THE American Surveyor
A Foot In The Past... An Eye To The Future
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# Wildfires!

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# Wildfire Maps

## Keep Agency Missions Blazing Forward

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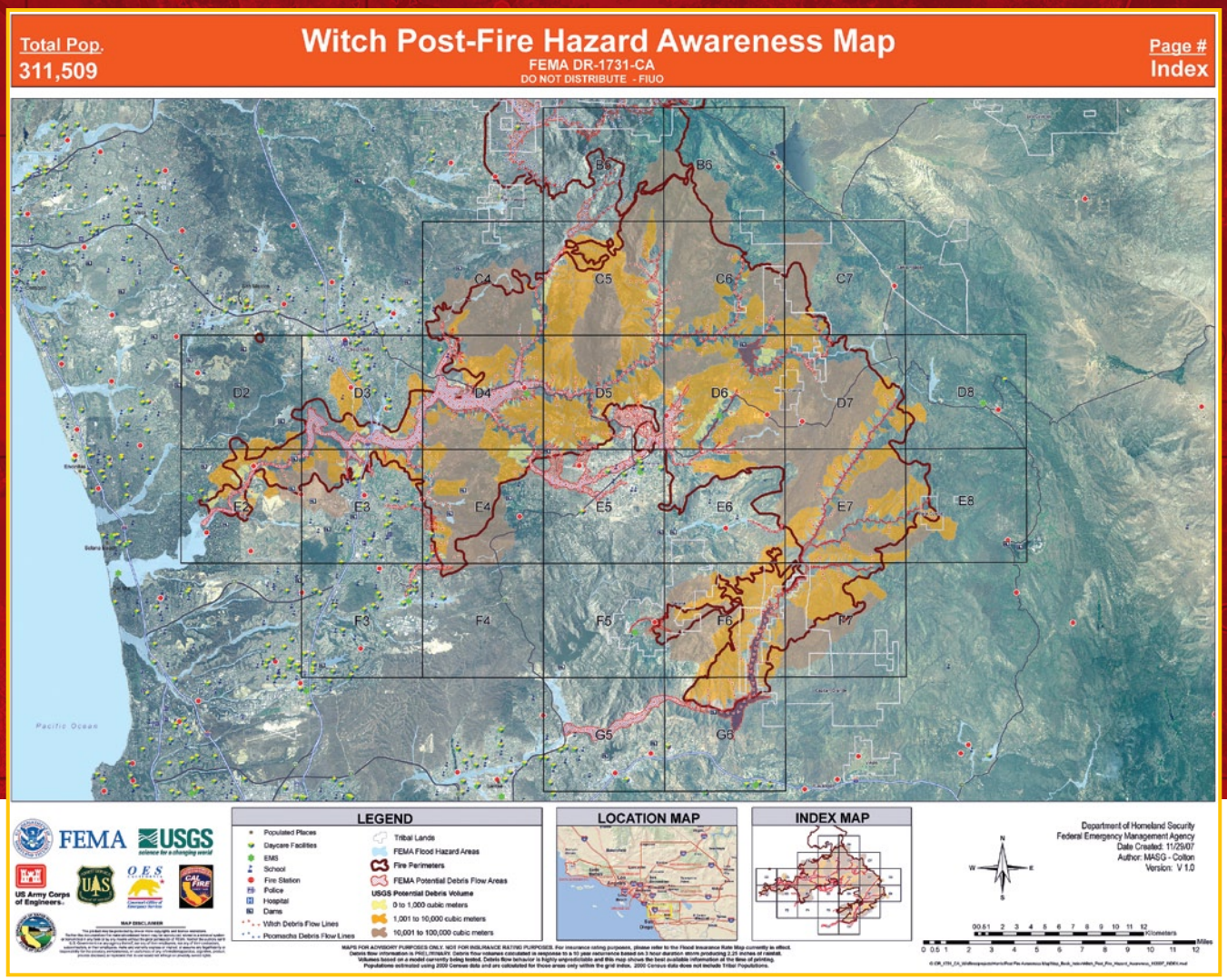


Soil Burn Severity Map of the Witch Fire that burned San Diego County, CA. Used with permission.
*Credit: Chad Markin, Geographer/GIS Coordinator, USACE, Rock Island District.*

Blazing out of control wildfires have been sweeping across northern California this summer just as they did last fall in the southern region of the state and many times previously, leaving in their path death and destruction. These fires are caused by a number of factors including drought, hot weather and strong winds. Homes have been burned to the ground, thousands of acres of forest destroyed, and thousands of people have been forced to evacuate. What's needed in these situations is a precise method to locate and assist displaced people.

**"The Corps' GIS maps help... protect states from potential safety hazards that can result from these fires in the future."**

To do this, agencies such as FEMA have called upon the U.S. Army Corps of Engineers' GIS experts. The Corps has used its GIS expertise for a variety of missions including the aftermath of the 9/11 World Trade Center attacks, Hurricane Katrina, and following the southern California wildfires last fall that scorched 500,000 acres of land. The Corps' GIS maps help agencies identify territories that have been scorched, locate displaced people requiring assis-

tance, and protect states from potential safety hazards that can result from these fires in the future.

