

Figure 1: Location map of Study Area.

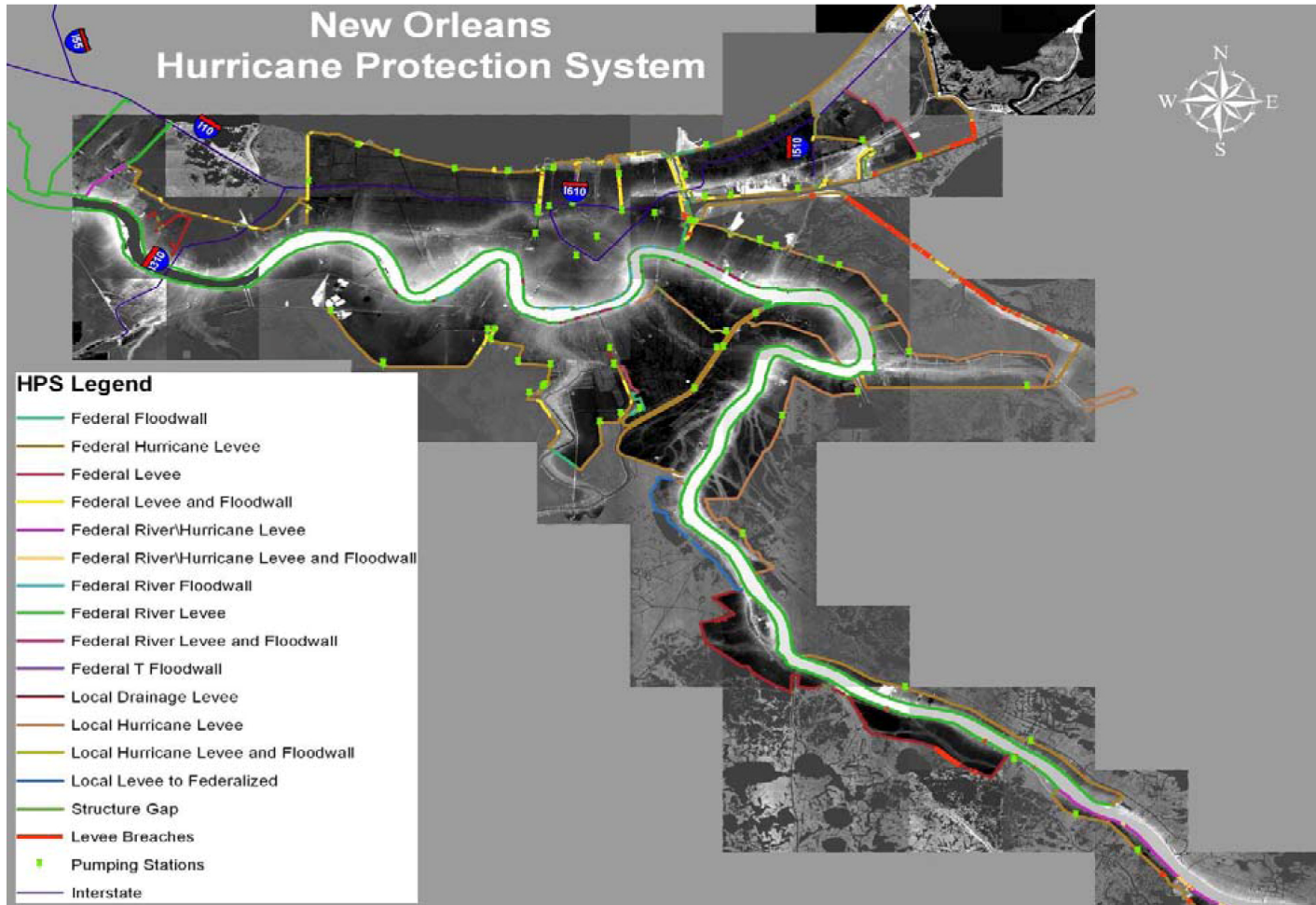


Figure 2: Inventory of existing levees.

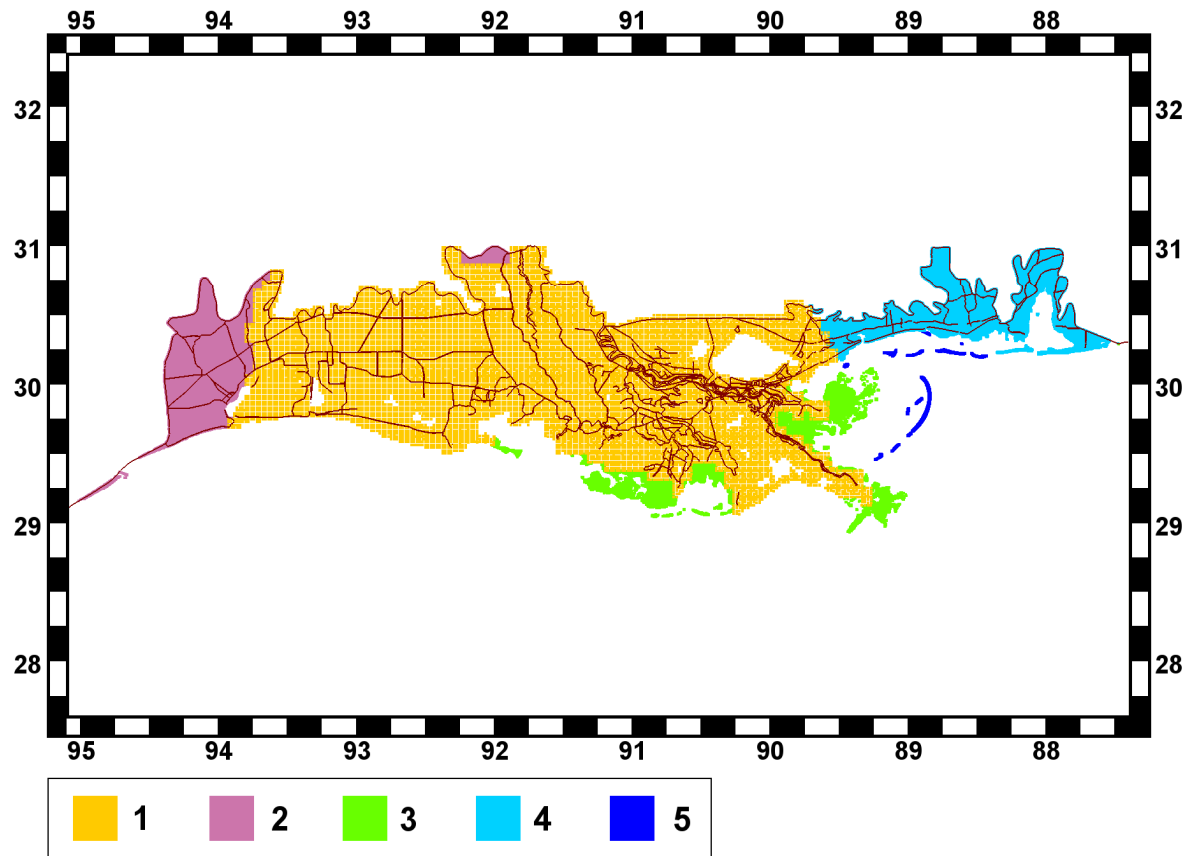


Figure 3: Topographic data source distribution.

Different colors indicate different sources. Color 1 = Atlas LIDAR DEM's, 5 m resolution (<http://atlas.lsu.edu/LIDAR>). Color 2 = USGS National Elevation Dataset, 30 m resolution (<http://gisdata.usgs.net/ned/>). Color 3 = USGS GAP data (<http://gapanalysis.nbi.gov/>). Color 4 = Topography received from "HMTAP TASK ORDER 18, MISSISSIPPI COASTAL ANALYSIS PROJECT, GEOSPATIAL TECHNOLOGY TASK PROJECT (TASK 3)," December 5, 2006. Color 5 = Various topographic sources. See Figure 4.

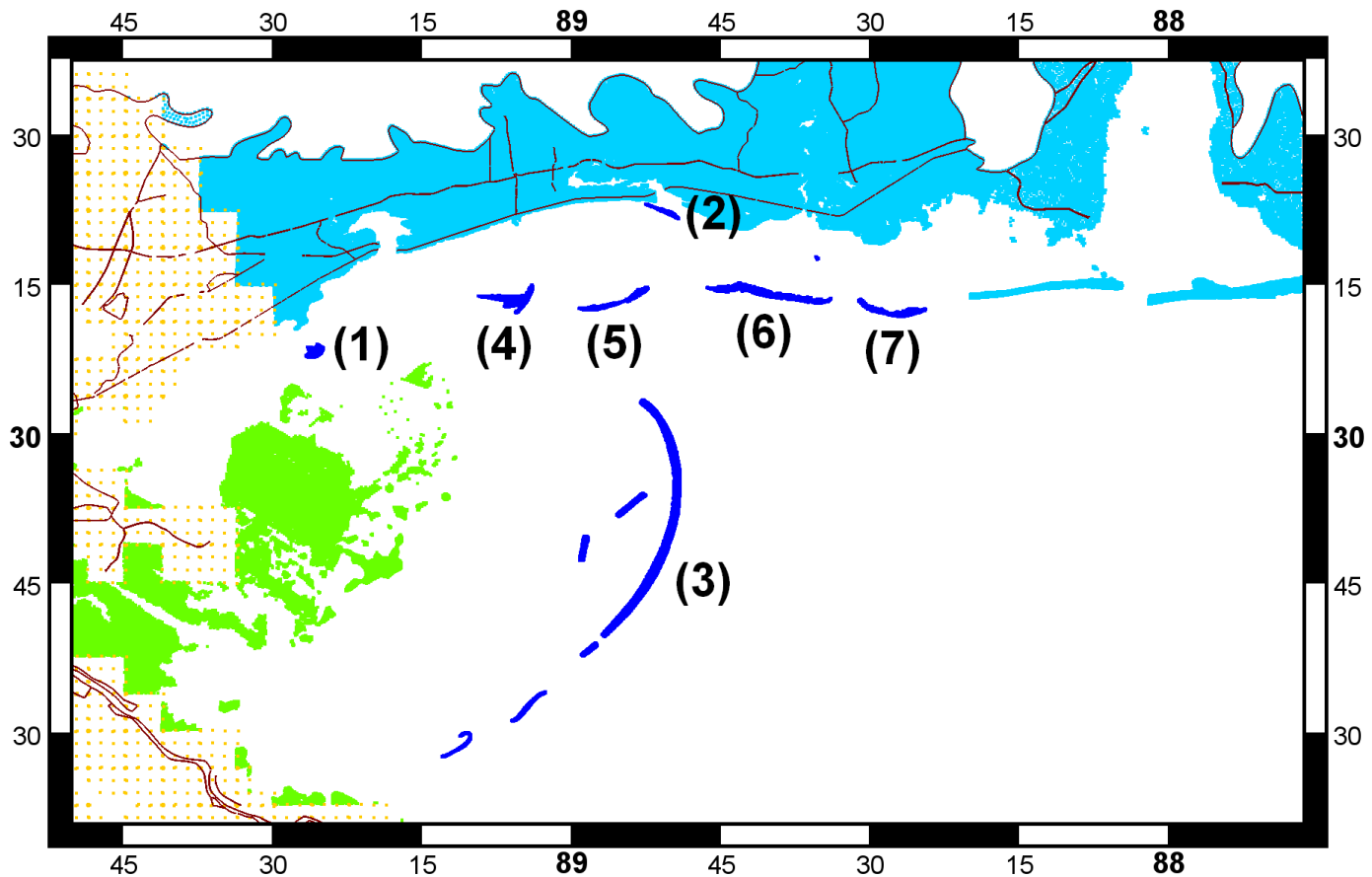


Figure 4: Topographic data sources for barrier islands on Louisiana and Mississippi coasts.

(1) Half Moon Island and (2) Deer Island – MARIS DEM's, 10 m resolution (<http://www.maris.state.ms.us/HTM/DownloadData/DEM.html>).
 (3) Chandeleur Islands – USGS Post-Katrina survey. (4) Cat Island, (5) Ship Island, (6) Horn Island, and (7) Petit Bois Island – Post-Katrina USACE Lidar Survey (ref: Jeff Lillycrop, USACE 2006).

