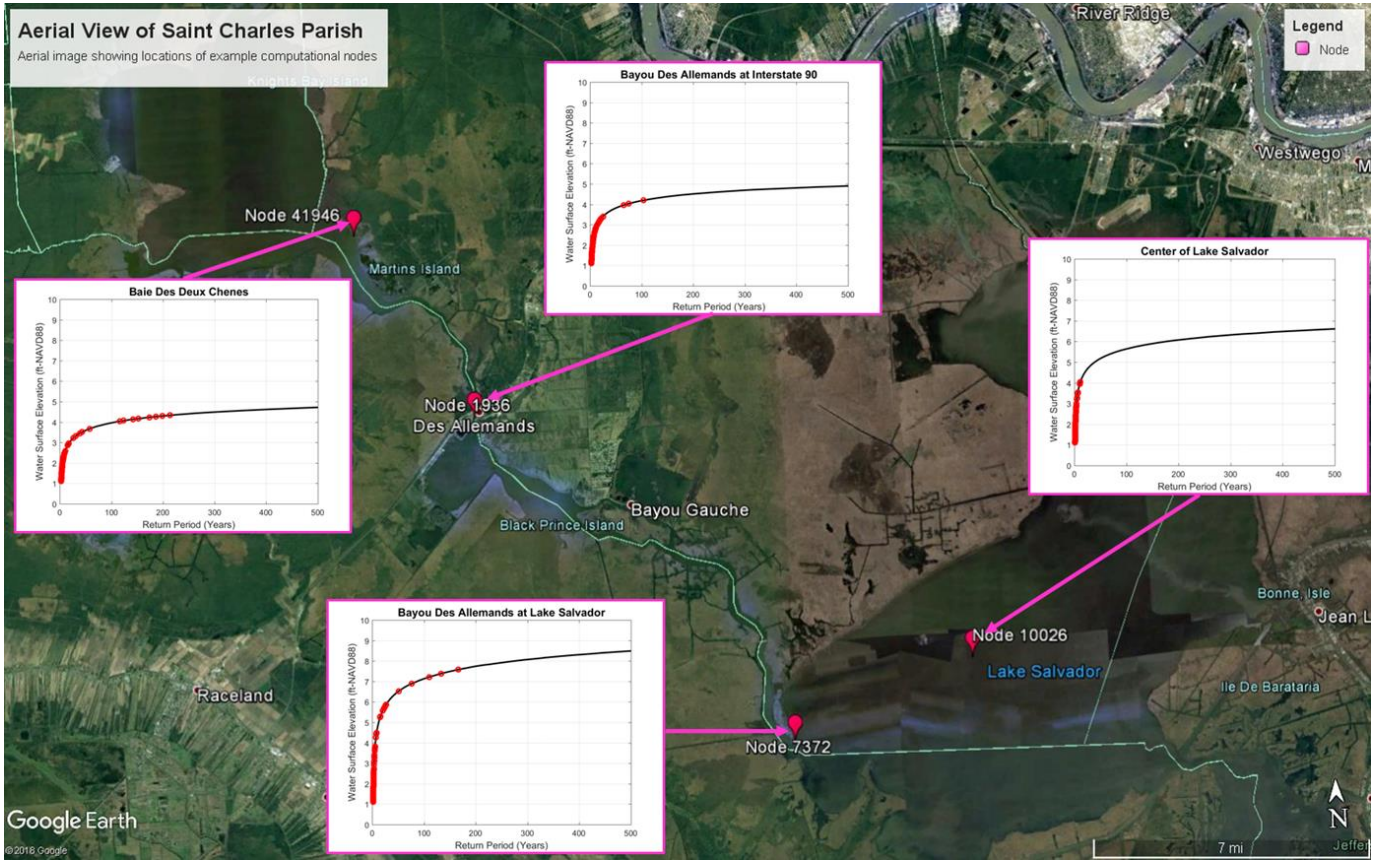


Synthetic Storm Climatology

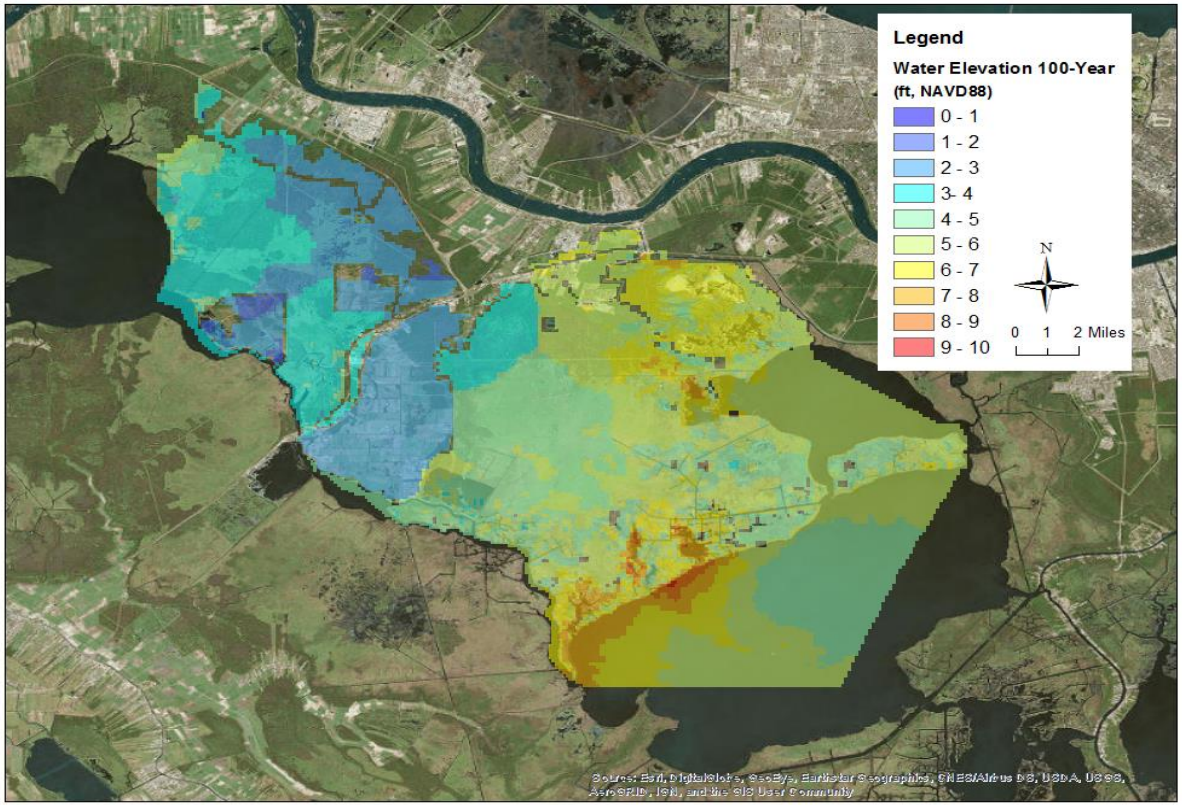
- Multiple large statistically robust sets of synthetic hurricanes (Emanuel, et al., 2006), simulated using coupled atmospheric-oceanic models
- 5 different hindcast models producing over 7,500 synthetic cyclones (1500 per model)
