



Earthquakes ★ Floods ★ Hurricanes ★ Landslides ★ Tsunamis ★ Volcanoes ★ Wildfires

Natural Hazards Science

A Matter of Public Safety

31st Annual Hazards Research & Applications Workshop Boulder, Colorado

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Acting Director
July 11, 2006

U.S. Department of the Interior
U.S. Geological Survey



The Need for Natural Hazard Science

The USGS has the lead Federal responsibility to provide notification for:

- ☑ earthquakes
- ☑ volcanoes
- ☑ landslides

and to enhance public safety and to reduce losses through effective forecasts and warnings based on the best possible scientific information.

We strive to:

- Provide better forecasts and predictions
- Issue timely & accurate warnings of the severity and locations of hazards
- Ensure availability & efficient dissemination of warnings
- Produce user-friendly products for a wide range of users



AVUL CREST
14 FT

ST LOUIS CATHEDRAL, FRENCH QUARTER

RIVER **SEA LEVEL** **PRE-HURRICANE CROSS SECTION** **NORMA**

Water levels between the city and Lake Po Wednesday, stopping the rise of water in the protected by levees from the lake, since m water level.

☐ **Pumping station** The extent of determined us satellite image

☒ **Flooded areas** Tuesday, Wat to rise after the was taken.

☒ **Major levees and flood walls**

☒ **Smaller levees, flood walls and roads that block flow of water**

train



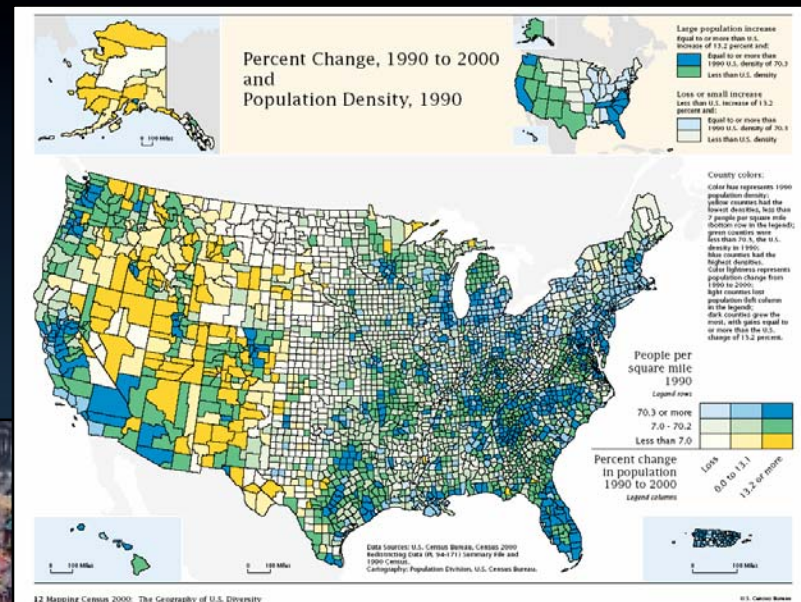
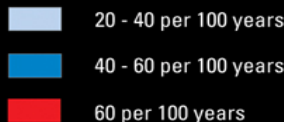
Understanding Geological Processes

Impacts and Vulnerability—Hurricanes

- Hurricane Katrina has proven to be the most expensive hurricane in U.S. history.
- More people are at risk from being affected by a hurricane now than at any other time in our history.
- Number of powerful hurricanes per year has nearly doubled in the last 35 years.