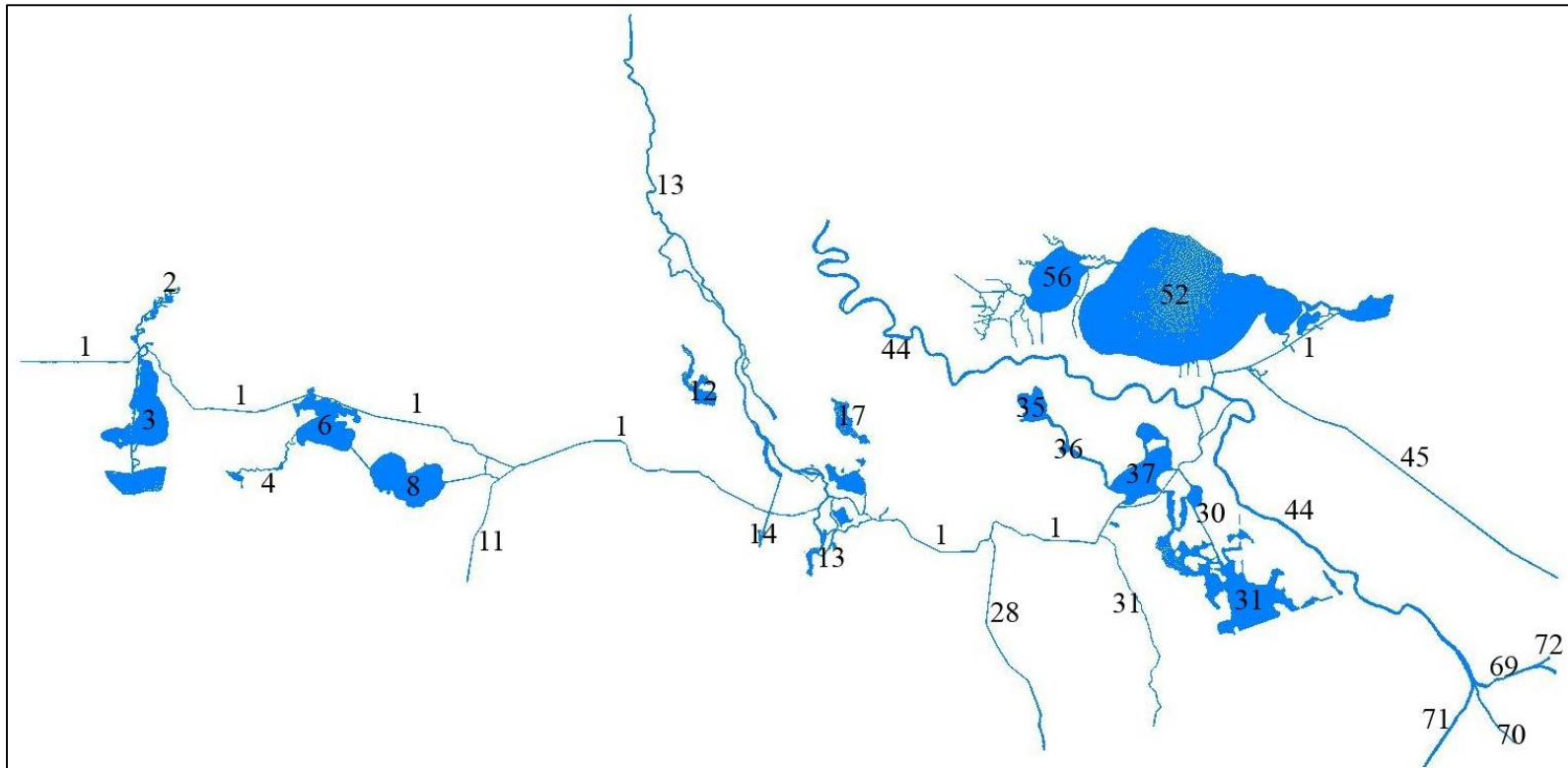


Figure 5: Individually meshed water bodies throughout Southern Louisiana.

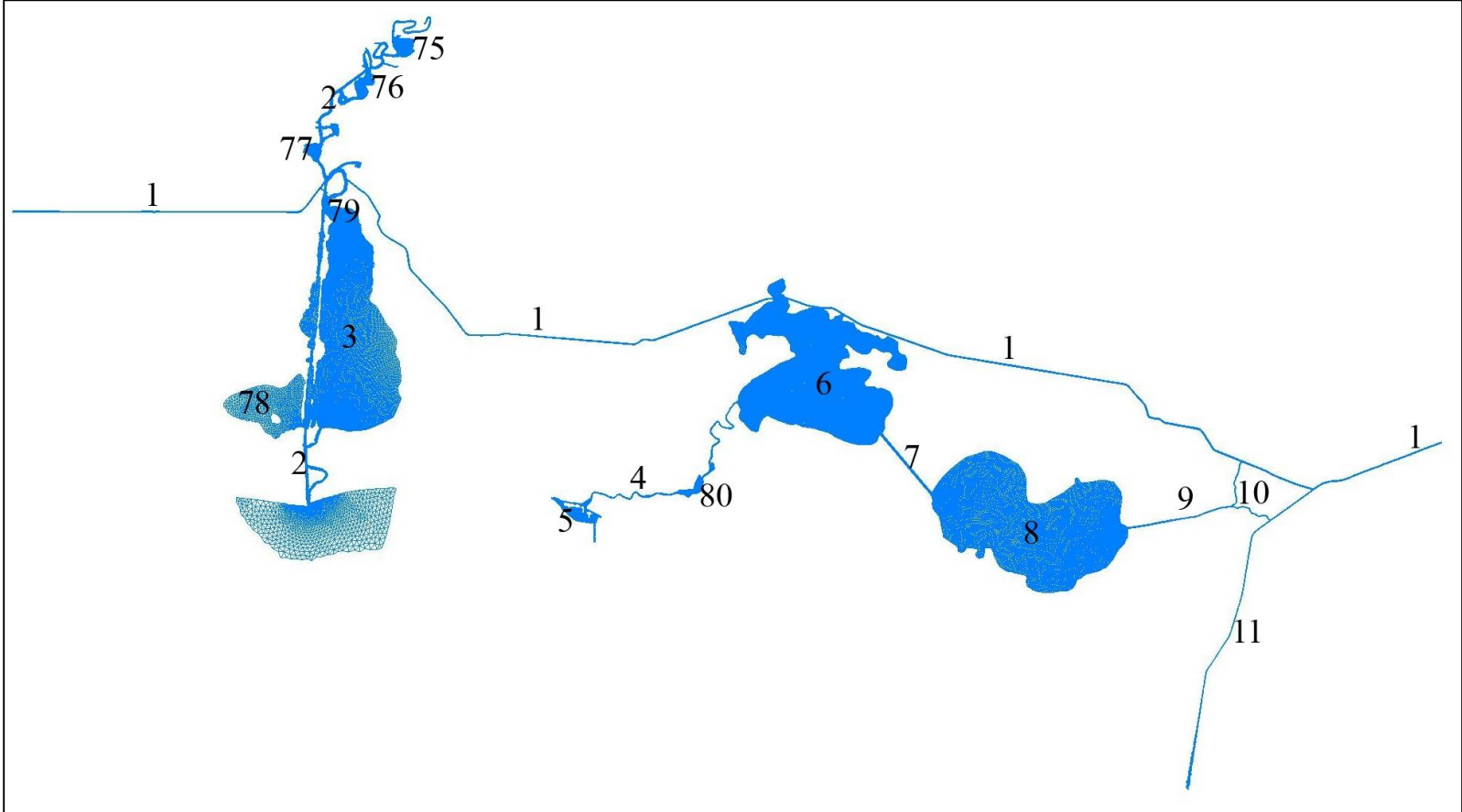


Figure 6: Individually meshed water bodies in Southwestern Louisiana.

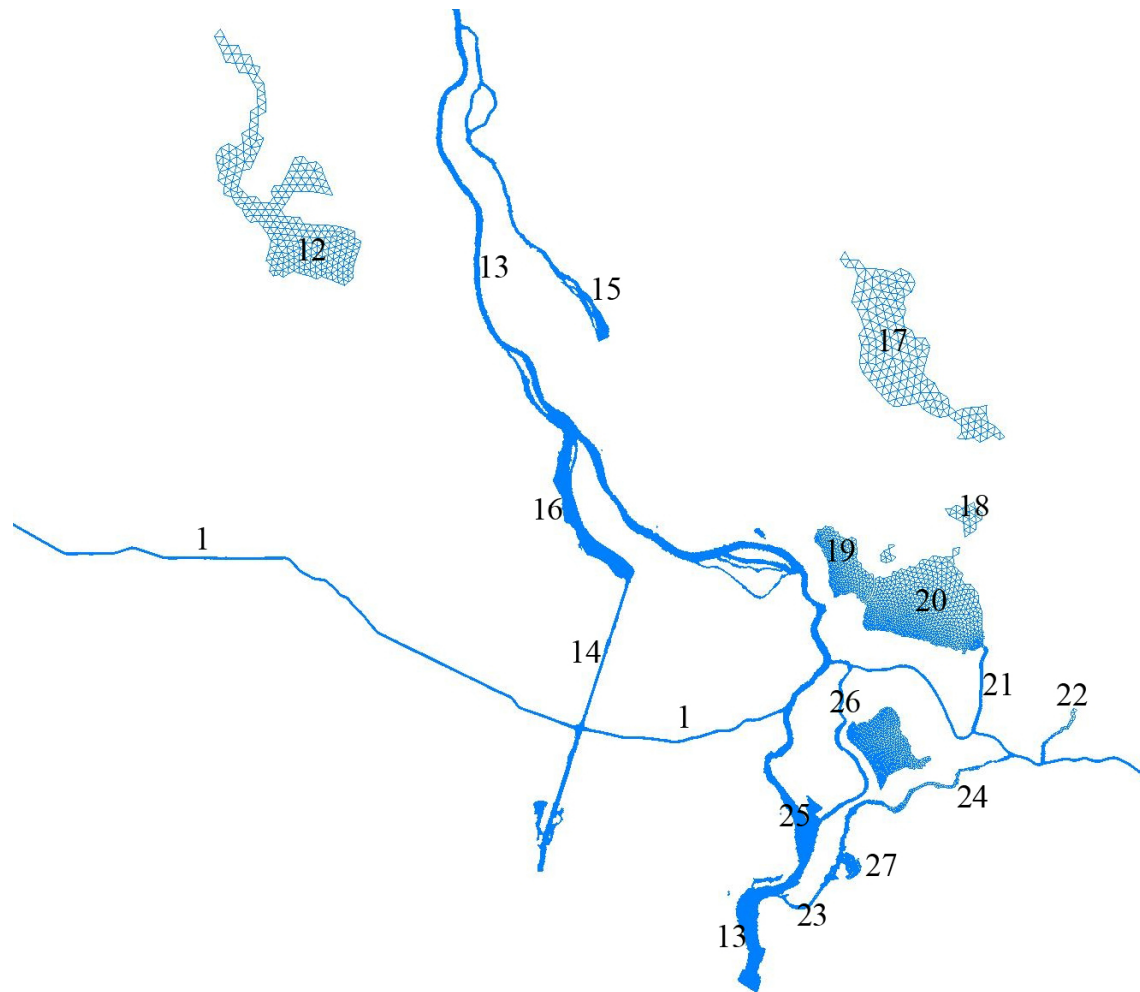


Figure 7: Individually meshed water bodies in the southern Atchafalaya Basin.