- Monte Carlo statistical approach, eliminating many of the smaller less severe events
- Always simulate all larger events
- Input into coupled model using Holland (1980) wind model (Gao et al., 2013)



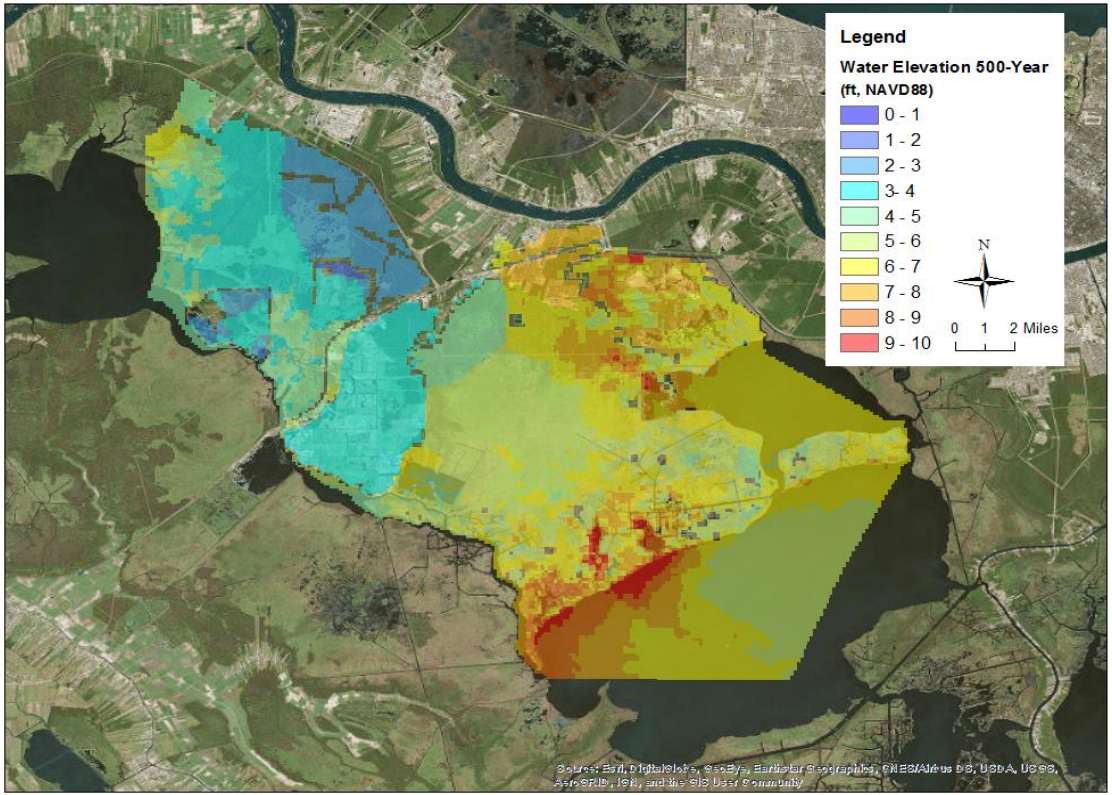
Cumulative Distributions of Water Levels



