THE HAYWIRED COALITION

Dale Cox¹, Grace S. Kang², Arrietta Chakos³, Kara Gross⁴, Richard McCarthy⁵, Lynn von Koch-Liebert⁶, Russ Heimerich⁷

ABSTRACT

The goal of United States Geological Survey (USGS) Science Application for Risk Reduction project is to innovate the application of science to reduce risk from natural hazards. One method of innovating the application of science is through the creation of scientifically plausible disaster scenarios. The method of making the scenarios timely, engaging, relevant and understandable is accomplished through building coalitions around the science. The USGS-led HayWired earthquake scenario is the latest example of this method in practice.

The HayWired scenario postulates a M7.0 earthquake on the Hayward Fault, with its epicenter in Oakland, on the east side of the San Francisco Bay. The scenario will provide the community a realistic picture of what could happen before it happens, with special focus on building codes, lifeline interdependencies, community impacts, and the Internet economy. By socializing the scenario before its public release on April 18, 2018 through the use of coalitions, chances of proactive and mitigating actions from the community are enhanced.

To make the scenario relevant to the larger community, the USGS engaged several key partners with constituents specific to the special focus areas of the scenario. The USGS engaged the following organizations: (1) PEER - Pacific Earthquake Engineering Research Center to reach the engineering and academic communities; (2) Association of Bay Area Governments / Metropolitan Transportation Commission to reach the 101 cities and nine counties affected by the earthquake; (3) Joint Venture Silicon Valley to engage the topic of the Internet, Internet economy and Silicon Valley; (4) Bay Area Center for Regional Disaster Resilience to address lifelines interdependencies; and (5) California Alfred E. Alquist Seismic Safety Commission and California Business, Consumer Services and Housing Agency to make the scenario relevant state-wide. In addition to this hub of key partners, over 60 organizations have formed a larger coalition that will be outfitted with outreach and educational materials to engage with multi-sectoral constituents.

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The HayWired Scenario

The USGS-led HayWired scenario postulates a M7.0 earthquake occurring on April 18, 2018, on the Hayward Fault with its epicenter in Oakland, on the east side of the San Francisco Bay. The HayWired scenario is a physics-based scenario for an earthquake on the Hayward Fault, and it depicts the geophysical, engineering, environmental, social and economic impacts in great detail.

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Fig. 1 shows the simulated ground shaking caused by the hypothetical M7.0 mainshock of the HayWired earthquake scenario on the Hayward Fault. The scenario provides the community with a plausible picture of what could happen with special focus on building codes, lifeline interdependencies, community impacts, and the Internet economy. Some of these vulnerabilities are newly emerging as the scenario examines community interconnectedness and reliance on communications and interdependencies of networked systems.

The HayWired scenario is documented in three volumes that describe the earthquake hazard, engineering implications, and social and economic impacts, respectively. Volume 1, which describes the earthquake hazard, was published in May 2017 [1]; Volume 2, which describes the engineering implications, is scheduled to be published April 2018, the date of the scenario itself; and Volume 3, which describes the social and economic impacts, is scheduled to be published October 2018.

**Overarching Themes and Objectives**

The HayWired Scenario has three overarching risk-reduction themes with 10 objectives intended to support these themes. The themes and objectives are as follows:

1. Improve the communication of earthquake hazard science and engineering for use in decision-making
   1. Support the use of science and engineering in risk reduction
   2. Improve understanding of the benefits of earthquake early warning
   3. Educate about aftershocks and afterslip and improve communication of aftershock forecasts
II. Help understand and inform actions to reduce earthquake risks
   1. Educate about building code performance objectives and public preferences for performance of new buildings
   2. Educate and facilitate conversations about reducing the risks of fire following earthquake
   3. Help anticipate environmental health issues
   4. Engage stakeholders in discussions about the vulnerabilities in and resilience of cyber infrastructure and the Internet economy

III. Help build community capacity to respond to and recover from earthquakes
   1. Facilitate conversations about lifeline restoration interdependencies
   2. Help inform and stimulate the development of pre-disaster plans and policy interventions in emergency management, hazard mitigation, and recovery management that can work towards keeping residents and businesses in their communities
   3. Provide materials for emergency response, business continuity and recovery exercises

**Engagement Strategy**

By socializing the HayWired scenario through the use of coalitions, chances of proactive and mitigating actions from the community are enhanced. A coalition is a social movement bound by a common goal of interest to a specific constituency. Frequently, coalitions are motivated by threats, and along the Pacific Rim of the United States, the threat of earthquakes and ensuing disruption are a constant presence.