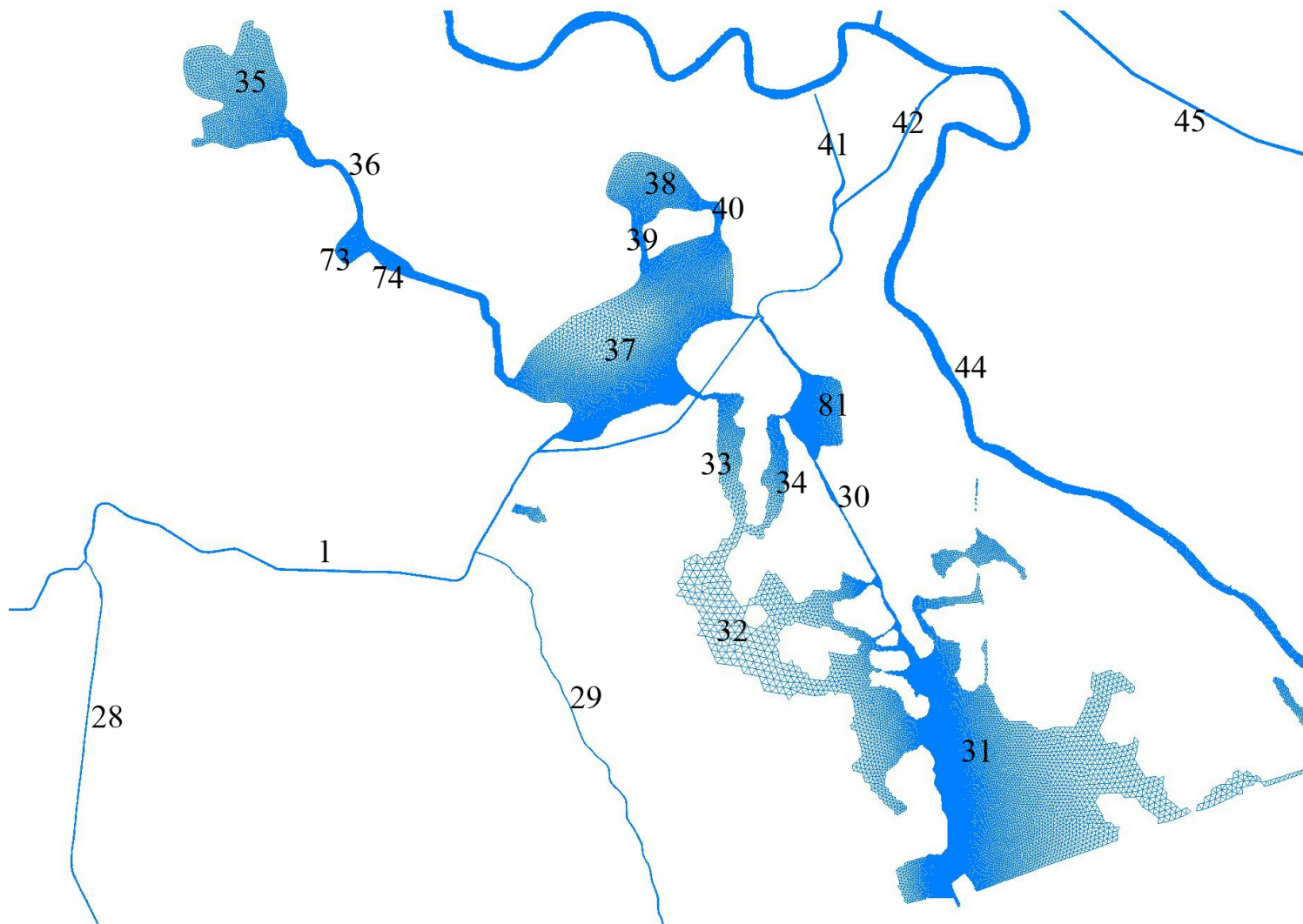


Figure 8: Individually meshed water bodies near Barataria Bay.

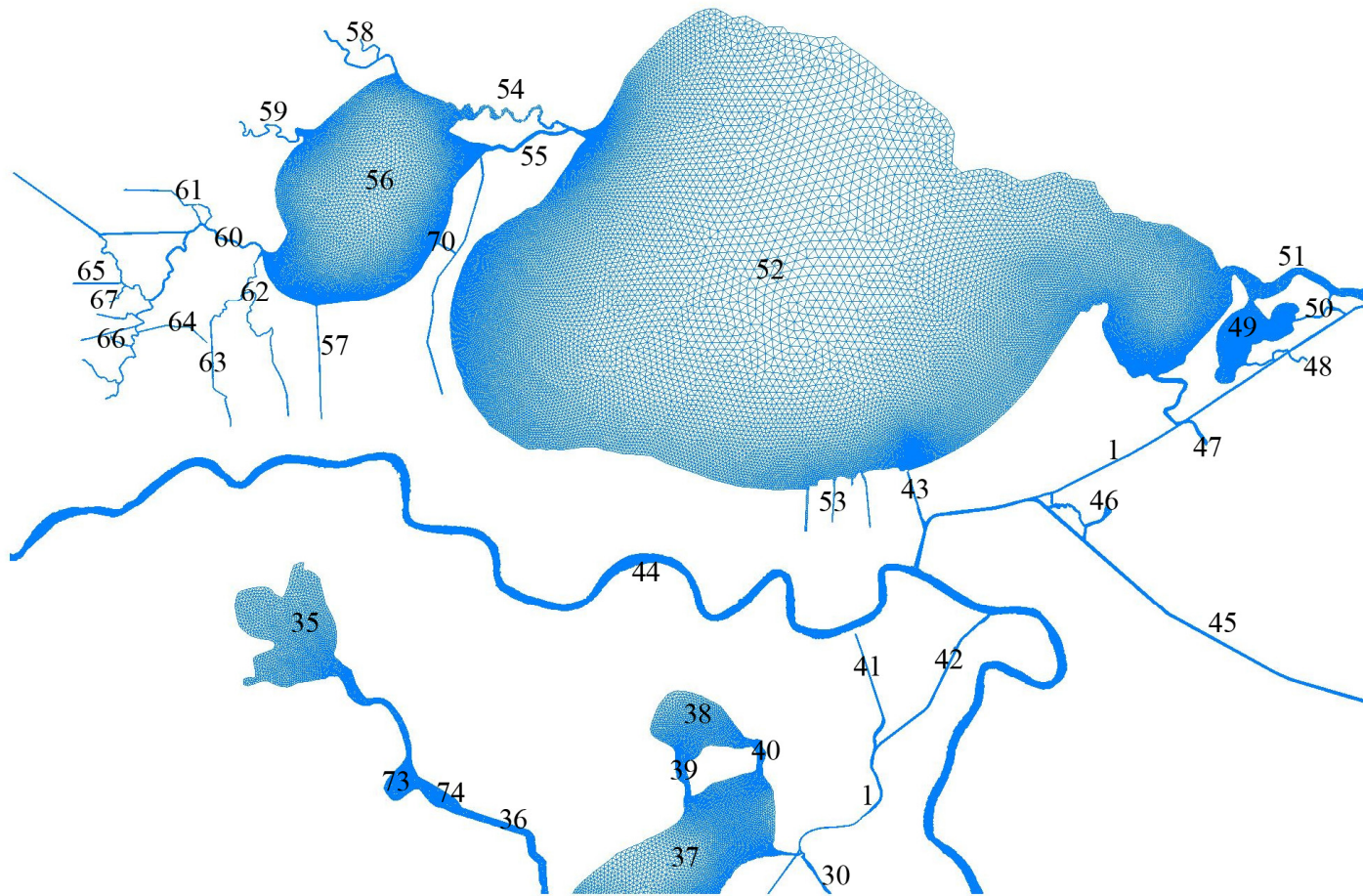


Figure 9: Individually meshed water bodies around New Orleans.

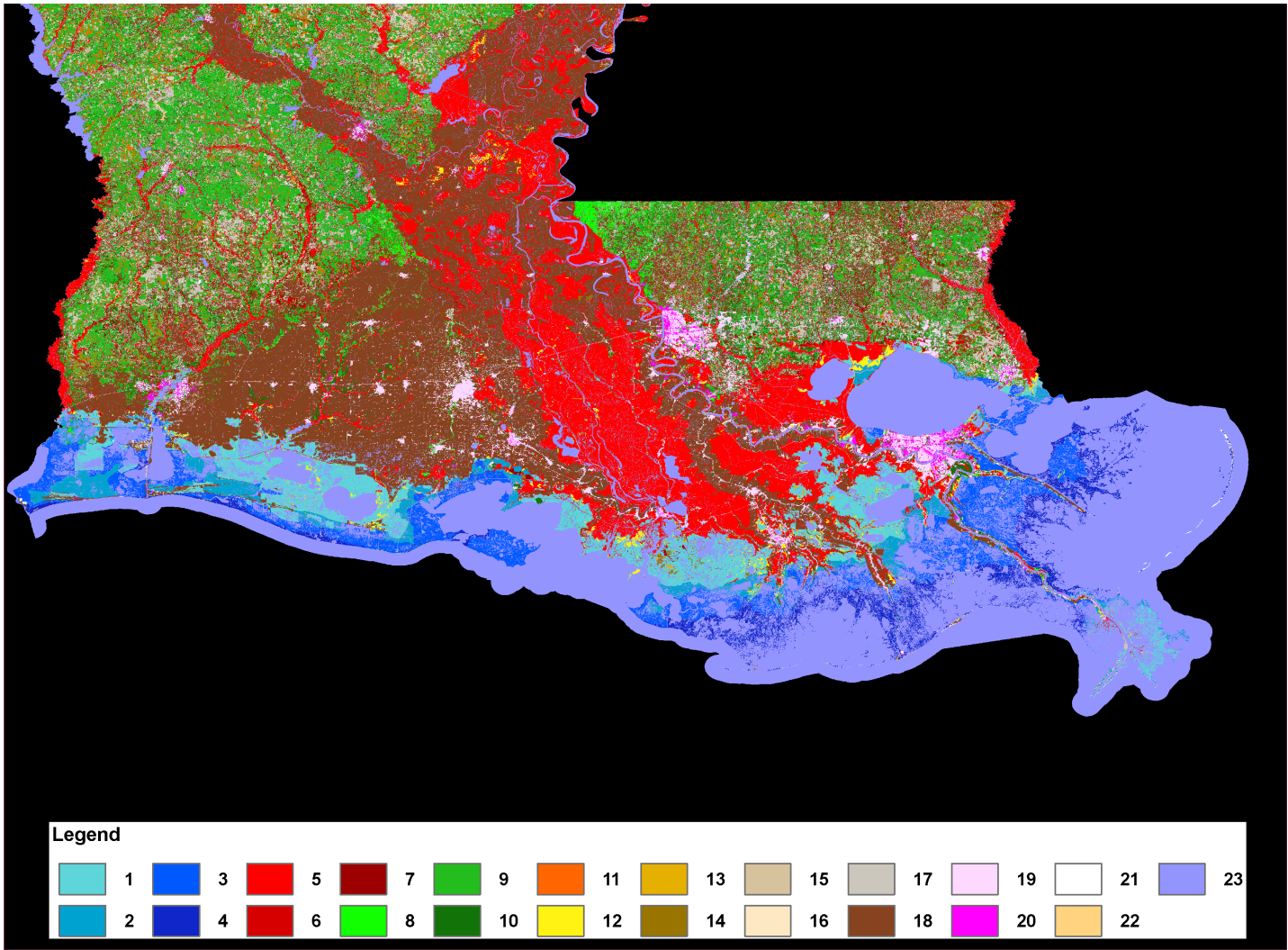


Figure 10: Louisiana Gap Analysis Program (LA-GAP) map.