Chad Markin, geographer/GIS coordinator with the Army Corps' Rock Island District has deployed to states for wildfire missions. "We use a lot of different data from a lot of different sources to perform analyses and create GIS mapping products for post wildfire situations," said Markin. "This can include aerial photography–pre and post event, satellite imagery, commercial data sources, and vector data from varying sources in the field that includes things like fire perimeters, ignition points, and burn intensity data."

## Types of GIS Maps

### County and Damaged Structure Maps

These maps identify counties that were adversely affected by wildfires and are used to identify damaged homes and businesses. The information shows agencies where they should set up Disaster Recovery Centers (DRC) to enable residents to obtain assistance and in the case of FEMA, fill out assistance applications. The Corps also creates maps used to direct the public to the nearest DRC. When FEMA contacts individuals that have filled out assistance applications it asks them where the damaged home is located. FEMA can then look up the location on the Corps' GIS maps and verify the information. This way FEMA knows they are providing assistance to someone who truly needs it.

### Individual Assistance Application Maps

These maps are used to locate where residents are submitting applications for assistance. "Agencies, such as FEMA, can plot these maps with dots to show where clusters of residents are filling in applications," said John D. Ennis, geographer/GIS with the Army Corps' Chicago District, who also has deployed to California to create maps. These dots also show agencies where damage may have occurred and where a DRC may need to be set up.

### Demographic Maps

These maps are being used by agencies to locate where economically challenged

## ARMY CORPS-FEMA POST-KATRINA EFFORT

In support of another critical mission, the Army Corps supported FEMA, other federal and state agencies, volunteer organizations, and the state of Louisiana in the aftermath of hurricanes Katrina and Rita. Hurricane Katrina was the sixth-strongest Atlantic hurricane recorded and the third-strongest hurricane that made landfalls in the United States.

The Corps used its GIS expertise to make Louisiana State University in Baton Rouge less prone to storm damage. The school wasn't damaged by Katrina, however, the university remains vulnerable to hurricanes. LSU is located in the southern part of Baton Rouge, bordered by the Mississippi River on the west.

Being a coastal state, Louisiana faces possible threats from hurricanes and tropical storms year round and especially during the hurricane season. Katrina was a Category 5 hurricane that left death and destruction along the region.

The Corps worked with LSU to map out the entire 2,000 acre campus using GIS technology. This was done so that if a hurricane strikes, the school security will have maps available electronically to help guide them through the event and reduce casualties and help with the evacuation of thousands of students.

Using GIS technology, the corps GIS experts linked building information into the school's safety database, including building names, number of rooms, classroom numbers, room layout, square footage, and the names and phone numbers of the professors. So if an emergency occurs in a particular building they can pull up the GIS map, click on the building, see where the emergency exits and fire extinguishers are and be able to contact professors or other personnel who are normally in that area of the campus. If a certain area of the building is damaged, this information can provide them with an idea of who may be trapped or immobilized.

One of the key buildings that was mapped out was the Pete Maravich Assembly Center, a large indoor basketball arena. The arena served as a medical shelter in the aftermath of Katrina for an influx of New Orleans residents with medical special needs. Now the school wants to better prepare it to serve as a medical special needs center in the event another hurricane hits.

If a hurricane comes and that shelter is activated to start evacuating people with special medical needs, they have maps printed up so that the employees who are working there know where and how to set up the beds, where to store medicine, where tables are set up, etc., in order that the emergency response can run smoothly.

GIS's electronic-based maps will enable the school to assess the situation more quickly as opposed to pulling out printed maps that may be obsolete. With GIS maps one can update a map with new information immediately as opposed to paper maps that may only be updated every couple of years or so.

GIS is also very useful for situations where many different agencies may converge on a scene. The agency personnel may not know the area, so GIS maps provide a way for them to become familiar with the layout of the buildings and the campus.

A FEMA expert said that due to the university's large population and its vulnerability to nearby rivers, these data layers are vital to first responders. [Editor's Note: For a related article, see Doug Drummond's article "Campus GIS Will Improve Public Safety at LSU," in the February 2008 issue of *The American Surveyor*.]

Area of southern California badly burned by wildfires in 2007.
*Photo by Chad Markin, Geographer/GIS Coordinator, USACE, Rock Island District.*

individuals may live that do not have transportation to get to their nearest DRC. Once identified, agencies can send a mobile DRC to the area.

### Flood Plain Maps

In order for some agencies to set up temporary trailer parks for residents, they need to know where flood plains are located. Agencies, such as FEMA, do not set up trailers where flood plains are located.

### Soil Burn Severity Maps

Even after a region gets back to normal, there are safety hazards that can result from these fires. For example in the case of southern California, Soil Burn Severity Maps created by the Corps can show where the fires burned the valley the most and where there is the most soil erosion. This is important for agencies to know because when fire "cooks" the soil it eventually breaks it up leaving pottery-like chunks of soil. When the rainy season comes in southern California, these large pieces of hard earth can cause mud slides down hills, injuring people and damaging property. "In the 2003 fires in southern California, many people actually got killed due to this. They had a big rain and they had mud slides that buried and killed people," said Ennis.

"Corps maps are being used by many different agencies for different reasons," said Ennis. "For example, the Environmental Protection Agency has used our maps to see what environmental impacts have occurred and emergency responders have used them to locate people that need to be evacuated." Markin added, "Our geospatial information and data products provide disaster emergency managers and responders at all levels of government, with the information that allows them to make more informed decisions ultimately reducing the risk to life, property, and the environment."

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