1% Annual Exceedance Water Levels



0.2% Annual Exceedance Water Levels



Wave Height Analysis for Flood Insurance Studies Common Terms

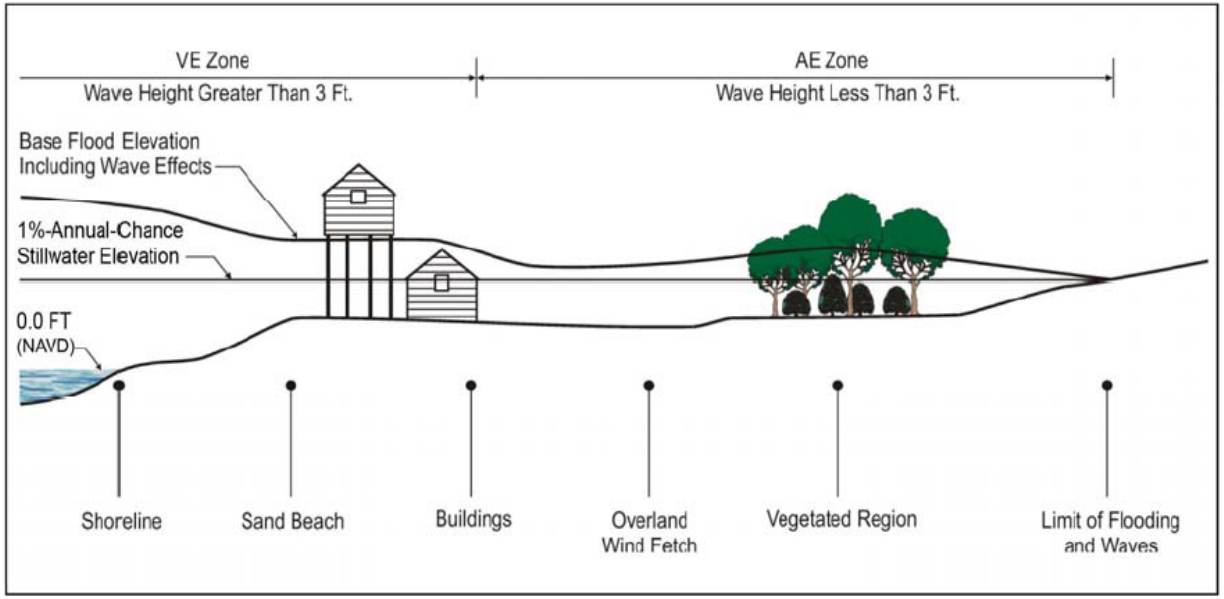
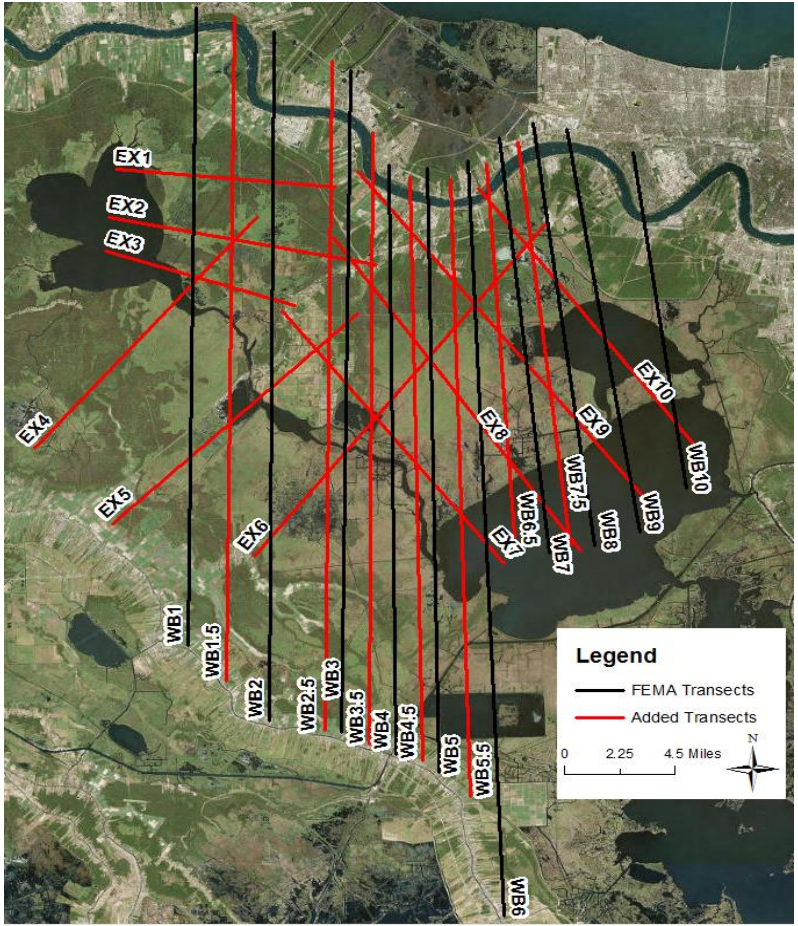