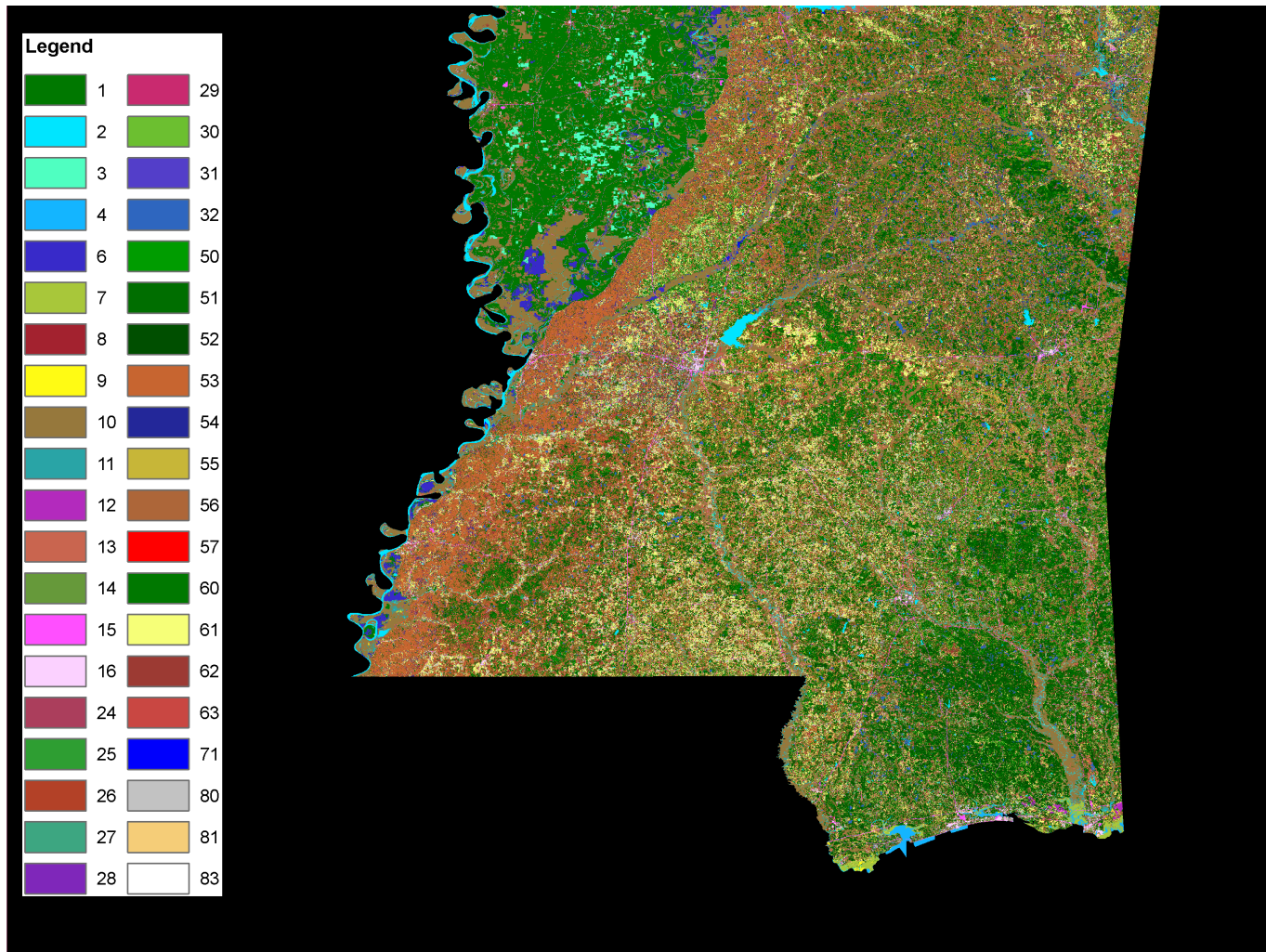


Figure 11: Mississippi Gap Analysis Program (MS-GAP) map.

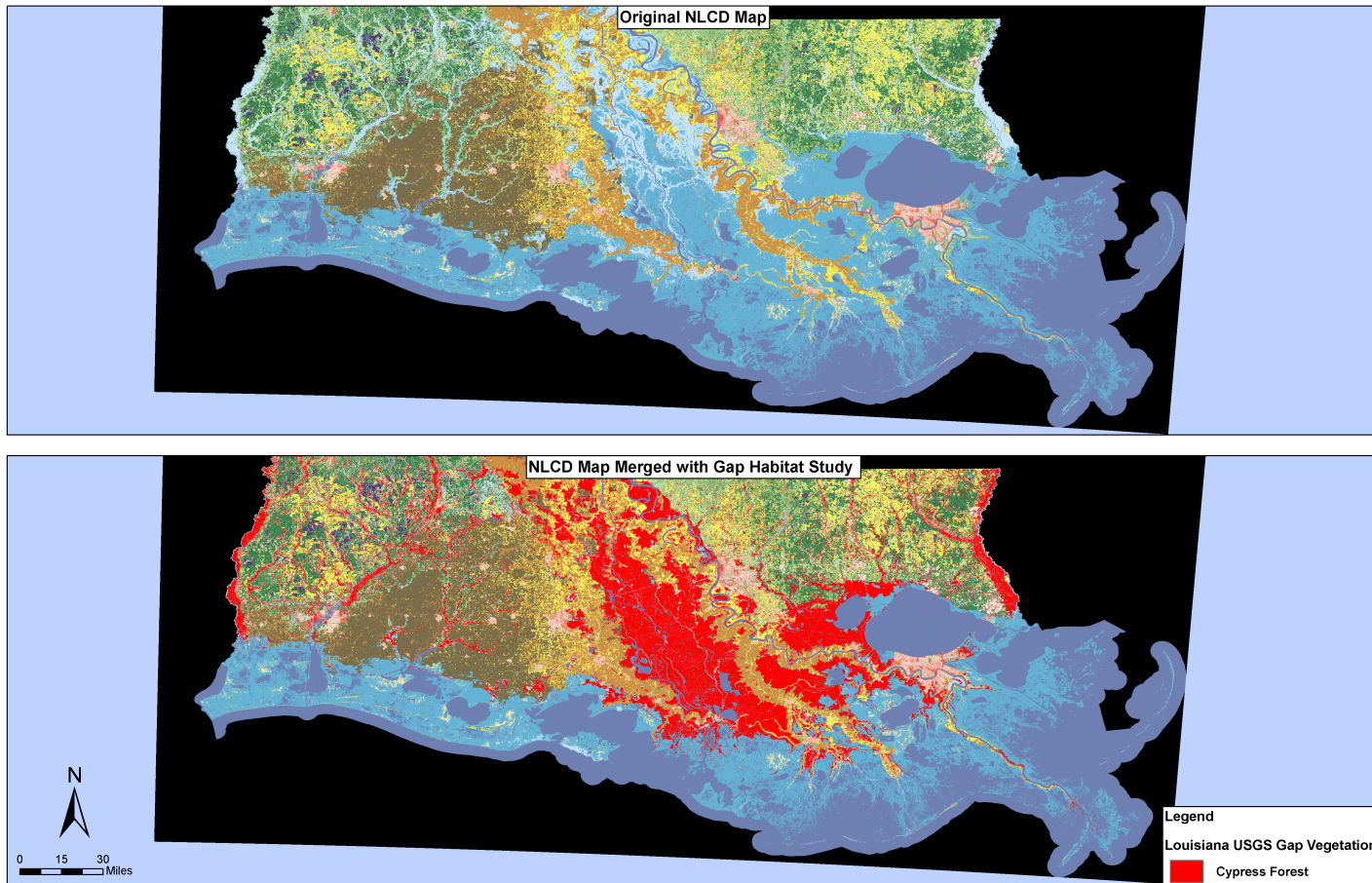


Figure 12: Louisiana National Land Cover Data (NLCD) and enhanced NLCD map.

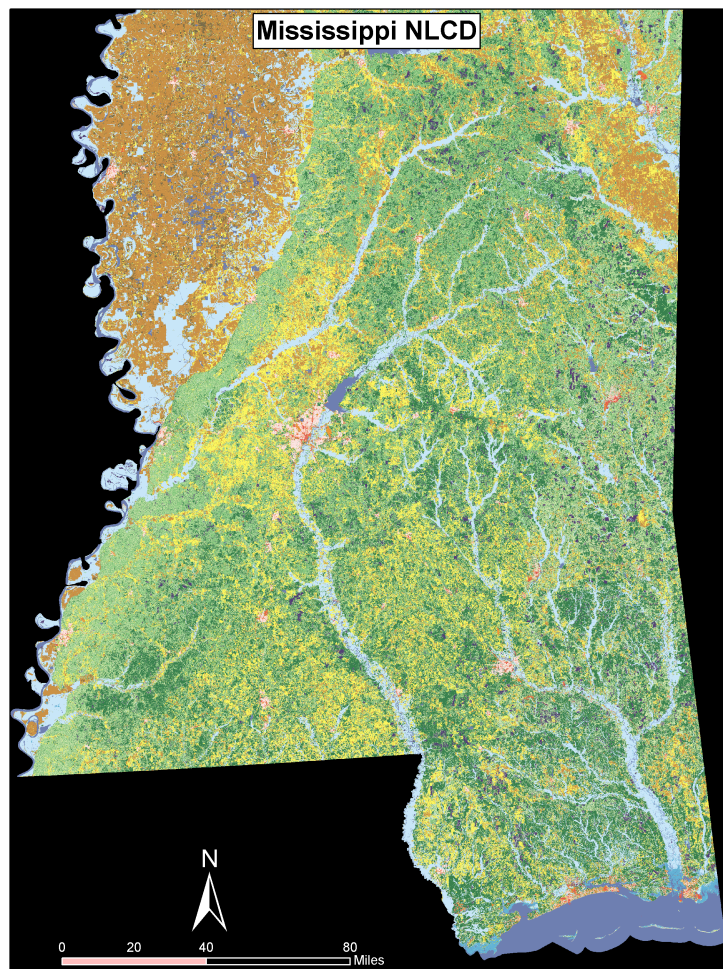


Figure 13: Mississippi National Land Cover Data map.

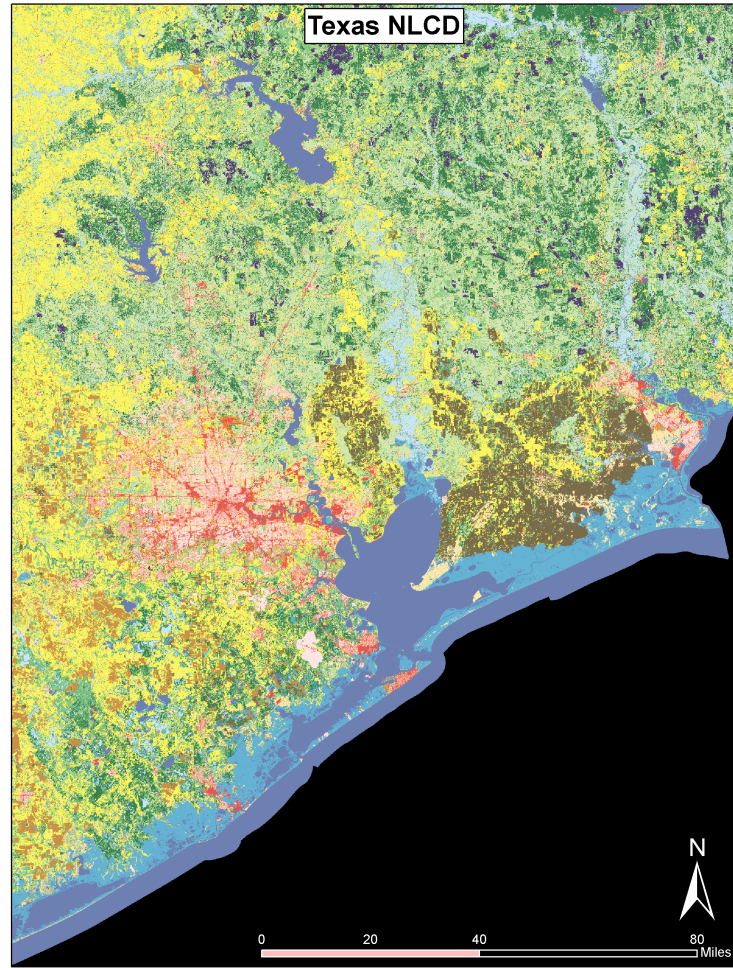


Figure 14: Texas National Land Cover Data map.

