



GIS for the Gulf: a Reference Database for Hurricane-affected Areas

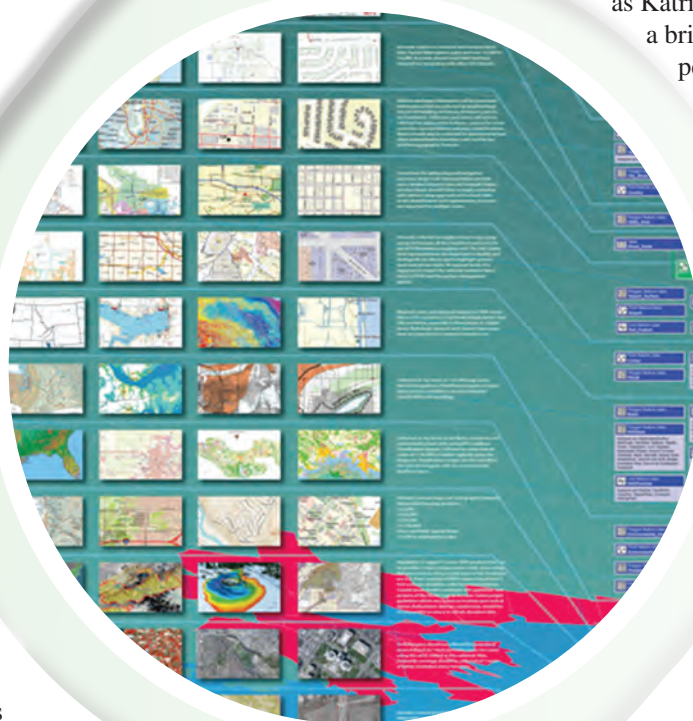
By Dave Greenlee

A week after Hurricane Katrina made landfall in Louisiana, a collaboration among multiple organizations began building a database called the Geographic Information System for the Gulf, shortened to "GIS for the Gulf," to support the geospatial data needs of people in the hurricane-affected area. Data were gathered from diverse sources and entered into a consistent and standardized data model in a manner that is Web accessible.

Background

One week after Katrina reached the Louisiana coast on August 29, 2005, a small group of geographic information system (GIS) leaders from the U.S. Geological Survey (USGS), the National Geospatial-Intelligence Agency (NGA), the Department of Homeland Security (DHS), and the Environmental Systems Research Institute (ESRI) met to discuss geospatial needs of people in the affected area.

They understood the critical need for a consistent



geospatial database for response and recovery and that an event such as Katrina or Hurricane Rita provides a brief window of opportunity for people to cooperate in harvesting data sets and preparing them to be used. They also understood that this effort could help to guide the way for more proactive data collection and integration to occur through a collaboration among multiple organizations.

Objectives

The primary objectives of the GIS for the Gulf were to gather existing information from disparate sources, to create a GIS database by using a consistent and standardized data model, and to complete this within 2 weeks. The collaborators began by defining a study area (fig. 1). They then anticipated likely questions and identified data layers that would be needed to answer the questions. Data layers were decided upon based on what had been learned through earlier projects and studies such as Geospatial Bluebook and Project Homeland. Data layers were arranged in priority order, with high priorities given to readily

available layers that help answer important questions and lower priorities given to layers that took too much time and effort for the information that they would have contributed.

Technical teams of data-subject and output-product specialists were identified; USGS personnel were contacted in Rolla, Mo.; Sioux Falls, S. Dak.; Denver, Colo.; and Menlo Park, Calif. Within 2 days, the teams were assembled and began working together. They harvested existing data at various scales and for various themes and then processed them through “extract, transform, and load” (ETL) operations. Extensible Markup Language (XML) code was generated for each ETL operation that would facilitate the mapping of future data sets (and updates) in a manner that is accurate, consistent, and involves minimal additional effort.

Data collection priorities entailed harvesting nationally consistent base-map layers and small- to medium-scale data themes from the USGS, including The National Map (<http://nationalmap.gov>). In parallel, larger scale and thematic data were gathered from cities, counties and parishes, and local councils of government. When possible, State agencies were enlisted that had already assembled data from local partners (for example, Texas Natural Resources Information System (TNRIS) and their Strategic Mapping Program (StratMap)). A partial list of organizations is shown below:

- U.S. Department of Homeland Security/Federal Emergency Management Agency Defense Installation Spatial Data Infrastructure (DISDI) Program
- U.S. Department of Commerce/Bureau of the Census
- U.S. Department of the Interior/U.S. Geological Survey
- State of Alabama
- State of Louisiana
- State of Mississippi
- Texas Natural Resources Information System
- The Regional Planning Commission for Jefferson, Orleans, Plaquemines, St. Bernard, and St. Tammany Parishes
- City of New Orleans, La.
- City of Biloxi, Miss.
- City of Slidell, La.
- Hancock County, Miss.
- Harrison County, Miss.
- Jackson County, Miss.
- Brazoria County, Tex.
- Chambers County, Tex.
- Fort Bend County, Tex.
- Galveston County, Tex.
- Harris County, Tex.
- Jefferson County, Tex.
- Liberty County, Tex.
- Montgomery County, Tex.
- Centex Homes
- Geographic Information Services, Inc.
- Solutient Corporation

GIS for the Gulf Data Themes

Data themes for the GIS for the Gulf database include the following:

- Emergency operations
- Structures/critical infrastructure
- Governmental units
- Utilities
- Addresses
- Transportation
- Cadastral data
- Hydrography
- Environmental
- Land use/land cover
- Base map
- Elevation
- Imagery
- Geodetic control

Just prior to Rita reaching landfall on September 24, 2005, portions of Texas were added to the GIS for the Gulf in an attempt to collect additional data that were likely to be needed once Rita reached landfall.

GIS for the Gulf Product

Only 2 weeks after the idea was conceived, the GIS for the Gulf database (with study area extensions for Rita) was

sent to nine FEMA Joint Field Offices by overnight express. On that same day, a GIS for the Gulf Web site was created that was linked to the Geospatial One-Stop portal (available at <http://geodata.gov>). A stand-alone first responder viewer was configured to run with the GIS for the Gulf database on DVD and/or external hard drive media. For the GIS for the Gulf viewer and the first responder viewer, imagery Web map services were displayable whenever Internet connections were present. Data download capability was provided to authorized users by means of password protection. A predefined Adobe® Acrobat® Portable Document Format (PDF) map-on-demand capability was made available with newly updated and enhanced topographic maps.

Since the GIS for the Gulf effort, it has become increasingly clear that even a Herculean effort to gather data after a hurricane could not meet the needs of the emergency

response community or for scientific disaster assessment. We know that we must do a better job of preparing our data layers and databases in the time between events. In that regard, a new effort is planned with a larger study area that extends to geographic areas with significant risk of hurricane damage.

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