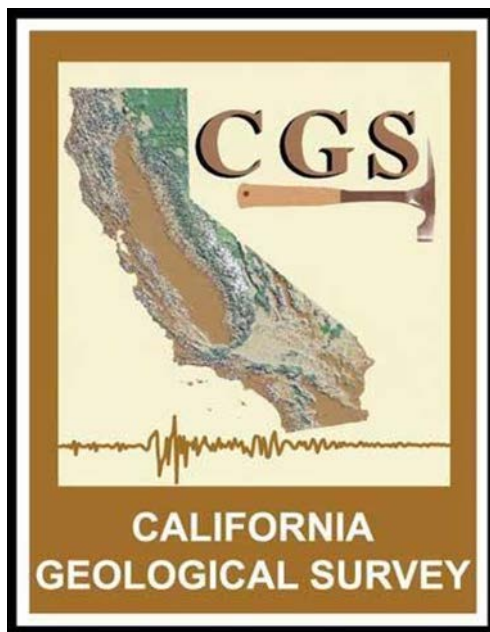


# California Earthquake Clearinghouse HayWired Exercise, August 17, 2018

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Summary Report

October 26, 2018



## EXERCISE OVERVIEW

<b>Exercise Name</b>	California Earthquake Clearinghouse HayWired Exercise
<b>Exercise Date(s)</b>	August 17, 2018
<b>Scope</b>	This exercise was a one-day interactive tabletop discussion, at the offices of the California Geological Survey, located at 1900 S. Norfolk Street, Suite 300, San Mateo, CA 94403. Prior to the exercise, the California Earthquake Clearinghouse (Clearinghouse) conducted three web-based seminars to solicit suggestions for discussion topics. On the day of the exercise, participation was limited to discussion of topics related to logistics of information sharing during response to a major earthquake.
<b>Mission Area(s)</b>	Emergency response
<b>Core Capabilities</b>	Operational coordination; Intelligence and information sharing; Operational communications
<b>Objectives</b>	Capacity building: Situational awareness and information sharing
<b>Threat or Hazard</b>	Earthquake
<b>Scenario</b>	United States Geological Survey (USGS) HayWired Scenario. A magnitude 7 earthquake on the Hayward Fault in the San Francisco Bay Area. The scenario recognizes the modern urban environment's reliance on the internet. <a href="https://www.usgs.gov/natural-hazards/science-application-risk-reduction/science/haywired-scenario?qt-science_center_objects=0#qt-science_center_objects">https://www.usgs.gov/natural-hazards/science-application-risk-reduction/science/haywired-scenario?qt-science_center_objects=0#qt-science_center_objects</a>
<b>Sponsor</b>	California Geological Survey (CGS), California Earthquake Clearinghouse
<b>Participating Organizations</b>	A total of 67 people participated; 21 in person and 46 via BlueJeans web conference. Participating organizations represent Federal, State, and local levels of government, non-governmental organizations (NGOs), the military, academia, and private industry. See Appendix A.
<b>Point of Contact</b>	Anne Rosinski, Senior Engineering Geologist, Chair, California Earthquake Clearinghouse, 1900 S. Norfolk Street, Suite 300, San Mateo, CA 94403 <a href="mailto:anne.rosinski@conservation.ca.gov">anne.rosinski@conservation.ca.gov</a>

## EXECUTIVE SUMMARY

The earthquake clearinghouse concept in California evolved out of response to the 1971  $M_w$  6.5 San Fernando earthquake. Formation and operation of the Clearinghouse is a legislatively mandated function of CGS pursuant to California Public Resources Code §2201(c) <https://codes.findlaw.com/ca/public-resources-code/prc-sect-2201.html>. During an emergency, CGS operates in accordance with the State of California Emergency Plan. Special functions are further defined under a Memorandum of Agreement (MOA) between CGS and the California Office of Emergency Services (CalOES) established under the authority of Executive Order No. W-9-91. This MOA defines that CGS is to provide earth science data and advice to CalOES regarding natural hazards for emergency planning and information support during State disaster response operations. CGS coordinates its emergency response with other State, local, academic and private entities, as well as with the USGS, the Federal Emergency Management Agency (FEMA), and the Earthquake Engineering Research Institute (EERI), pursuant to the National Earthquake Hazards Reduction Program (NEHRP). Clearinghouse functions in response to a major earthquake include: coordination of field personnel and data collection activities, translation of high-level scientific and engineering field observations of earthquake impacts into actionable intelligence that can be used by emergency managers and other decision makers. These functions are primarily carried out through operation of both a physical clearinghouse and a virtual clearinghouse (website), and nightly briefings.

On Friday, August 17, 2018, the Clearinghouse conducted a one-day exercise consisting of an interactive tabletop discussion among participating organizations. The exercise used the USGS HayWired scenario, which describes what might happen during and after a major earthquake event, specifically a magnitude 7.0 earthquake on the Hayward Fault. The USGS scenario identifies vulnerabilities related to societal dependence on internet use. In response to a major earthquake, a virtual Clearinghouse that relies on internet connectivity will be activated. The goal of the exercise was to engage participating organizations to increase information sharing capacity by developing geospatial information collaboration Best Practices. The value of developing these Best Practices is that it provides emergency managers and decision makers with improved access to relevant and actionable scientific and engineering information on the nature and extent of earthquake damage, any cascading effects, and the status of a response effort. Exercise discussion included (but was not limited to) the following topics:

- Common Operational Data
- Understanding how to use engineering, geologic, and seismic data
- Geospatial Processes
- Geospatial Technologies
- Data interoperability
- Capacity Building in advance of a disaster – curating data that are:
  - Trusted
  - Timely
  - Discoverable
  - Accessible
  - Useable
  - Scaled

In addition, the CISCO Tactical Operations (TacOps) Team attended the meeting and brought the CISCO Network Emergency Response Vehicle (NERV) <http://cs.co/tacops>. The TacOps Team provided tours of the NERV to exercise participants, demonstrated its capabilities, and discussed how the Clearinghouse could, directly by a simple phone call, request the resource in support of a Clearinghouse activation.