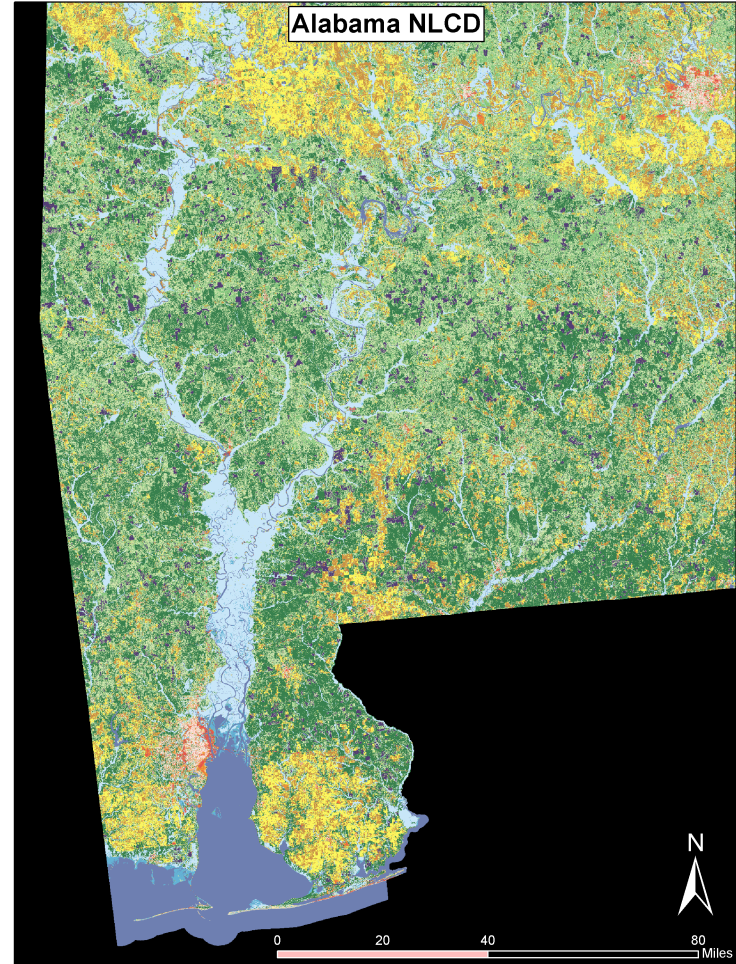
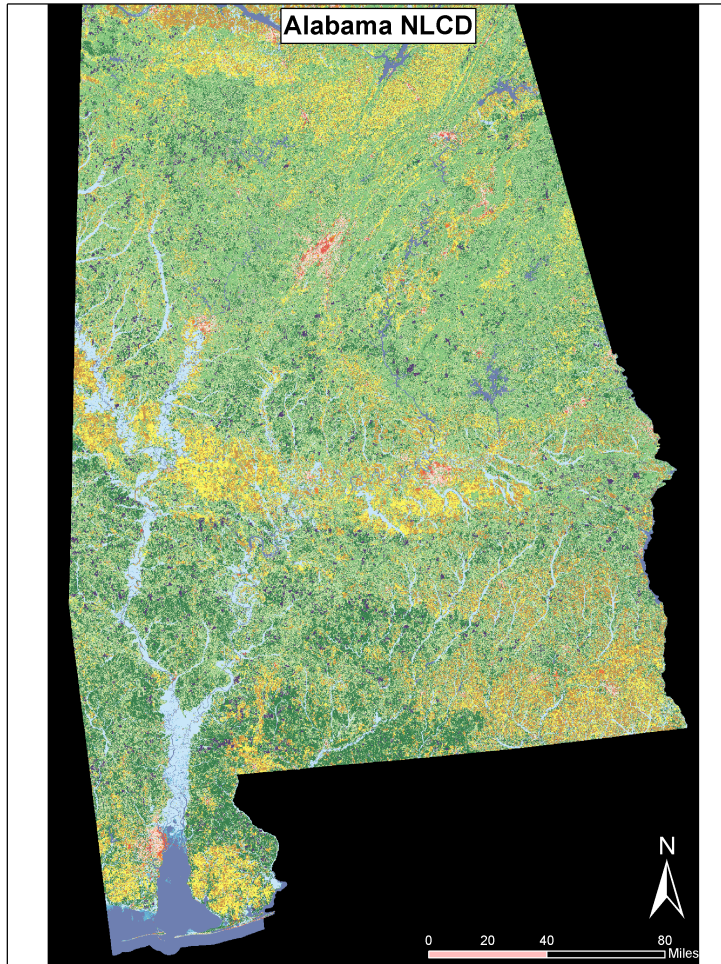


Figure 15: Alabama National Land Cover Data map.






















National Land Cover Dataset Classification System Legend		
Color Key	RGB Value	Class Number and Name
	102, 140, 190	11 - Open Water
	255,255,255	12 - Perennial Ice/Snow
	253, 229, 228	21 - Low Intensity Residential
	247, 178, 159	22 - High Intensity Residential
	231, 86, 78	23 - Commerical/Industrial/Transportation
	210, 205, 192	31 - Bare Rock/Sand/Clay
	175, 175, 177	32 - Quarries/Strip Mines, Gravel Pits
	83, 62, 118	33 - Transitional
	134, 200, 127	41 - Deciduous Forest
	26, 129, 78	42 - Evergreen Forest
	212, 231, 177	43 - Mixed Forest
	220, 202, 143	51 - Shrubland
	187, 174, 118	61 - Orchards/Vineyards
	253, 233, 170	71 - Grasslands/Herbaceous
	252, 246, 93	81 - Pasture/Hay
	202, 145, 71	82 - Row Crops
	121, 108, 75	83 - Small Grains
	244, 238, 203	84 - Fallow
	240, 156, 054	85 - Urban/Recreational Grasses
	201, 230, 249	91 - Woody Wetlands
	144, 192, 217	92 - Emergent Herbaceous Wetlands

Figure 16: National Land Cover Data Classifications used in Figures 12 through 15.

(Additional red classification in the Louisiana map is Cypress Forest).

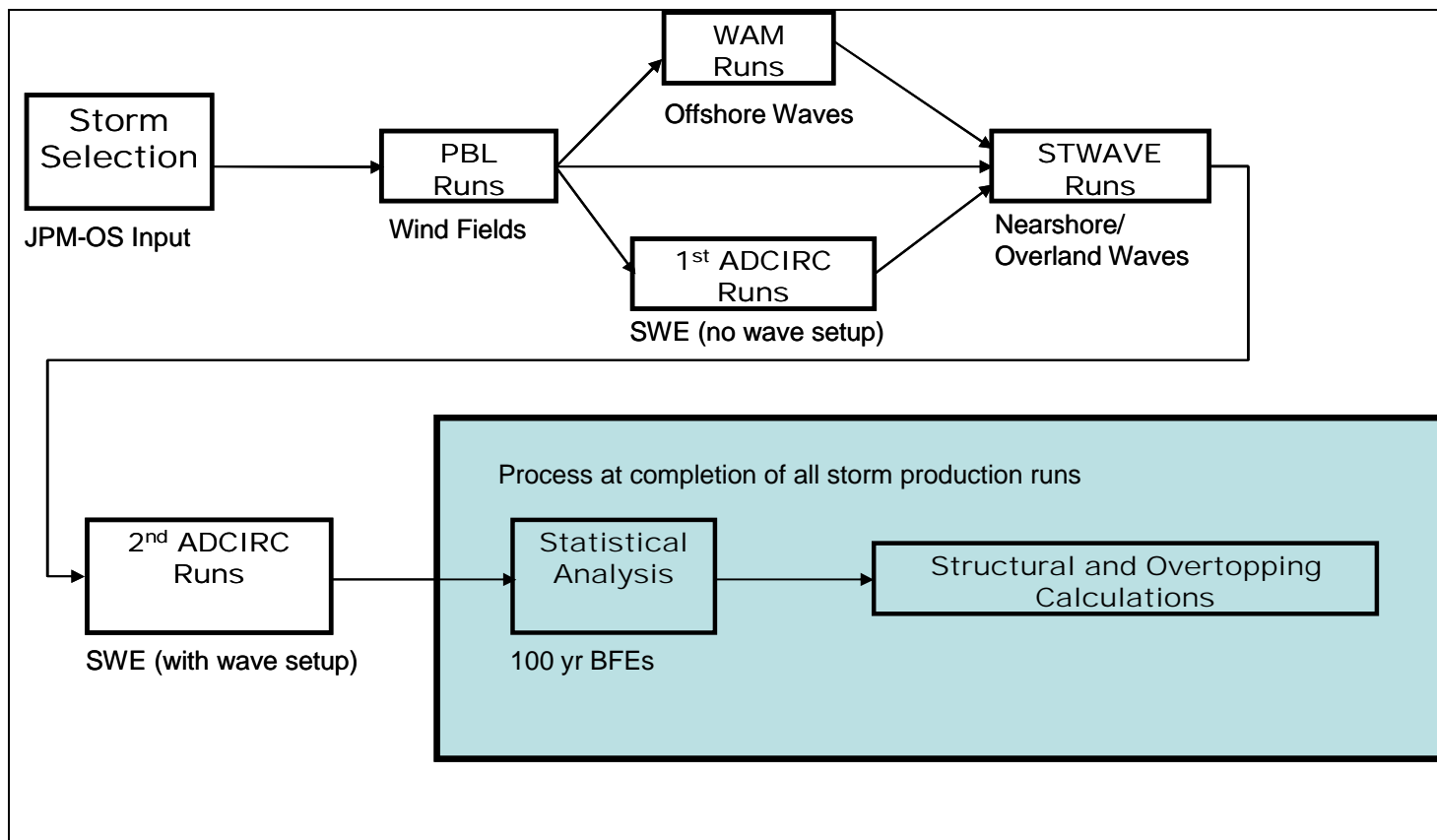


Figure 17: Process flow diagram.

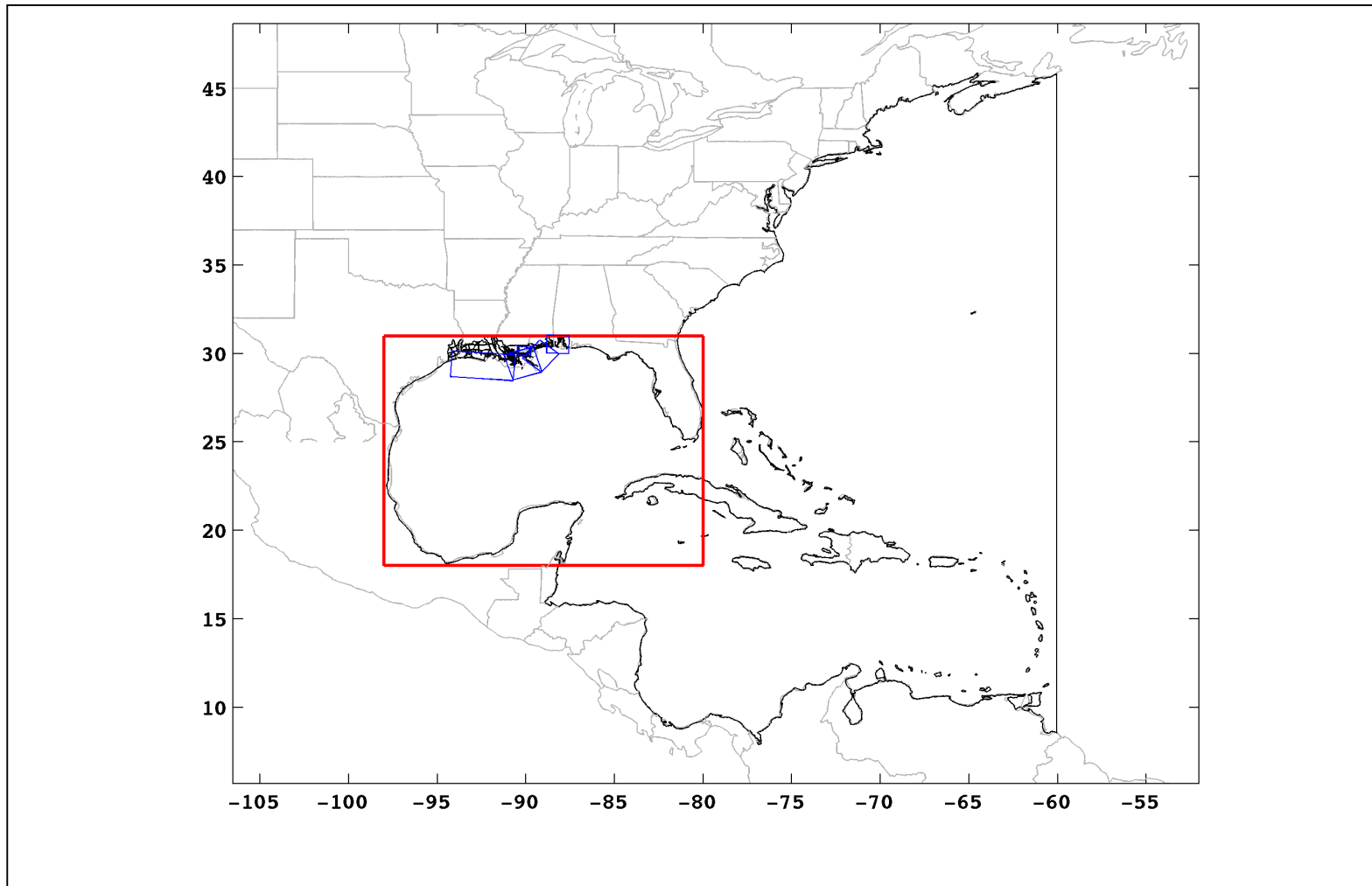


Figure 18: Footprints of the various model domains for the coupled ADCIRC/STWAVE system.

