A Picture is Worth 1,000 Lives

We've all seen the images of Hurricane Katrina's destruction. Pictures of flooded streets and destroyed homes and businesses continue to inundate the organizations focused on recovery efforts throughout the Gulf Coast region.

Such imagery is critical to the geographic information systems (GIS) that people are using to generate maps in support of recovery initiatives. In the case of the U.S. Army Corps of Engineers (USACE), "the GIS takes data from various sources, including aerial photography, flood zones, and demographic data, and combines these layers of information in various ways . . . to perform spatial analysis and produce a map that depicts the results of that analysis," said Stephen Mcdevitt, USACE, New York District. "The region needs to be mapped out first before these recovery efforts can begin because the hurricane blew away most of the street signs," Mcdevitt added. "Rescue teams and recovery teams have no idea what streets they are on." Mcdevitt is one of three national action officers responsible for deploying and managing GIS teams throughout the disaster region.

Imagery is critical to the geographic information systems (GIS) that people are using to generate maps in support of recovery initiatives.

JOANNE CASTAGNA, ED.D.

The USACE continues to create maps for recovery initiatives that support the Federal Emergency Management Agency (FEMA) and other state, federal, and volunteer agencies. The Corps has more than 1,600 employees engaged in recovery in Mississippi and Louisiana, all of whom are focused on providing residents with housing, removing debris, repairing the levees around New Orleans, and pumping floodwater out of the region.

Creating maps from GIS is the first step to performing such recovery efforts as:

- **Assessing post-disaster damage.** First aerial photos are taken, then these photos are laid over geographic coordinates and brought into a computer mapping system to create a map.
- **Rescue & recovery.** GIS teams gathered data about the location of hurricane victims and fed this information into a GIS database. These data were combined with aerial photography and other data to produce maps that search and rescue teams could use to locate individuals.
- **Building temporary homes.** Temporary housing must be created on land that is not prone to flooding and is near hospitals and schools. Flood-zone data are combined with other data types to produce maps that show the best locations for temporary housing.
- **Removing debris.** GIS-generated maps can show engineers where debris is located. Engineers can also use the maps to calculate how much debris exists, how much it will cost to remove it, and optimal routes for debris removal and transportation. Such maps can also show where land is clear of debris. Clear land can house the equipment that will be used to remove debris.
- **Pumping floodwater.** GIS can perform three-dimensional analysis and modeling, which can show how long it will take for floodwaters to recede using different rates of pumping. Field crews can obtain information about the location of pump stations and which stations are working, which can help with determining how long it will take to pump water out of a given region.
- **Identifying impacted communities.** GIS can create demographic maps to identify which economic and racial groups are impacted most. Maps can combine hurricane-path data with aerial imagery and wind-speed and census data.

According to Mcdevitt, "Communicate, coordinate, and cooperate are the three essential C's for getting things going and accomplishing what you need to in a short amount of time in disaster situations." He suggests the following to engineers faced with initiating a disaster relief mission:

- **Plan ahead.**
- **Create a team of diversified specialists.** Many team members will be non-GIS specialists, but their skills can meet other needs during a disaster.
- **Organize and use available resources.** The USACE called existing contractors to begin work immediately. "In the beginning, we needed to take aerial photography of the disaster and were able to immediately call an existing contractor to perform this work," Mcdevitt said.
- **Keep lines of communication open.**

"There is an incredible variety of ways that GIS can be used to help support disaster missions," Mcdevitt said. "A picture is worth a thousand words, and if that picture has a lot of useful information in it, people do relate to it."

JoAnne Castagna is a technical writer/editor for the U.S. Army Corps of Engineers, New York District. She can be reached at joanne.castagna@usace.army.mil.