Figure 1. Transect Schematic

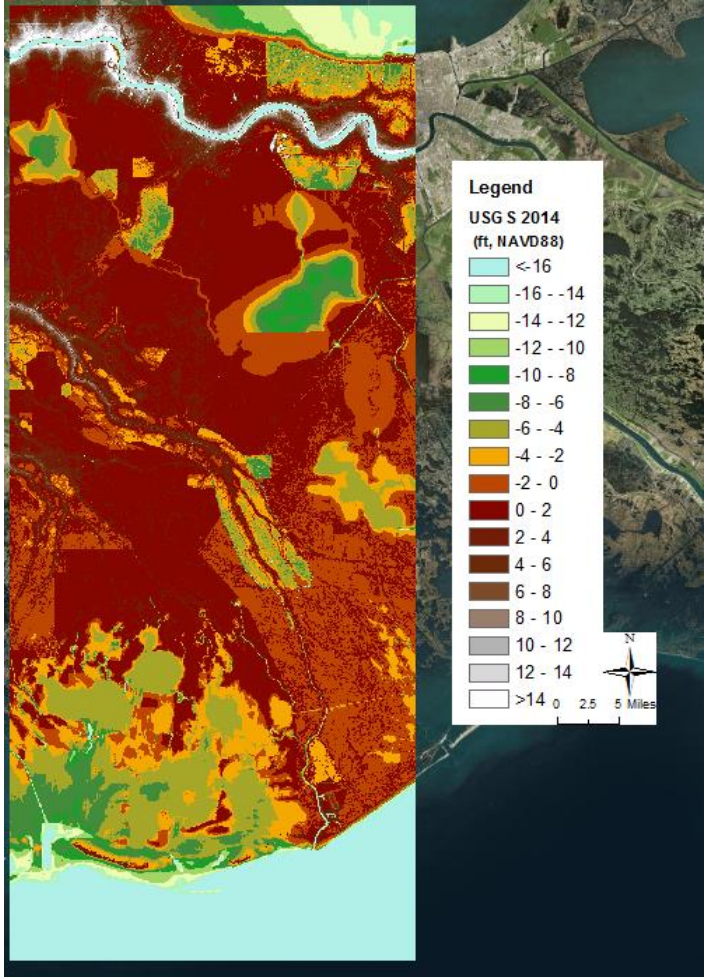
WHAFIS Transects

- Originally 10 transects
- All Transects originated at the GOM (LaFourche, Jefferson, Terrabonne)
- Updated topography and Bathemetry
- Upgraded land use type (WHAFIS ‘cards’)
- Added additional intermediate transects
- Added an additional 10 transects originating in Lac des Allemands, Lake Salvador



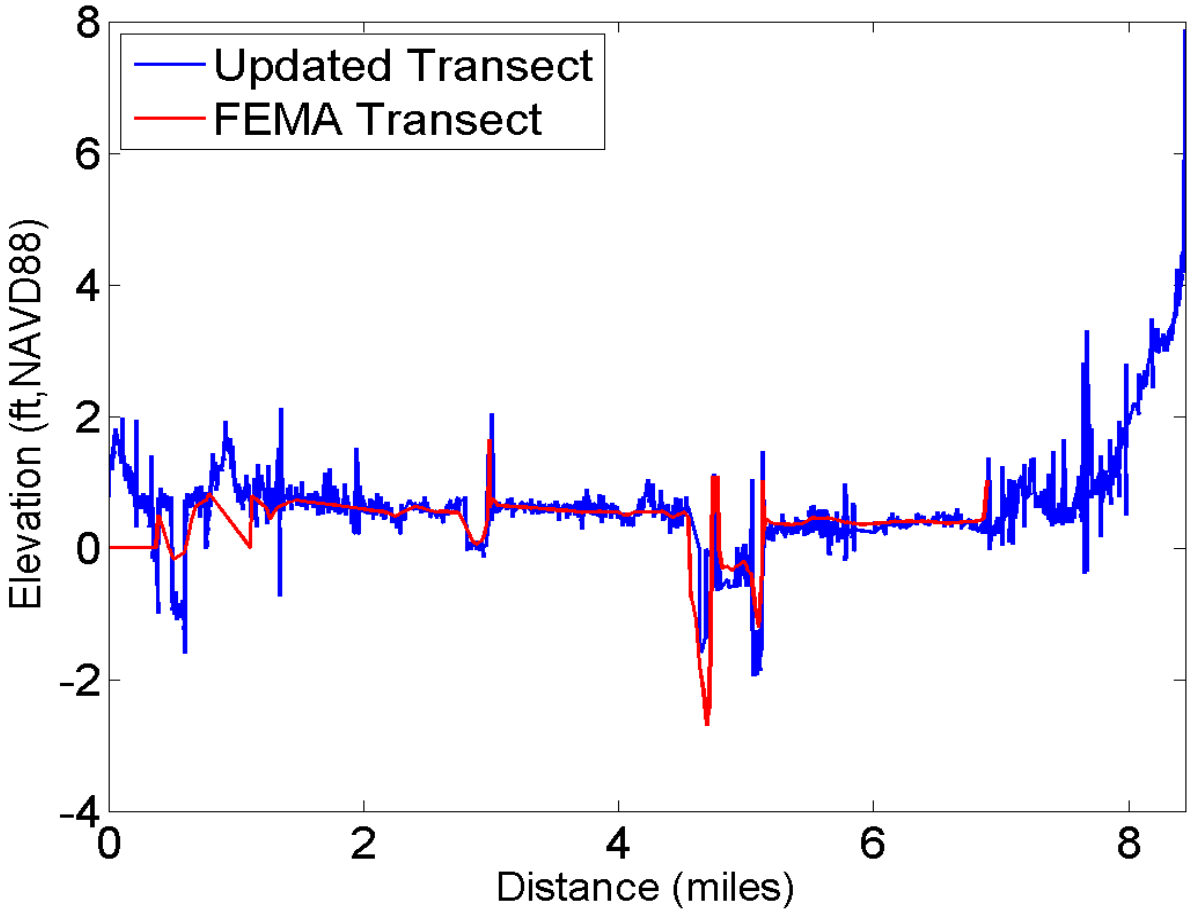
Topography & Bathymetry

- Parish provided LiDAR (where available)
- USGS Northern GOM DEM (where needed)
- CB&I bathy survey for Lake Salvador, Lake Cataouatche, Bayou des Allemandes, an Lac Des Allemands