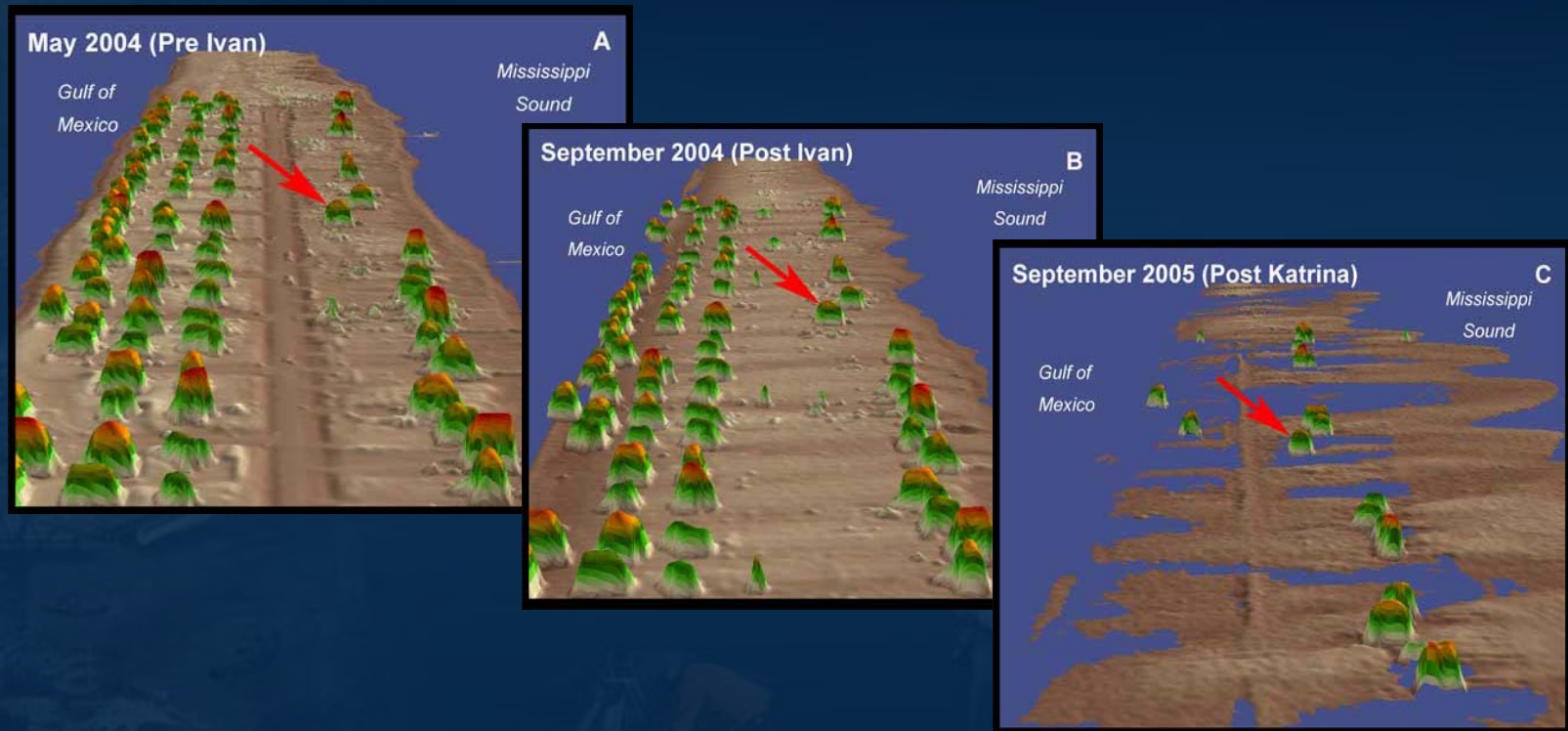
Number of Hurricanes



Understanding Geological Processes

Impacts and Vulnerability - Hurricanes

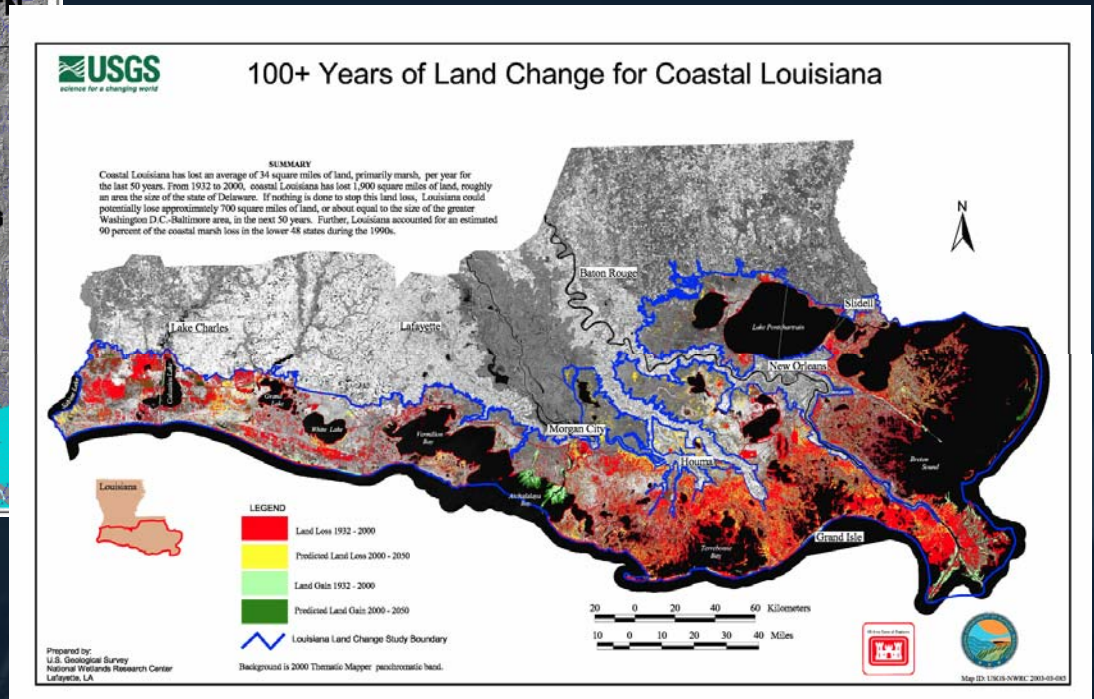
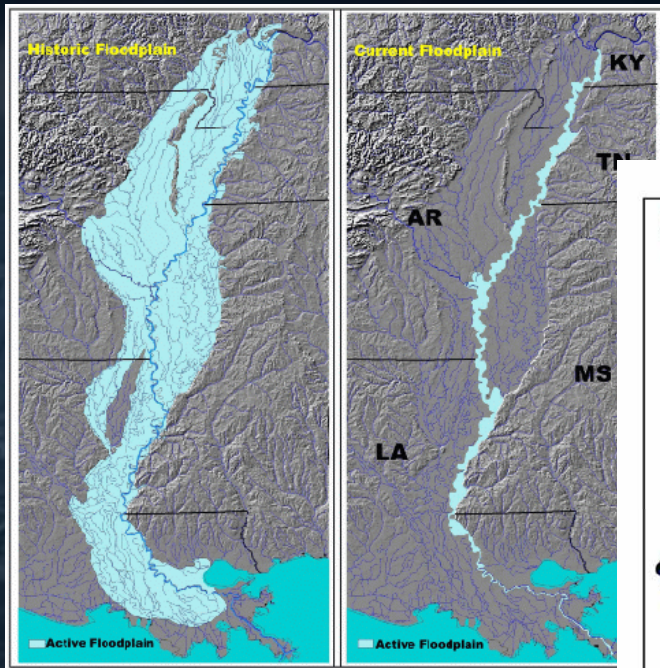