ADCIRC, OWI/PBL, and STWAVE grid boundaries are shown in black, red, and blue, respectively.

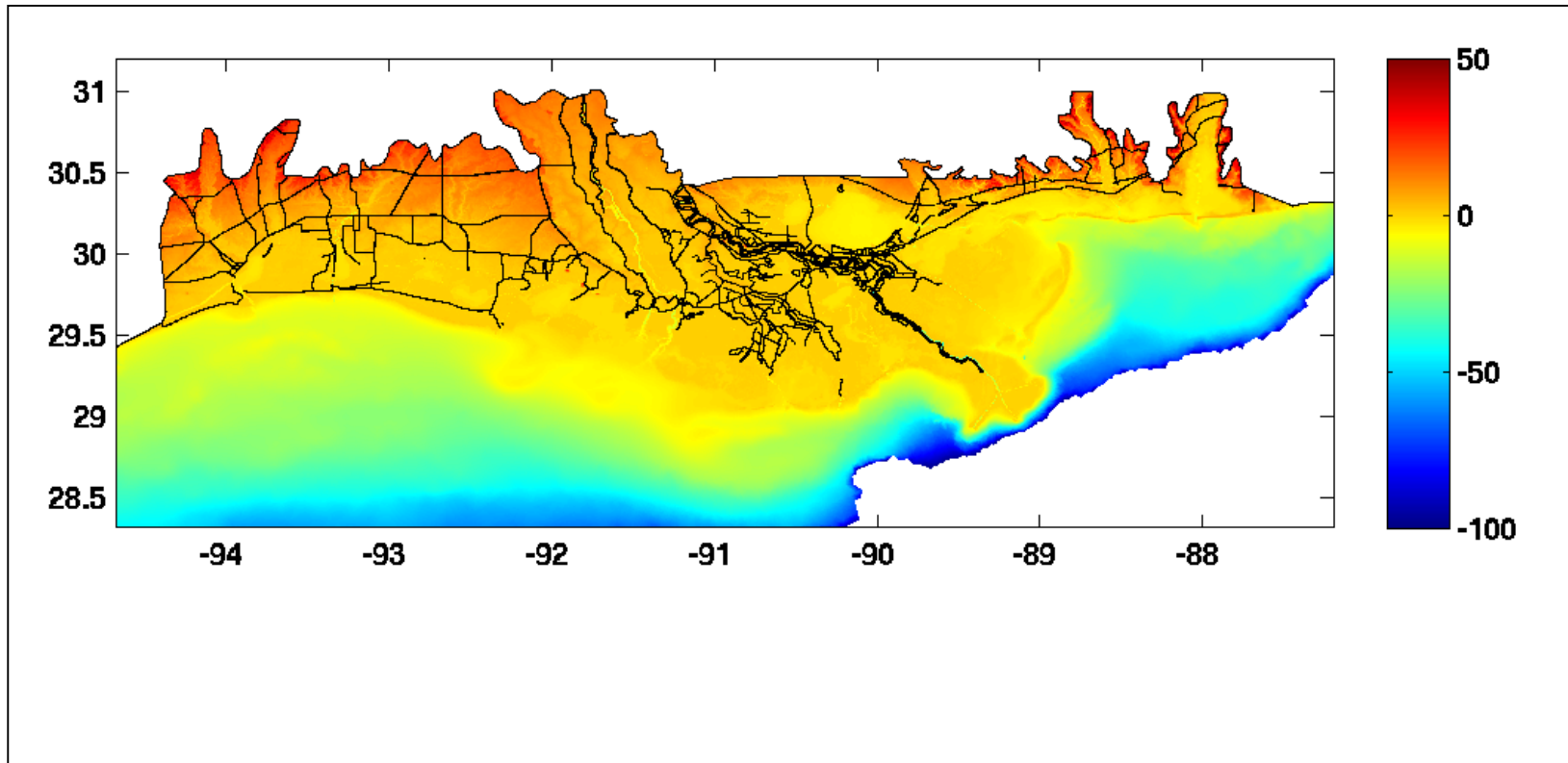


Figure 19: ADCIRC bathymetry (in meters) for the SL15 grids along the northern Gulf of Mexico coast.

In this image, the bathymetry is clipped at -100 meters for display purposes. Each of the SL15 grids, for the 2005, 2007, and 2010 simulation sets has details that are not discernable at this scale shown.

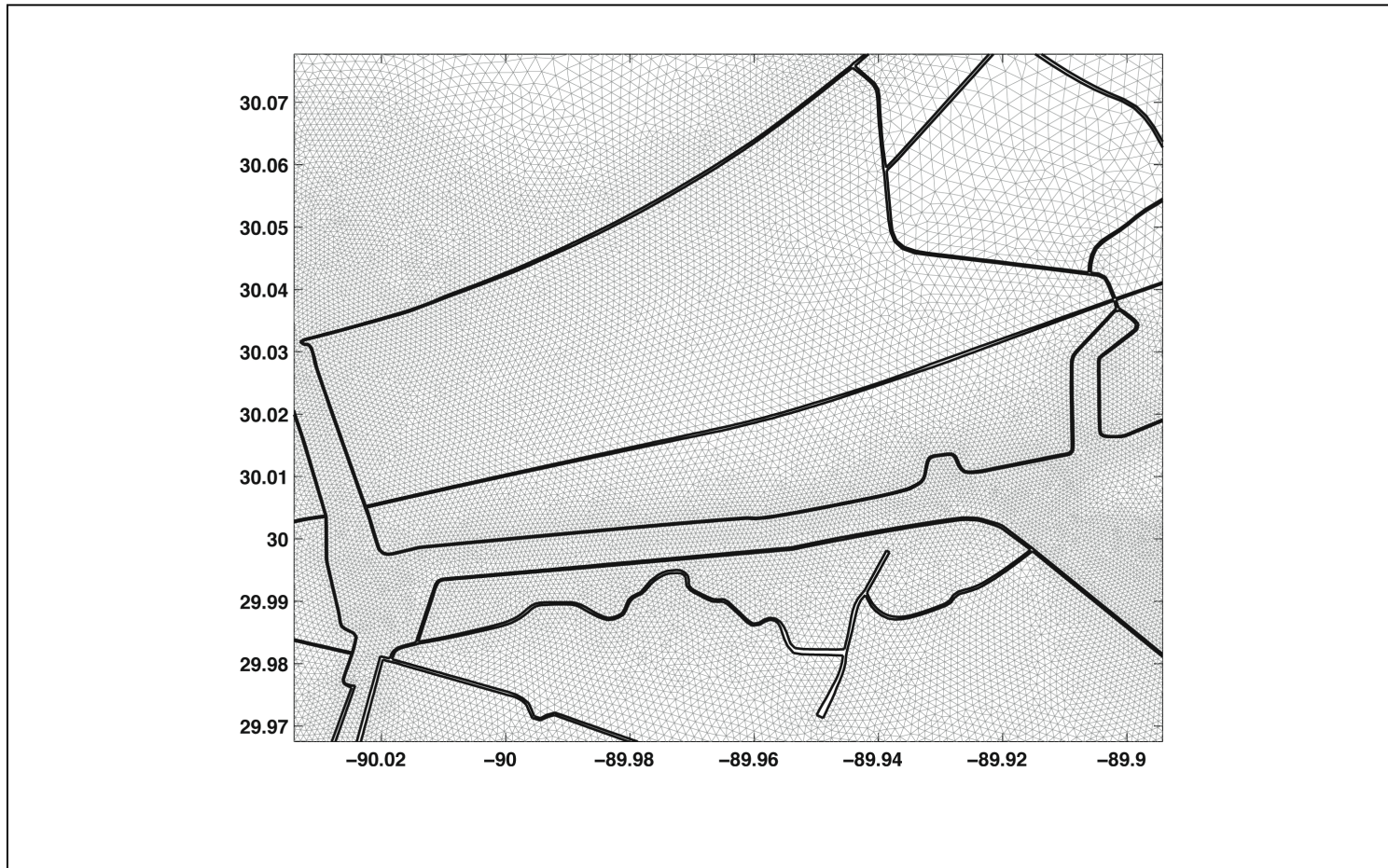


Figure 20: ADCIRC grid detail in the New Orleans East area.

The solution is computed at the vertex of each triangle, and the thick black line is the model boundary. Weir boundary conditions are applied at the boundaries shown in this image.

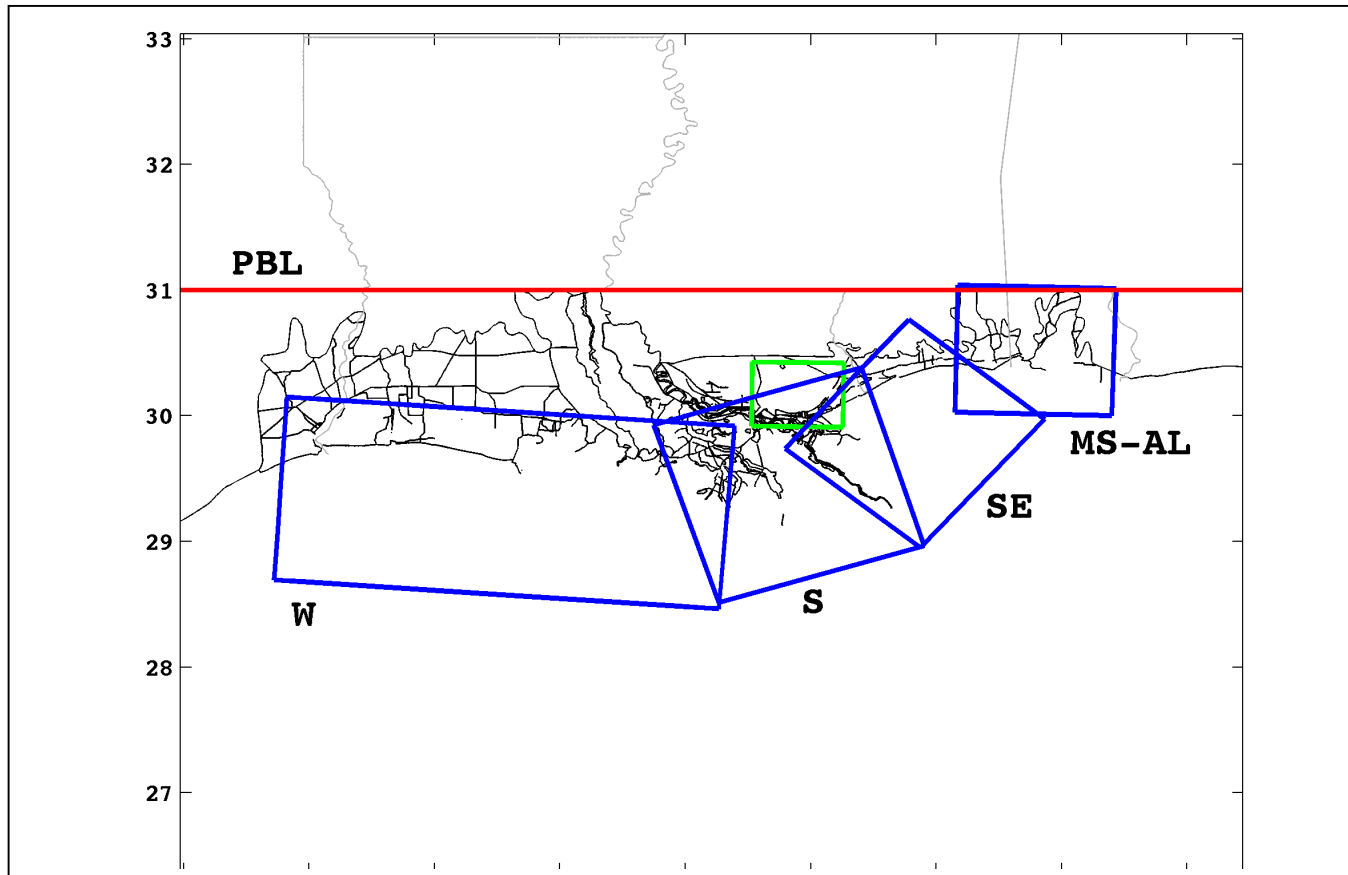


Figure 21: Boundaries of the five STWAVE model domains and the PBL wind model northern extent (red) used in the current implementation of the production simulation system.

