SCENARIO INSIGHTS

KEN HUDNUT | U.S. GEOLOGICAL SURVEY

HayWired Scenario - The HayWired Scenario is not a prediction; it is a cautionary tale about impacts of one potential future earthquake and high risk in the San Francisco Bay Area, a place where humans and hazards collide.

Reducing Risk - The HayWired Scenario paints a vivid and scientifically realistic picture to help communities accurately envision their potential future risk; risk reduction saves lives and property. Over $50 billion already invested in seismic resilience ensures that major losses will be reduced, but additional risk reduction is needed.

Useful Science - Together, we can "Outsmart Disaster" by putting science into action. Let's reduce estimated impacts of the HayWired Scenario by devising cost-effective resilience strategies to reduce risk.

DR. BRAD AAGAARD | U.S. GEOLOGICAL SURVEY EARTHQUAKE SCIENCE CENTER

The Earthquake - The HayWired mainshock is a magnitude 7.0 earthquake that occurs on the Hayward Fault along the base of the East Bay hills; this earthquake would cause strong shaking over the entire San Francisco Bay Area with severe impacts along the fault.

Shaking Pattern - The shaking will be strongest along the fault and it will generally diminish with distance, but there will be locally intense shaking in some areas due to soft soils.

Ground Failure - The Hayward Fault will slip and then continue to move for months after the mainshock with the potential for recurring disruption of infrastructure. Widespread ground failure will also occur along the shores of San Francisco Bay in the form of liquefaction and in the East Bay hills as landslides.

DR. ANNE WEIN | U.S. GEOLOGICAL SURVEY

Aftershocks - After a large earthquake is not the time to relax. Aftershocks extend the duration of disruption and can require repeated repairs and inspections for months to years.

Wired - Earthquakes damage telecommunication infrastructure and cause power outages, while our need to connect with friends and relatives will overload compromised networks. You need power and connectivity to plug in.

Alerts - Realtime ShakeAlert messages could prevent injuries by providing valuable extra seconds to drop, cover, and hold on prior to the arrival of very strong shaking in some areas.

DR. KEITH PORTER | UNIVERSITY OF COLORADO BOULDER & SPA RISK LLC

Buildings - Communities can't bounce back from disaster if their buildings don't. The building code calls for buildings that you can safely leave after a big earthquake, but they don't assure us that all buildings will be safe to go back into.

Fires - Big earthquakes can burn cities as much as they shake them. Communities can reduce fire risk by acquiring portable water supply systems like those of San Francisco, Berkeley and two other Bay Area fire departments.

Water - The HayWired Scenario could disrupt water service for weeks or months, making fire risk worse, costing billions of dollars in economic disruption, and possibly driving people away from their homes and businesses.

Trapped and Injured Occupants – Adding emergency power to elevators could prevent thousands of people from being trapped.

DR. LAURIE JOHNSON | LAURIE JOHNSON CONSULTING | RESEARCH

Damage Footprint and Dollars - We cannot build resilience in an ad hoc, one city-, one project-at-a-time way; we have to approach resiliency in a systematic and comprehensive fashion with a focus on regional housing and infrastructure.

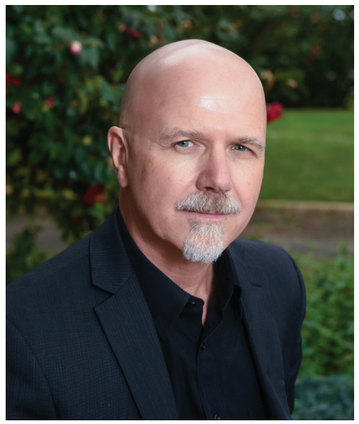
Recovering - Long-term recovery challenges for communities and residents after a catastrophic earthquake like the HayWired Scenario would be unprecedented but not insurmountable if we take collective action now.

Community Resilience - Let's keep collaborating to strengthen our communities, using science to better understand urban infrastructure, social, and economic linkages.

HAYWIRED SCENARIO

SPEAKERS

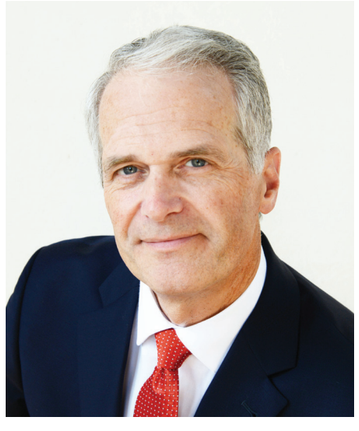
HAYWIRED
OUTSMART DISASTER



DALE COX

U.S. GEOLOGICAL SURVEY SCIENCE APPLICATION FOR RISK REDUCTION

Dale Cox is the Project Manager and creator of USGS Science Application for Risk Reduction (SAFRR) (formerly USGS Multi-Hazards Demonstration Project). Cox coordinated the work of over 300 scientists and experts in 2008 to create the ShakeOut Earthquake Scenario. He is one of the creators of the "The Great ShakeOut" now an international event occurring annually with millions of people participating. Cox also led "ARkStorm," a disaster scenario examining modern impacts of a storm analogous to those that impacted California in 1861/62. He led the 2010 Tsunami Summit in the Pacific months prior to the Tohoku earthquake and tsunami and the 2011 USGS post-fire response in Arizona and New Mexico. He was a coordinator of the Lake Tahoe Presidential Forum, the bathymetric mapping of Lake Tahoe and the National Oceans Conference, another presidential forum. Cox is now managing the HayWired earthquake scenario.