Extreme Coastal Change Dauphin Island, AL



Understanding Geological Processes

Impacts and Vulnerability - Hurricanes

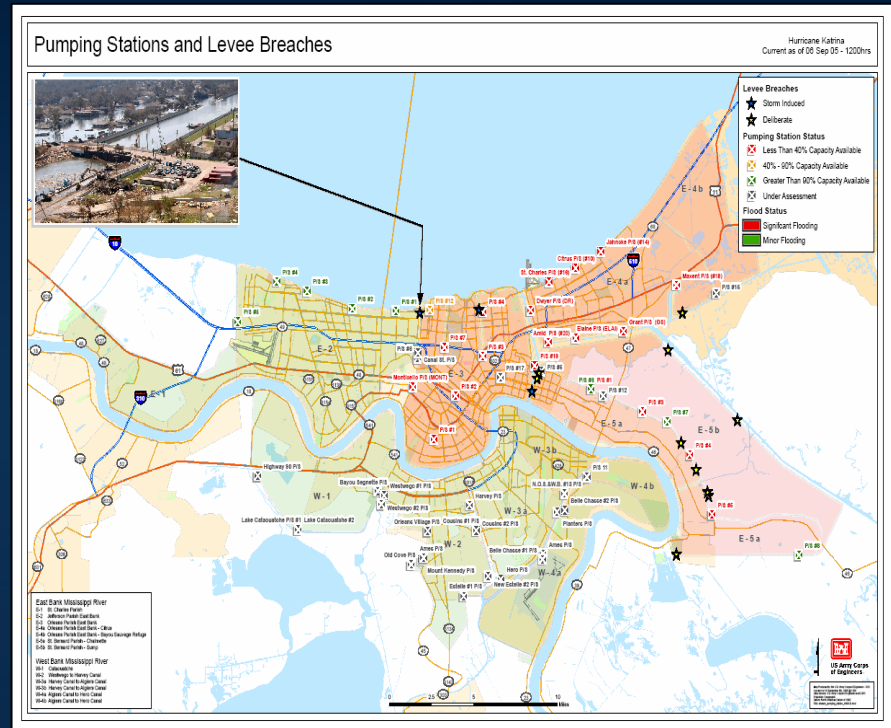
The Mississippi River Floodplain: Past and Present