The ADCIRC grid boundary is also shown (black) for one of the production grids. The Lake Pontchartrain (in green and not labeled) simulations use the full-plane STWAVE version; the other domains use the half-plane STWAVE. The "W" west grid is used in the LAWEST simulations, but not in the LAEAST simulations. The specific STWAVE grids to use for a specific simulation are a configurable part of the system.

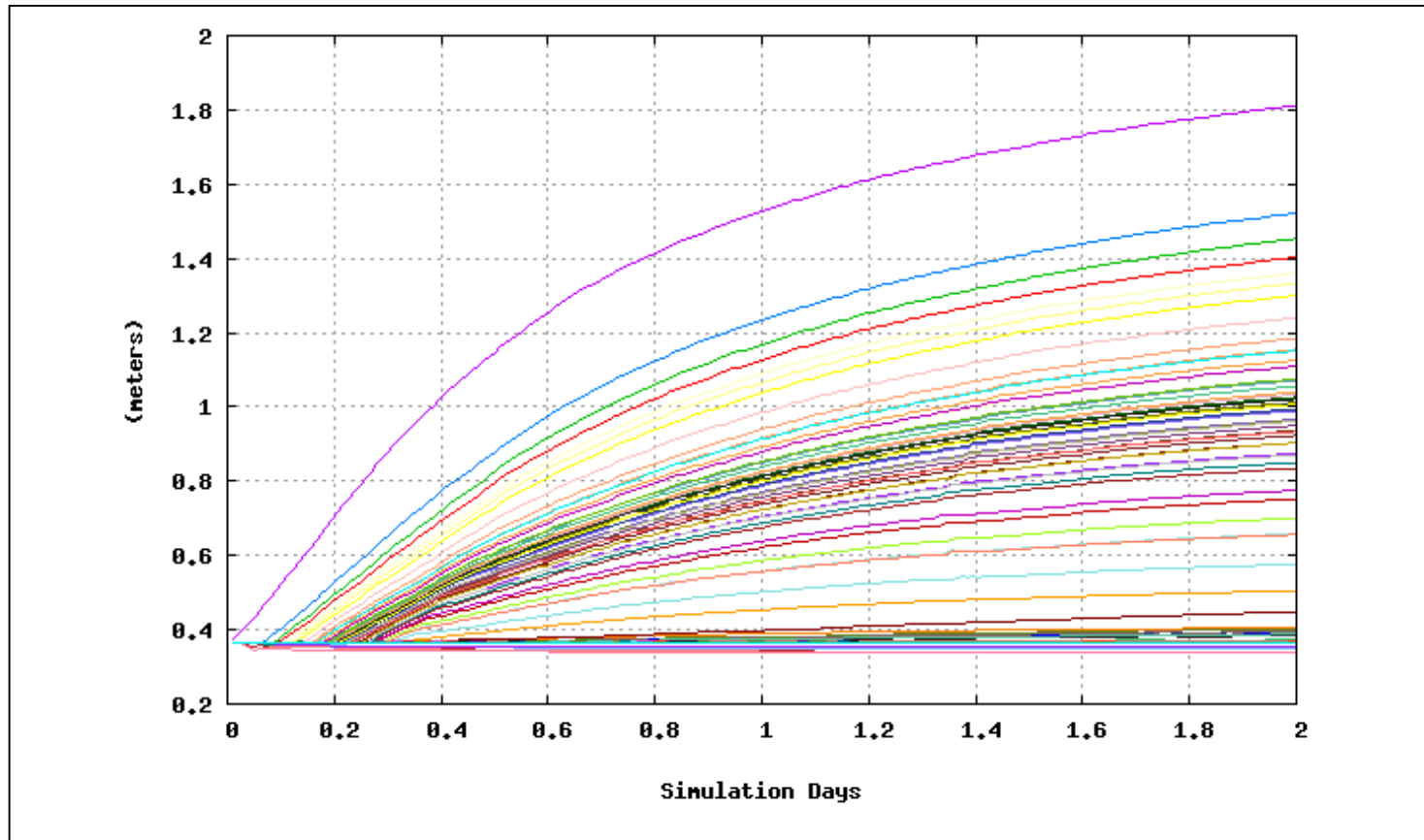


Figure 22: Water elevations along the Mississippi and Atchafalaya rivers showing the spin-up of the initial condition.

This solution is driven in volume fluxes across the open boundary on the two rivers. This discharge is ramped up over the first 0.5 day. The maximum elevation reached at the top of the Mississippi River is 1.84 meters.

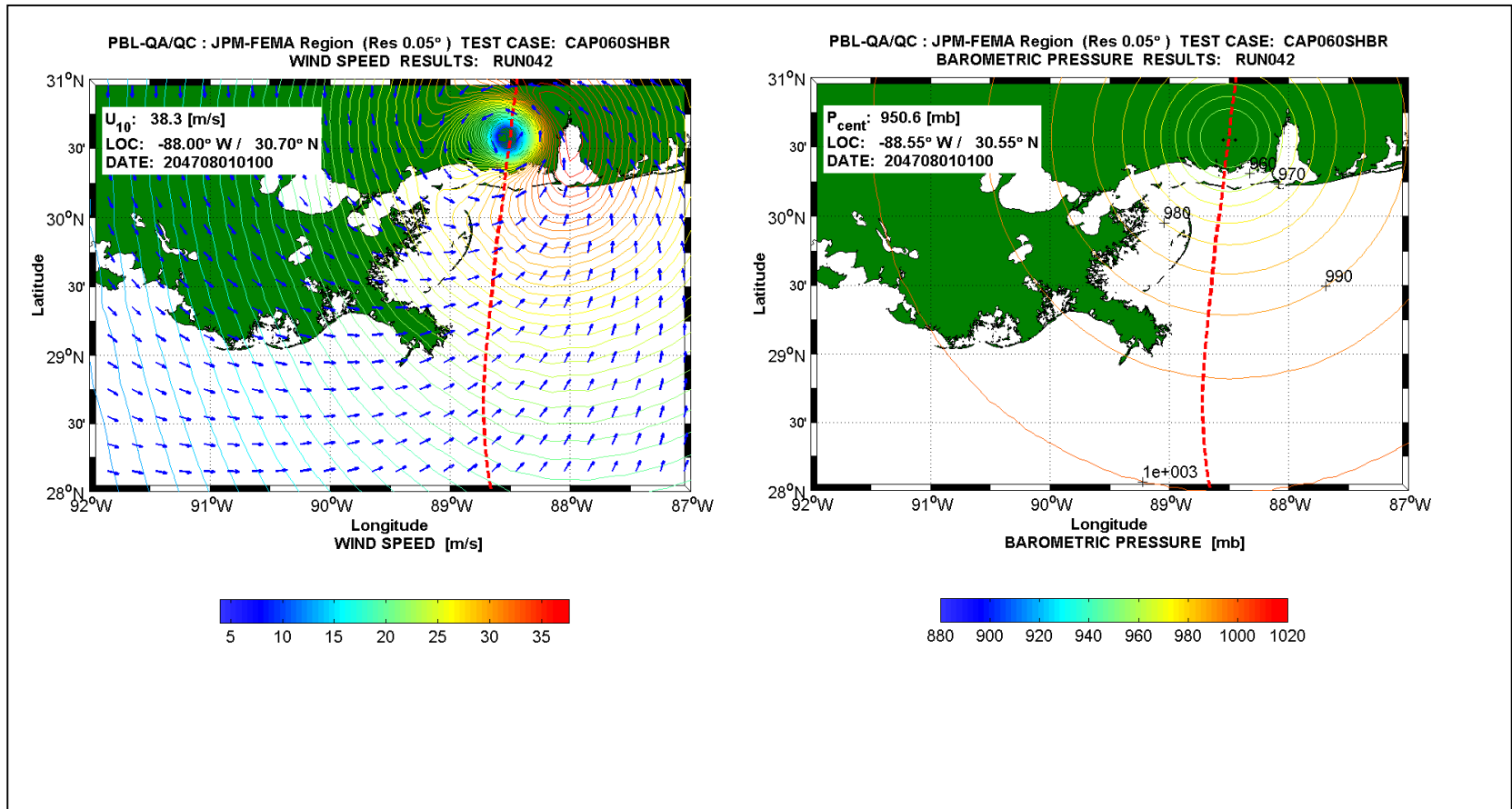


Figure 23: Wind (left) and pressure (right) fields for storm 042 at landfall.

The storm track is shown with the dashed, red line. The fields are computed with the Ocean Weather Planetary Boundary Layer (PBL) model, and are used to drive the far-field wave model WAM and ADCIRC. The wind field information is passed to STWAVE through the ADCIRC global output wind file fort.74.

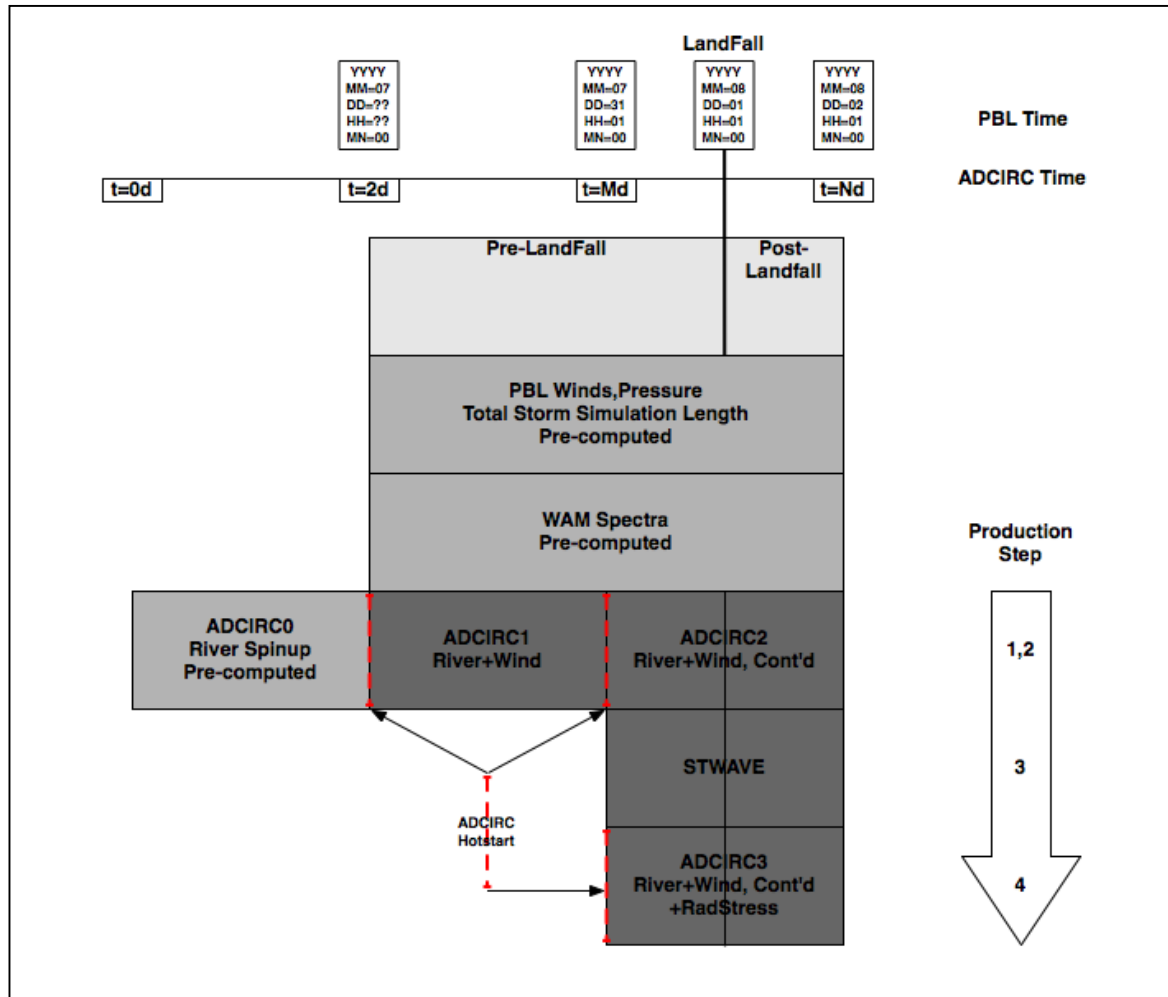


Figure 24: Timeline for Production System simulations.