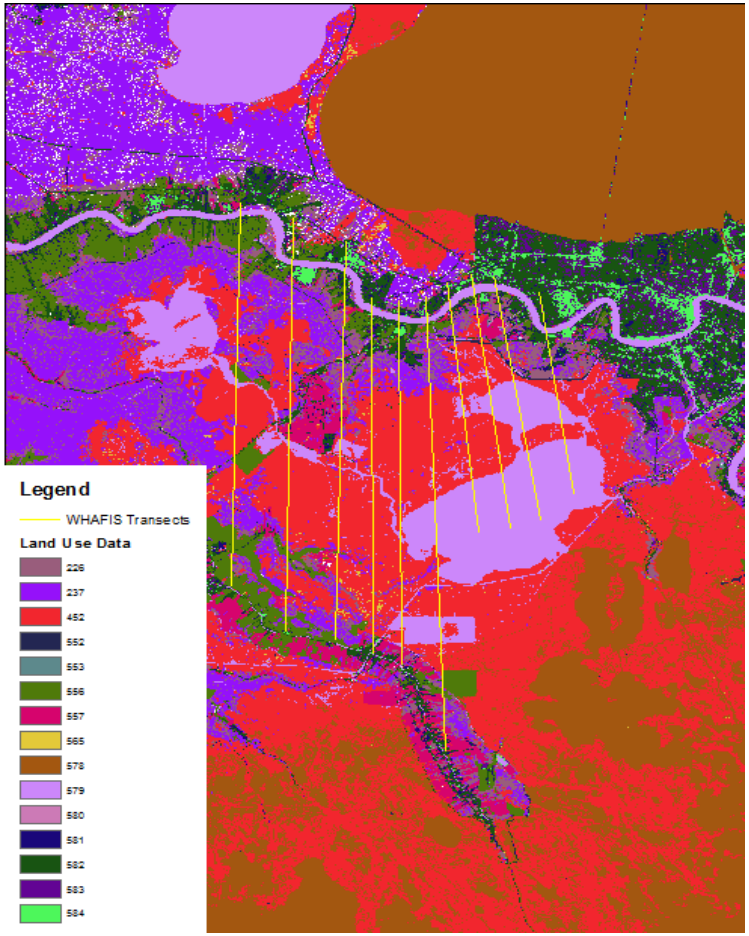
Transect WB1

- Resolution of the existing transect (red) in the order of miles
- Resolution of the updated transect (blue)in the order of feet
- In addition to capturing more features, based on a more recent dataset