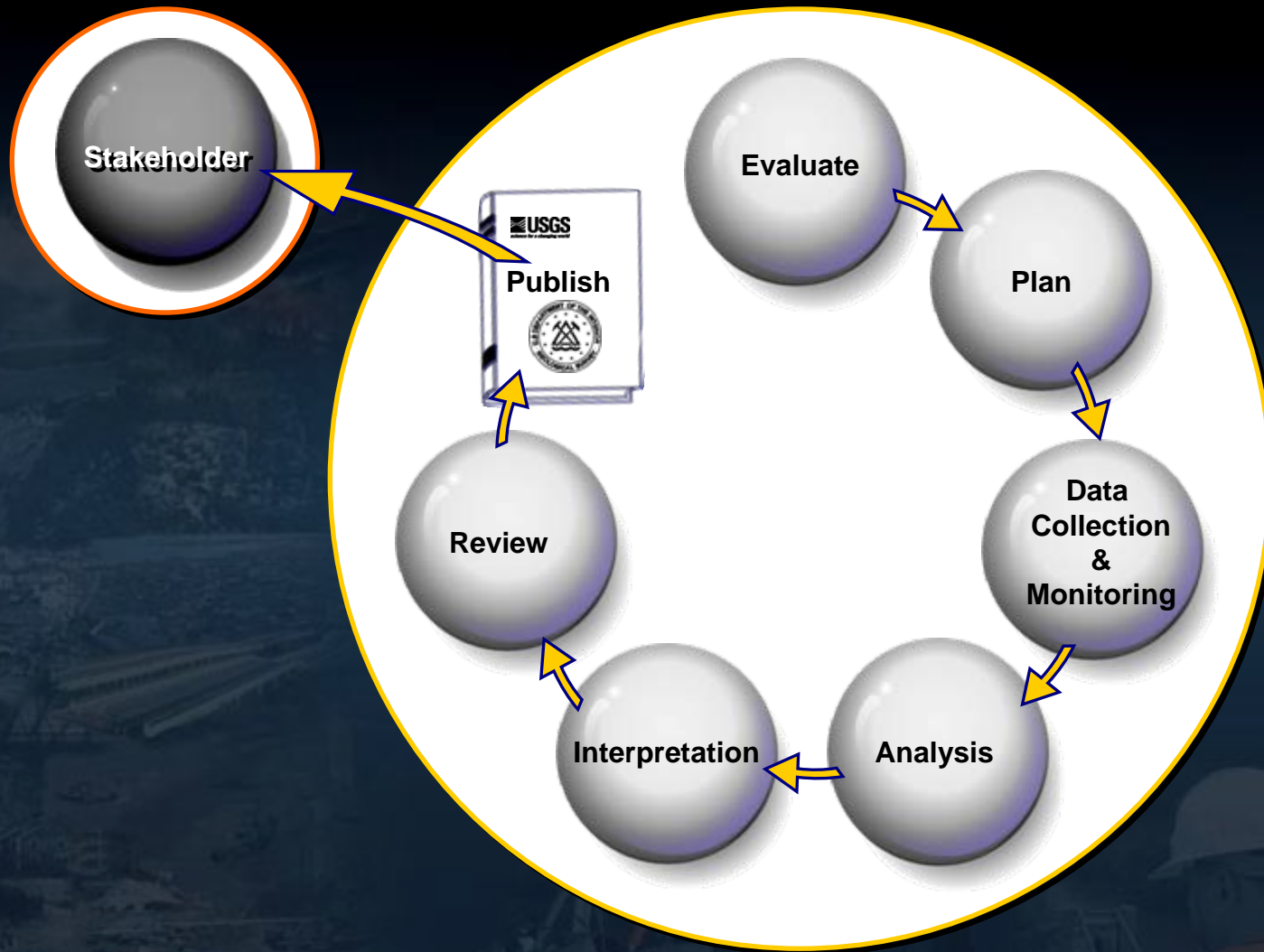
Translate Science Into Useful Information