The timeline for the wind forcing (PBL) is shown at the top. PBL winds and pressures are used to drive both the WAM wave model and the ADCIRC/STWAVE simulations. Specification of the PBL and WAM fields is a required input to the Production System.

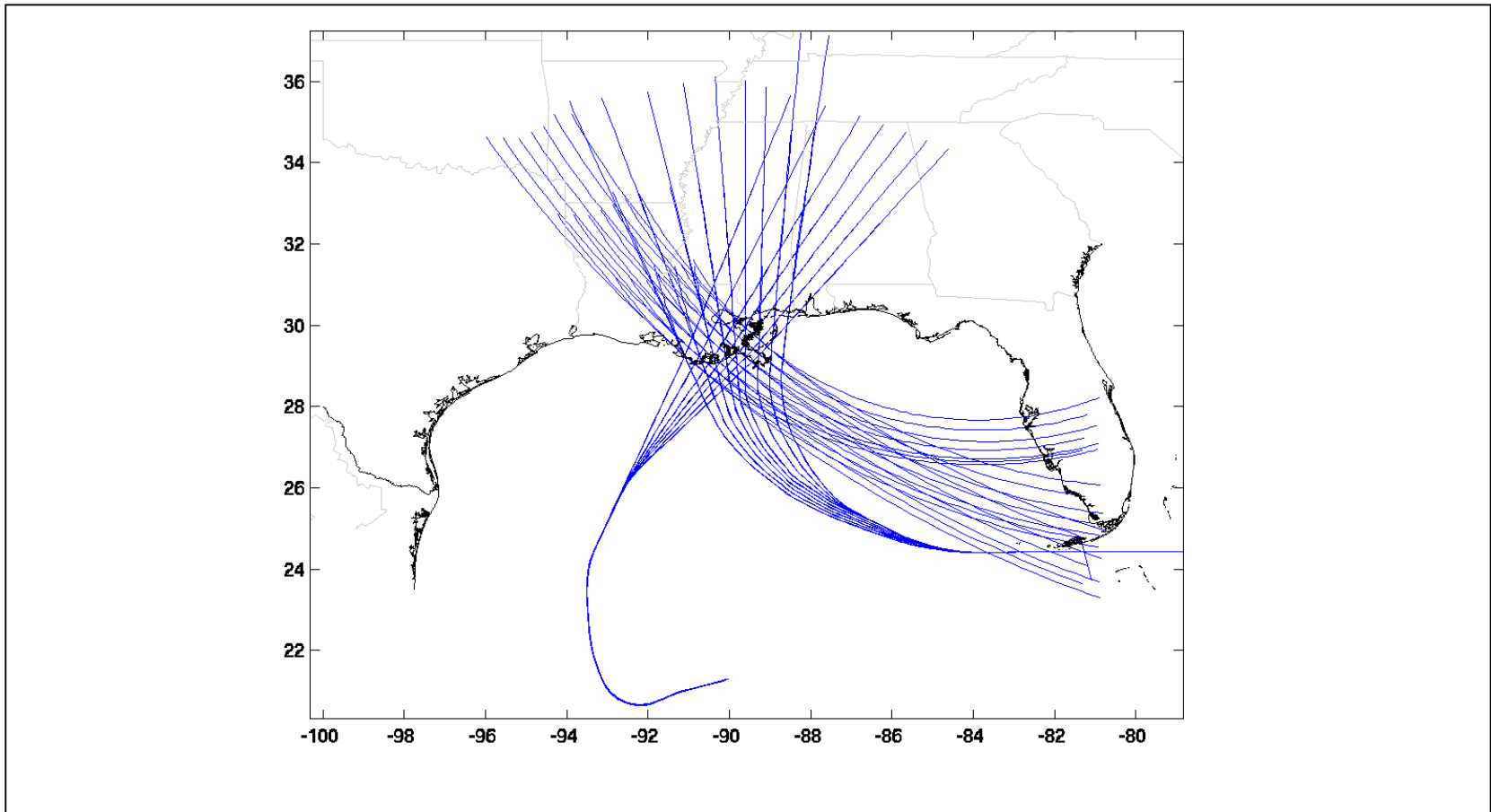


Figure 25: Tracks used to define the 152 Louisiana Coastal Protection and Restoration storms.

Hurricane parameters vary along the tracks, and provide the input to the OceanWeather, Inc., PBL wind/pressure field model. This provides the storm forcing required for each production system simulation.

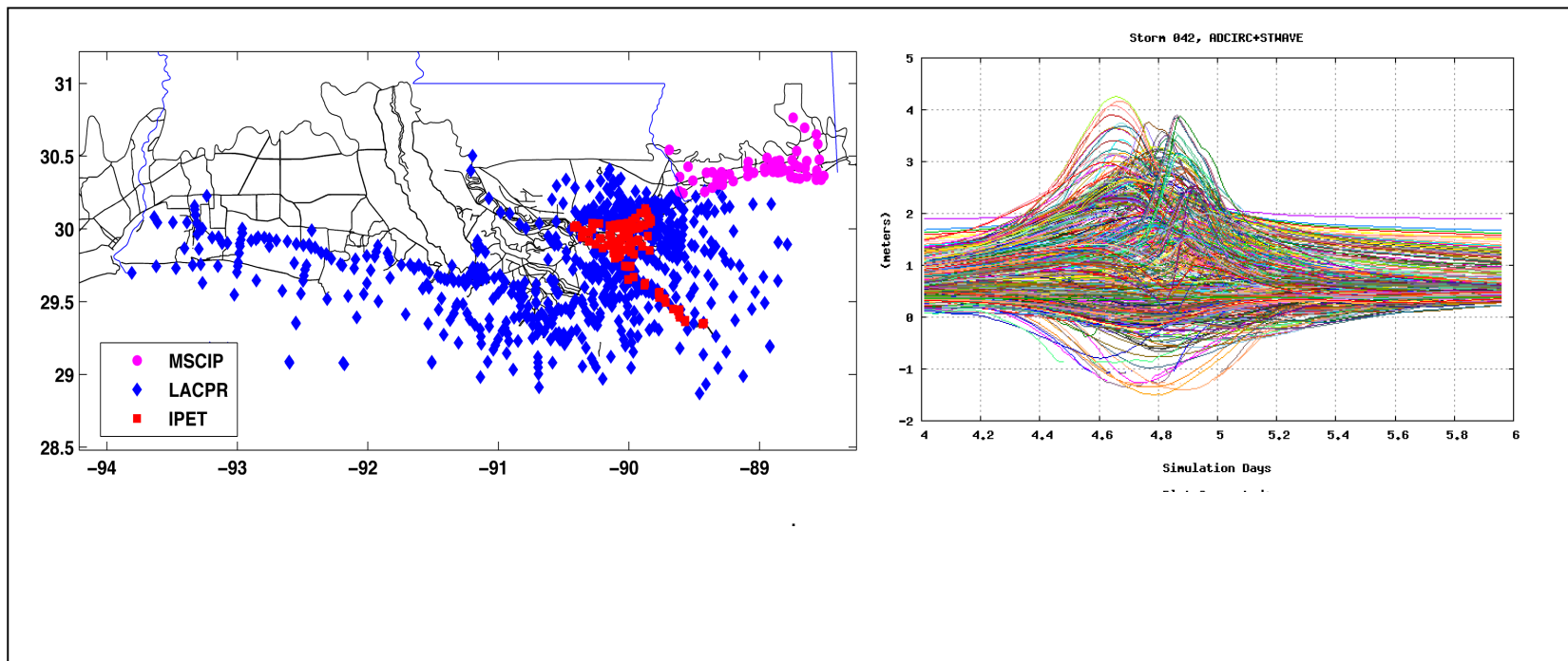


Figure 26: (Left) ADCIRC solution sampling points that define the station output in the fort.61 file. The global model solution is interpolated to these locations and output for QA/QC visualization and analysis. (Right) Hydrograph plot generated by plotfort61.pl, for the ADCIRC3 step of the production system, for storm 042.

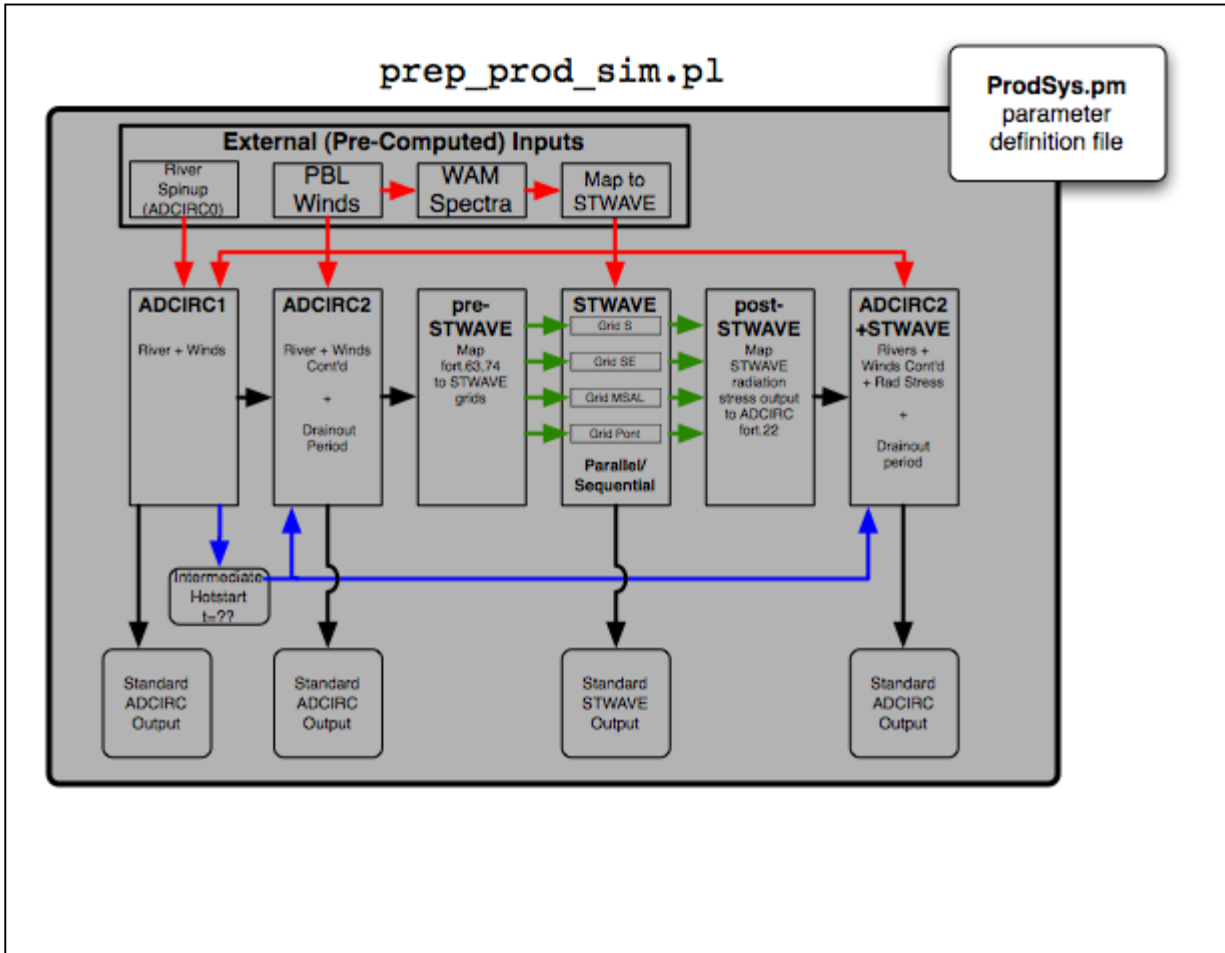


Figure 27: Data flow controlled by the Production System script `prep_prod_sim.pl`.

Pre-computed inputs are shown at the top with red arrows. The middle row of boxes corresponds to the four steps, where the STWAVE step includes interpolation from ADCIRC to the STWAVE grids, the STWAVE simulations, and the interpolation back to ADCIRC. ADCIRC2+STWAVE is the "ADCIRC3" step. Blue lines indicate the ADCIRC hotstart file process. Parameters that are the same for all simulations are defined in the `ProdSysDef.pm` file and read by `prep_prod_sim.pl` at runtime.