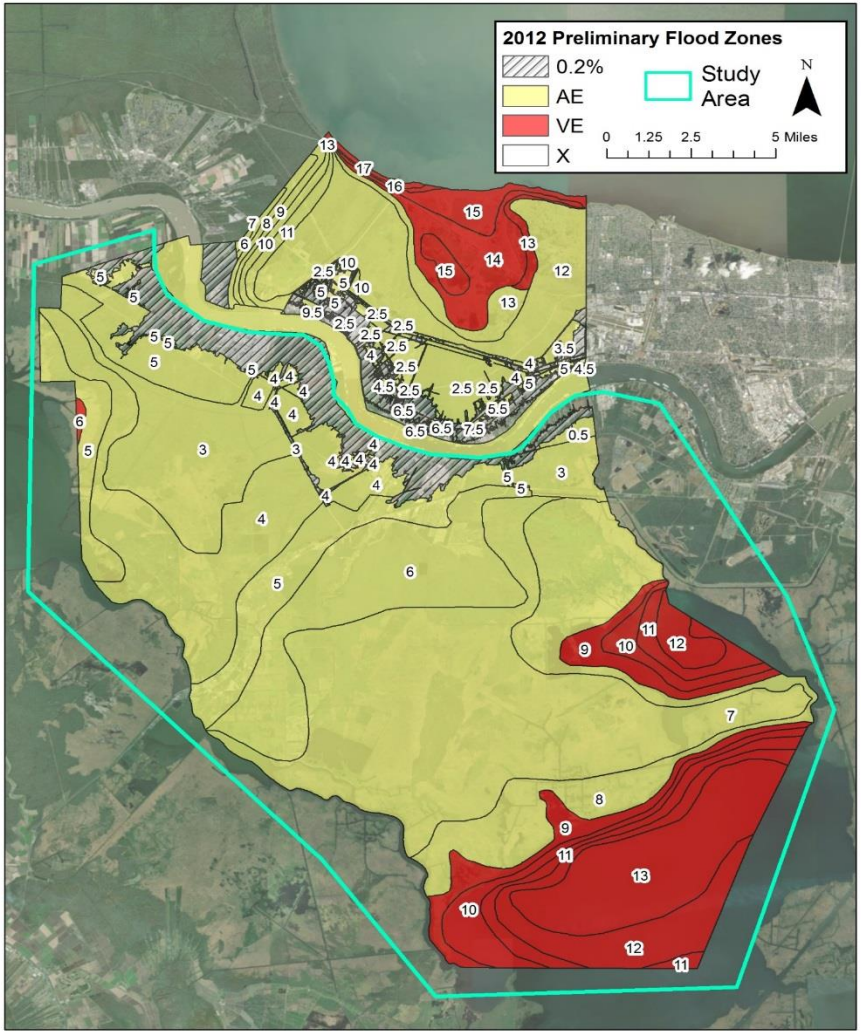
CCAP Land Use Dataset

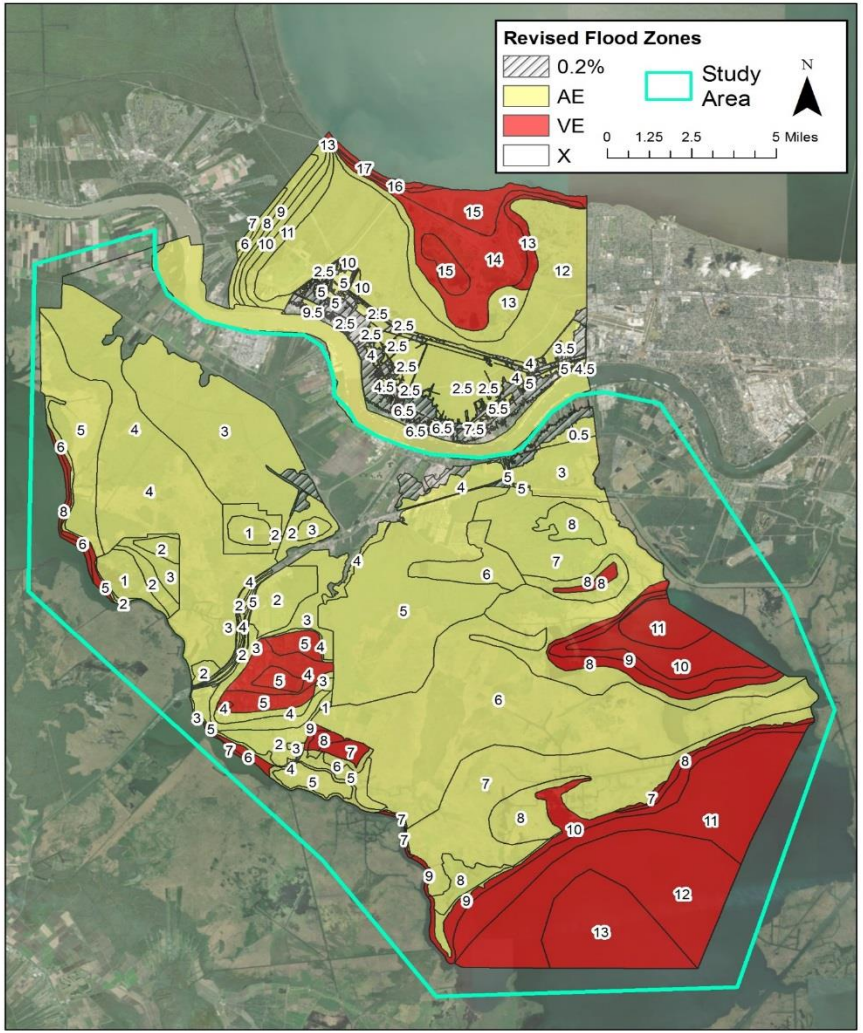
Land Use Category	Land Use #	WHAFIS Card
Developed High Intensity	584	BU/IF
Developed Medium Intensity	583	BU/IF
Developed Low Intensity	582	Bu/IF
Developed Open Space	581	IF
Quarries Mines Gravel Pits and Oil Wells	580	IF
Open Water (Fresh)	579	OF
Open Water (Brackish/Salt)	578	OF
Disturbed Non-specific	565	IF
Pasture Hay	557	IF
Cultivated Cropland	556	IF
Undifferentiated Barren Land	553	IF
Unconsolidated Shore	552	IF
Gulf and Atlantic Coastal Plain Tidal Marsh System	452	VH
Gulf and Atlantic Coastal Plain Swamp Systems	237	VE
Mississippi River Floodplain and Riparian Forest	226	VE



FEMA Flood Zone Designations

Designation	Flood Zone Description
Zone AE	Areas subject to inundation by the 1-percent-annual-chance flood event determined by detailed methods. Base Flood Elevations (BFEs) are shown.
Zone VE	Areas subject to inundation by the 1-percent-annual-chance flood event with additional hazards due to storm-induced velocity wave action. Base Flood Elevations (BFEs) derived from detailed hydraulic analyses are shown.
Zone X (shaded)	Areas of moderate flood hazard which are above the 1% annual chance (100-year) flood, but lower than the 0.2% (500-year) flood
Zone X (unshaded)	Areas of minimal flood hazard which are not subject to flooding at the 0.2% chance (500-year) flood event.