DR. KEN HUDNUT

U.S. GEOLOGICAL SURVEY

Dr. Ken Hudnut is the Science Advisor for Risk Reduction for the U.S. Geological Survey (USGS). He ensures that USGS hazards science is being applied to help solve societally relevant problems. To help understand the San Andreas Fault system and the behavior of faults in general, he has studied earthquakes worldwide using satellite & airborne imagery along with field work to provide ground truth. In 2017, he received the Ivan I. Mueller Award for distinguished service and leadership from the American Geophysical Union. He has served as a geophysicist studying earthquakes for the USGS office in Pasadena, California since 1992. He is a Visiting Associate in Geophysics at Caltech and a lecturer in Civil & Environmental Engineering at UCLA. He received his Ph.D. from Columbia in 1989, and his A.B. (high honors) from Dartmouth in 1983.

DR. BRAD AAGAARD

U.S. GEOLOGICAL SURVEY EARTHQUAKE SCIENCE CENTER

Dr. Brad Aagaard is a research geophysicist with the USGS Earthquake Science Center in Menlo Park, California. His research focuses on understanding the physics of earthquake ruptures and how ground shaking in earthquakes is affected by geologic structure and the characteristics of fault rupture. Before joining the USGS as a Mendenhall Postdoctoral Scholar in 2001, he was a postdoctoral scholar in seismology at the California Institute of Technology. He received an M.S. and Ph.D. in civil engineering from the California Institute of Technology and a BS in engineering from Harvey Mudd College.

DR. ANNE WEIN

U.S. GEOLOGICAL SURVEY

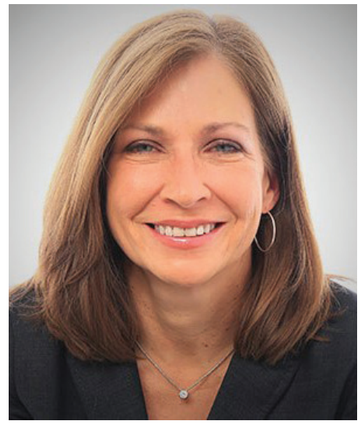
Dr. Anne Wein cares about using scientific information to reduce earthquake risks. She leads research at the United States Geological Survey (USGS), Menlo Park, California. For the USGS scenarios (ShakeOut, ARkStorm, SAFRR Tsunami, and now HayWired) she coordinates and conducts collaborative research activities to transform natural hazard information and data into consequences. She works at the interfaces of disciplines, between theory and practice, using quantitative and qualitative methods. Also, she investigates the communication of aftershock forecast information during the 2010-present Canterbury earthquake sequence with social scientists in GNS Science, New Zealand. In 2010, she received a Success Story award for advancing the goals of the USGS Science Strategy through the development and execution of the ShakeOut Scenario and Exercise. She represented Societal Impacts in the 2013 USGS Hazards Science Strategy Plan. She obtained a Ph.D. in Decision Science from the Graduate School of Business, Stanford University, in 1988.

HAYWIRED SCENARIO SPEAKERS

DR. KEITH PORTER

UNIVERSITY OF COLORADO BOULDER & SPA RISK LLC

Dr. Keith Porter is a Research Professor in Structural Engineering and Structural Mechanics at the University of Colorado Boulder and Principal of the international risk consulting company SPA Risk LLC. He is a licensed Professional Engineer and author of 180 scholarly and professional works. He specializes in societal risk from natural disasters, seismic vulnerability of buildings, and 2nd generation performance-based earthquake engineering. He led the recently released study for the National Institute of Building Sciences and FEMA that found that natural-hazard mitigation saves $6 per $1 spent. He participated in the San Francisco Community Action Plan for Seismic Safety, which led to San Francisco's mandatory soft-story retrofit ordinance. And he coordinated the engineering aspects of the USGS' ShakeOut, ARkStorm, SAFRR Tsunami, and HayWired disaster planning scenarios.



DR. LAURIE JOHNSON

LAURIE JOHNSON CONSULTING | RESEARCH

Dr. Laurie Johnson is an internationally-recognized urban planner specializing in disaster recovery and catastrophe risk management. For nearly 30 years, she has combined her unique blend of professional practice and research to help communities address the complex urban challenges posed by natural hazards and disasters. Much of her post-disaster recovery work is captured in her recent book, After Great Disasters: An In-Depth Analysis of How Six Countries Managed Community Recovery (2017). She is a visiting project scientist at the Pacific Earthquake Engineering Research Center (PEER) at the University of California-Berkeley. She chairs the federal advisory committee (ACEHR) for National Earthquake Hazards Reduction Program, and is the President-elect of the Earthquake Engineering Research Institute (EERI). She holds a Doctor of Informatics degree from Kyoto University and a Master of Urban Planning and Bachelor of Science in Geophysics, both from Texas A&M University.

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