The HayWired coalition consists of collaborators and partners. The collaborators of the scenario are those who authored the descriptions of the scenario, as well as a few organizations that the USGS engaged for focused outreach. Partners are informants: organizations and experts who are involved in discussion of the scenario and who can inform and apply the scenario with additional information for their constituents from their perspective.

A unique feature of creating a coalition for the HayWired scenario is the timing of the publication of the scenario and the release of information for coalition partners. A goal of the scenario outreach is to engage constituents before the final report volumes are released, in order to maximize the potential for alignment in the preparedness community so that the public can be more effectively engaged to build community capacity and strengthen resilience efforts. Involvement in the scenario development also fosters early buy-in of the process and awareness of the results, further encouraging coalition partner action.

To make the scenario relevant to the larger community, the USGS engaged several key collaborators with constituents specific to the special focus areas of the scenario. The USGS engaged the following organizations: (1) PEER - Pacific Earthquake Engineering Research Center to reach the engineering and academic communities; (2) Association of Bay Area Governments / Metropolitan Transportation Commission (ABAG/MTC) to reach the 101 cities and nine counties affected by the earthquake; (3) Joint Venture Silicon Valley to engage on the topic of the Internet, Internet economy and Silicon Valley; (4) Bay Area Center for Regional Disaster Resilience to address lifelines interdependencies; and (5) California Alfred E. Alquist
Seismic Safety Commission and the California Business, Consumer Services and Housing Agency to communicate the results and make the scenario relevant state-wide.

The five partner organizations used the three overarching risk-reduction themes and supporting 10 objectives as guidelines to focus the type of outreach desired. The objectives themselves became more refined as a result of input received during the outreach process.

**Kickoff Meeting, Workshops, and the Public Rollout**

On April 24, 2017, the USGS and the HayWired scenario collaborators hosted a HayWired Coalition Kickoff meeting for collaborators and partners to seek innovative ways to prioritize objectives and bring more depth, realism, and use to the HayWired scenario. The meeting was attended by over 60 participants representing organizations with constituents throughout the San Francisco Bay Area. The facilitated meeting included breakout group discussions on the three overarching risk-reduction themes and the supporting 10 objectives, and identified information that would be effective in addressing the risks.

Over the course of the year following the kickoff meeting, through a series of formal and informal events, the vision identified during the kickoff meeting is being used to engage more partners and ultimately provide an even clearer picture of the common threat and what can be done about it.

PEER is reaching out to the research, academic, and engineering communities with workshops that include the scenario findings and discussion about ground motion modeling, earthquake performance of code-compliant buildings, and the public’s expectation of buildings’ structural performance.

ABAG/MTC are engaging elected and senior appointed officials in local jurisdictions, regional agencies, and the state legislature. The ABAG/MTC effort will include briefings on the scenario findings and public policy recommendations to support measures to improve residential seismic safety, develop financial resources for resilience implementation, and enhance coordination among lifeline service providers and communities.

Joint Venture Silicon Valley is holding workshops and meetings designed to engage Bay Area communications and internet providers and businesses. Discussions are focused on enhancing resilience to earthquakes during response and recovery, and incorporating industry expertise about potential earthquake damages, service restoration, and resilience to earthquake impacts and other lifeline disruptions.

To support the communication of the results, the California Alfred E. Alquist Seismic Safety Commission and California Business, Consumer Services and Housing Agency employed a public relations and marketing firm to support the generation and dissemination of information using terminology and phraseology that will resonate with private businesses, local governments and individual consumers. In a series of meetings, private companies were invited to be financial sponsors of the public engagement campaign or sign up to be “First Movers”, i.e. early adopters, in a resiliency challenge that will be launched at the HayWired public rollout. The logo and call-to-action tagline developed by the marketing firm are shown in Fig. 2.
As of this writing (February 2018), workshops and meetings are still in progress. Results of this year of coalition engagement will be released with the public rollout of the final HayWired scenario on April 18, 2018.

Conclusions

Although the HayWired earthquake scenario is specific in the description of a plausible major earthquake and its impact on a region, it is important to note that the scenario is not an earthquake prediction. Real outcomes of a next major earthquake in the region may differ from the scenario description, but the value of the scenario is the visualization, analysis, and proactive mitigation and planning that can help reduce damage and disruption from a major earthquake. Building a coalition of stakeholders who, as partners, have access to salient features of the scenario enables the community to become engaged as the final scenario document is being developed. The significance of this temporal overlapping approach is that when the scenario is released to the general public, the scenario collaborators and partners have helped to shape the issues raised by such a scenario, and they are able to create a proactive environment so that mitigation and planning activities can be shared with the public, and future aligned collaborations with multi-sectoral constituents are fostered.

Reference