Hurricane Katrina

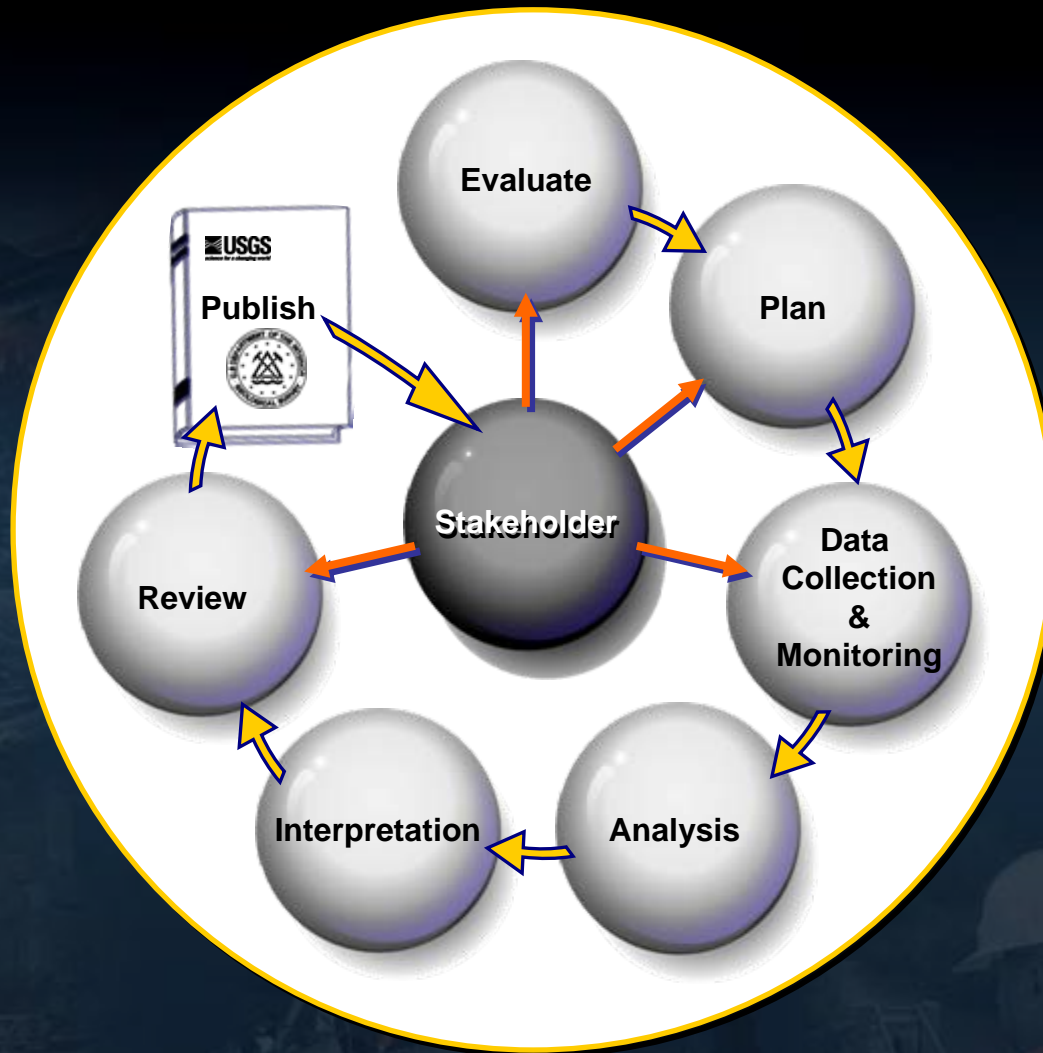
- GIS helped locate and rescue stranded victims of Hurricane Katrina
- Mapped roads, levees, and pipelines remaining in New Orleans
- Documented impacts
- Provided a means for flood forecasting and control



Traditional Project, Planning & Implementation Process



Improved Project, Planning & Implementation Process



Southern California Multi-Hazard Demonstration Project

Southern California Knows Disasters

- 20 million people
- 7% of the USA
- \$3 billion/yr earthquake losses
- Wildfires
- Landslides
- Floods
- Tsunamis
- Coastal erosion