2012 Preliminary Flood Zones
0.2%
AE
VE
X
Study Area
N
0 1.25 2.5 5 Miles


Revised Flood Zones
0.2%
AE
VE
X
Study Area
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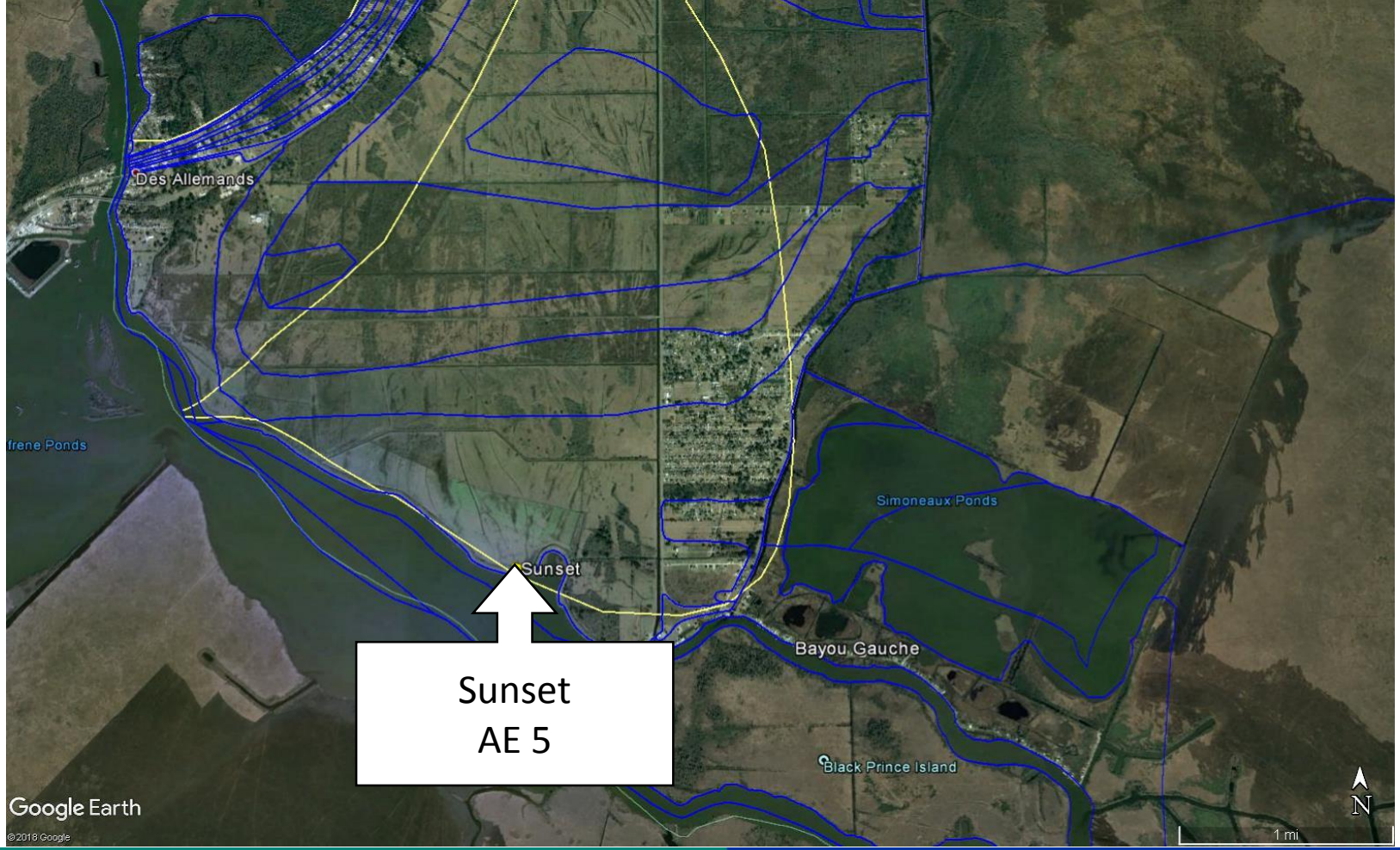
0 1.25 2.5 5 Miles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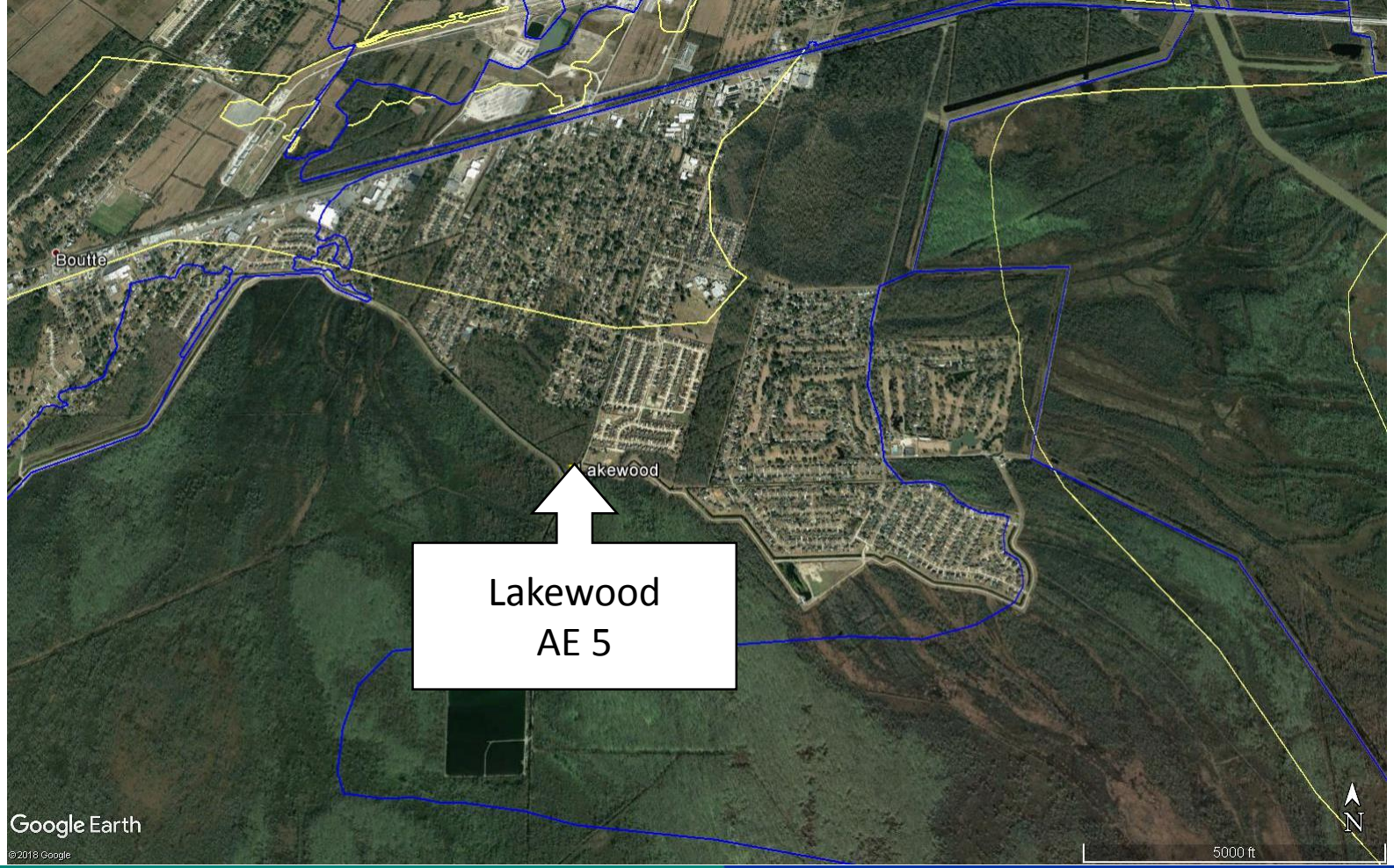
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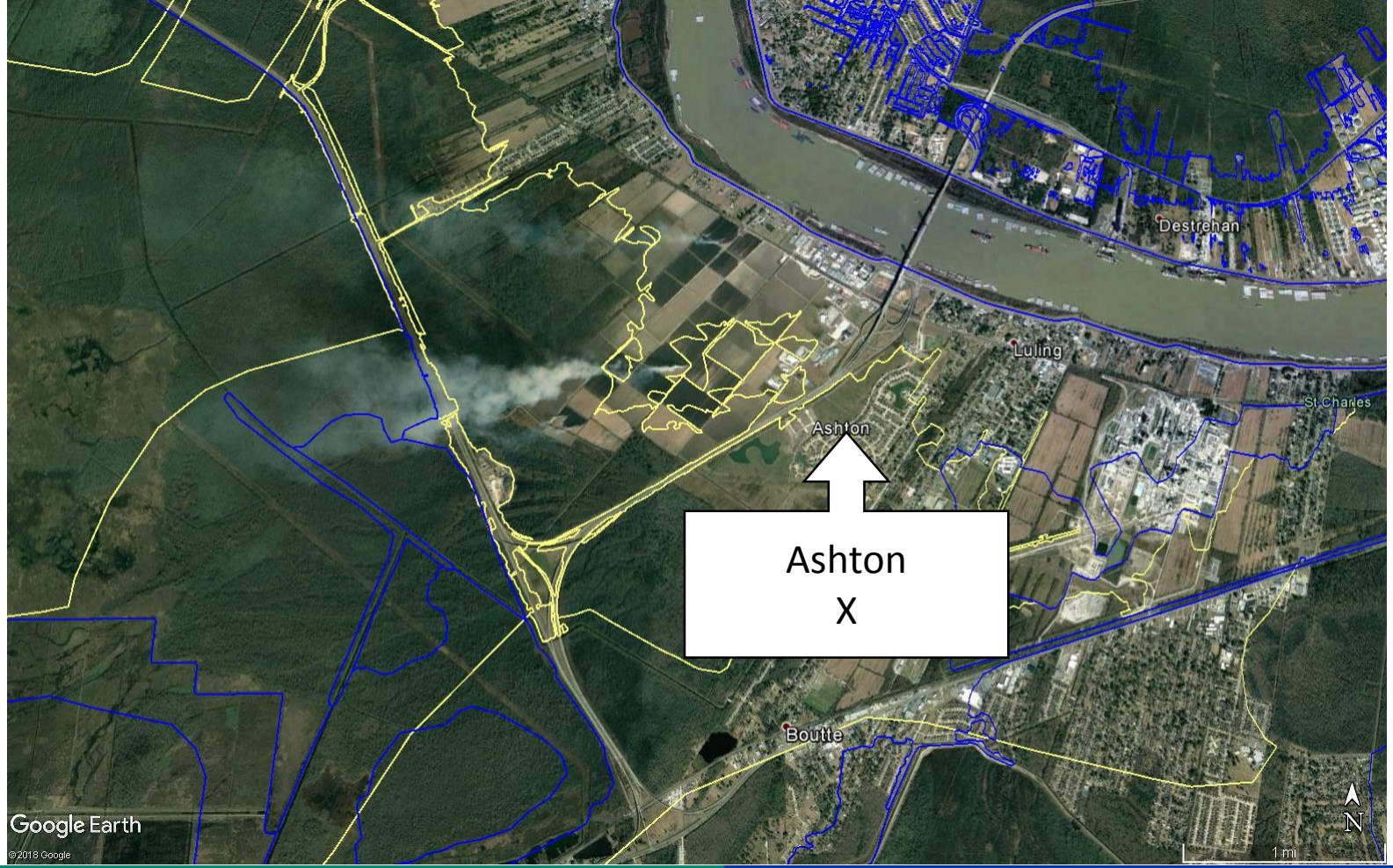
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