Southern California Multi-Hazard Demonstration Project

Overarching Goals

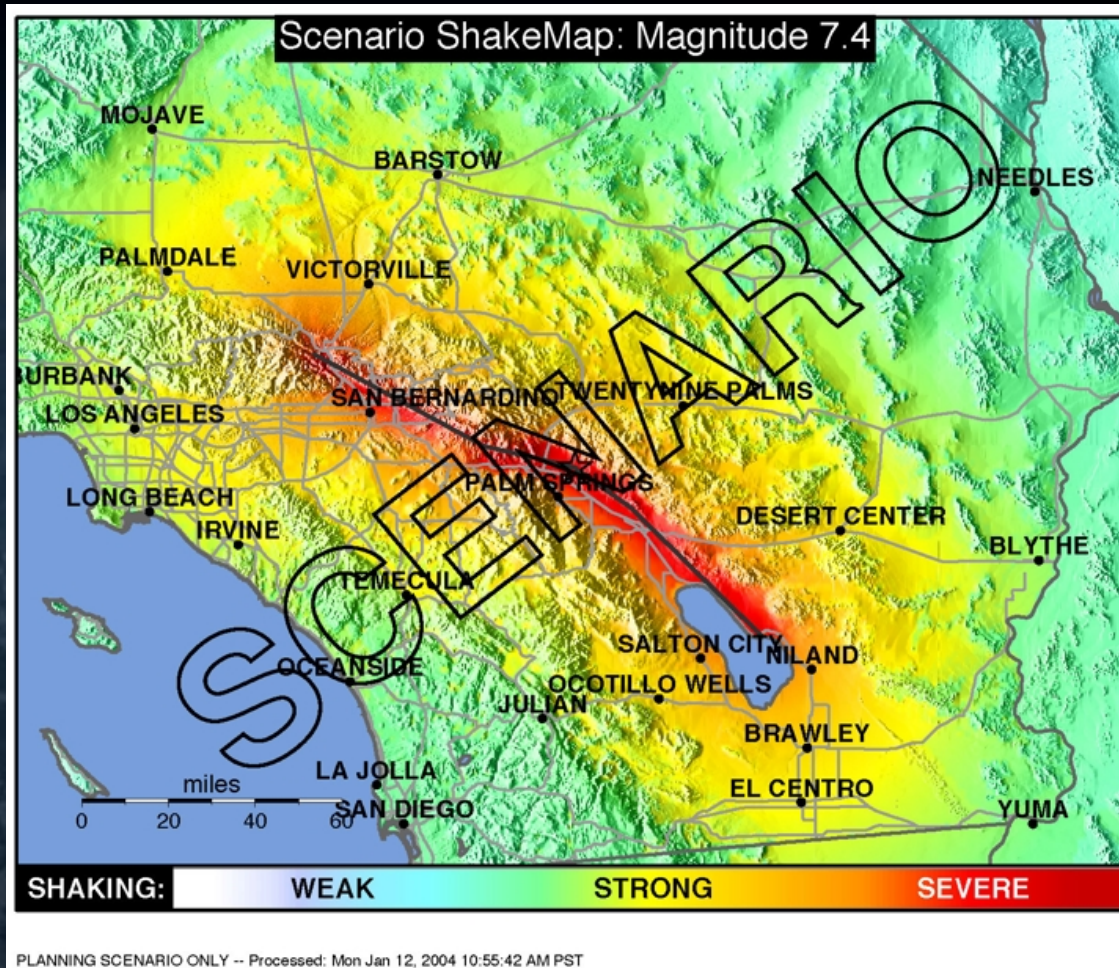
- **Develop user-friendly materials to support the community in decisions about natural hazards**
- **Provide support for the community in using this science**
- **Conduct research to improve the science of hazards, as identified with the user community**

Near-term Goals for FY2007

- **A systematic analysis of the southern San Andreas fault**
- **Additional streamgages to support flood analysis and forecasting**
- **Debris flow early warning system for burned areas with NWS**
- **A new process to determine future research directions with the decision makers of Southern California**

Risk Reduction Through Scenarios

San Andreas Earthquake Scenario

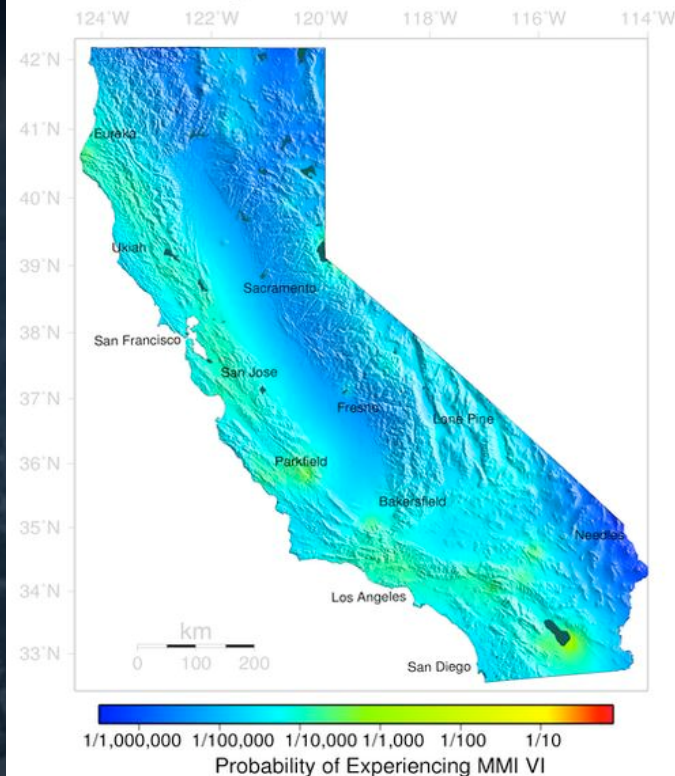


Risk Reduction Through Scenarios

San Andreas Earthquake Scenario

24 Hour Forecast of Aftershock Hazard

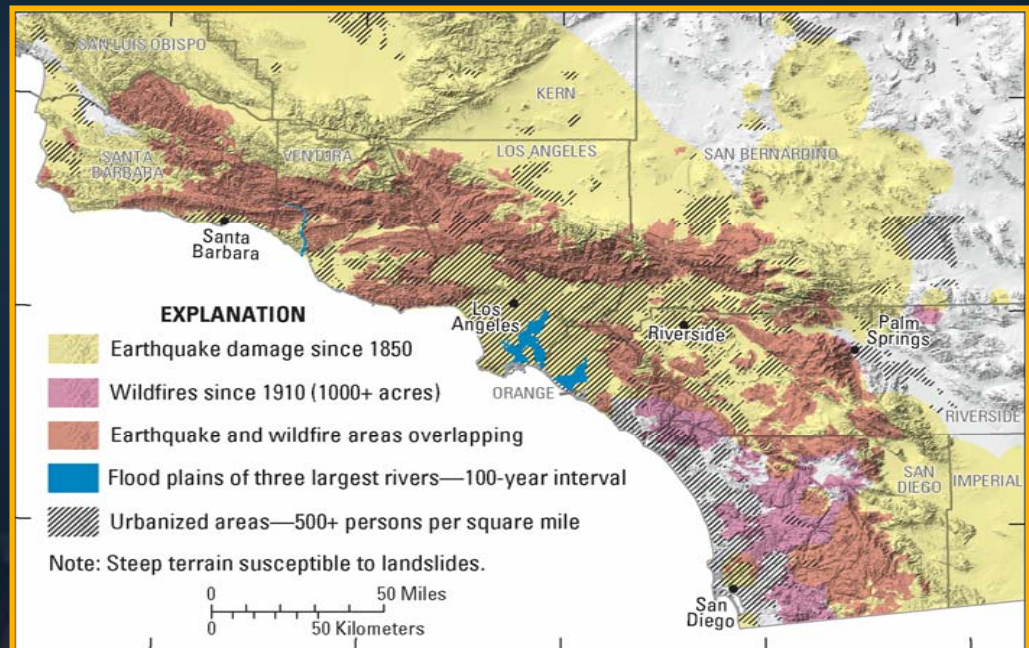
Forecast for 09/17/2005 09:29 PM PDT
through 9/18/2005 09:29 PM PDT



<http://pasadena.wr.usgs.gov/step/>

Science can support decision making before, during and after the natural hazard event.

◀ This is an example of an Automated Aftershock Probability Forecast



Natural Hazards Science

A Matter of Worldwide Public Safety

Natural hazards will always be with us and can happen at any time with potentially tragic consequences. USGS research, science and technology, strives to prevent these natural hazards from becoming disasters.

We no longer see our efforts as just a scientific endeavor – we see it as *a matter of worldwide public safety.*