## PRE-EXERCISE EVENTS

The Clearinghouse conducts a coordination call every Tuesday at 2:30 p.m. (Pacific). The Clearinghouse leveraged this resource to help develop and prepare for the August exercise by conducting three webinars. Clearinghouse Information and Technology Committee lead, Phil Beilin, led the following discussions prior to the August 17<sup>th</sup> exercise:

- April 24, 2018 webinar:
  - Build on previous Tuesday call discussions regarding the need to become familiar with existing utility GIS data sets (Federal Homeland Infrastructure Foundation-Level Data (HIFLD), State and local when available) available now, for support of response to natural and man-made incidents.
  - Review known and available utility GIS data sets. Review how to use a web map to display spatial data layers covering the Contra Costa/Alameda areas. Discuss existing data fields associated with data layers, and what fields should be added to expand the range of analysis that can be performed on the data. A discussion of petroleum pipelines, railroads, water, electricity, and gas infrastructure data layers.
  - Gather input about the usefulness, or lack thereof, of these data layers, and why/how they can be improved.
- June 9, 2018 webinar (See Appendix B):
  - Stage GIS layers in preparation for the Clearinghouse HayWired Earthquake-themed Exercise.
  - Solicit feedback on suggested discussion topics to develop an exercise agenda prioritizing topics important to Clearinghouse stakeholders. A discussion seeking input about Clearinghouse stakeholders, and how they use various GIS layers of critical infrastructure (roads, bridges, buildings, cell towers), utility status, vulnerable populations, geologic/hydrologic hazard data, incident data, and Clearinghouse scientific and engineering observation data. Discuss different ways all these data could be combined to better support the end-user, e.g., analysts and decision-makers.
  - Discuss the rationale for, and benefits of, combining data from different sources in different ways.
  - Identify data gaps, and use specific data gaps identified as topics for a robust discussion during the exercise.
  - Discuss the importance of multi-disciplinary coordination.
- August 7, 2018 webinar (Figures 1 and 2):
  - Outreach presentation by National Aeronautics and Space Administration (NASA).

- Review the NASA Disasters Program’s use of Earth observations to improve prediction of, preparation for, response to, and recovery from natural and technological disasters.
- Learn about the NASA Disaster Program applications and applied research on natural hazards available to support Local, State, and Federal Emergency Managers in developing mitigation approaches, such as early warning systems, and providing information and maps to disaster response and recovery teams.
- Discuss the NASA Disasters Team example products and Program capabilities as they relate to earthquakes and cascading hazards.



Figure 1: Title slide of talk provided to the Clearinghouse by NASA Applied Sciences Disasters Program. The presentation provided an overview of the Applied Sciences Program and Data Products.

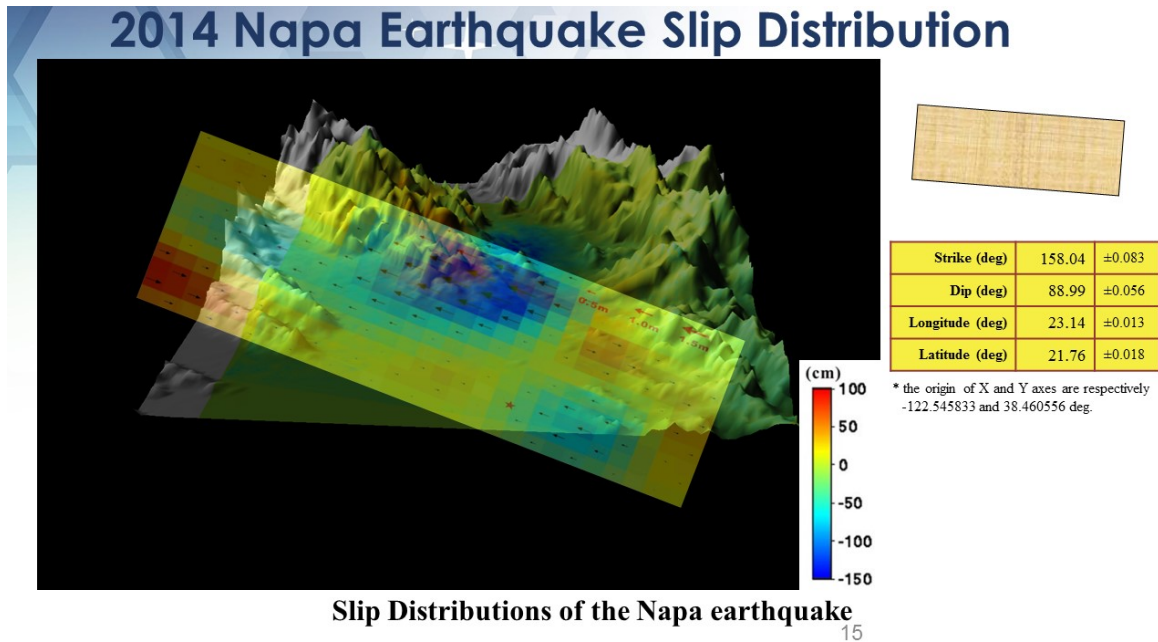


Figure 2: An example of NASA Applied Sciences Disasters Program and Data Products resources available to the Clearinghouse.

## AUGUST 17, 2018, ROUNDTABLE DISCUSSION

The one-day roundtable discussion focused on Capacity Building (enhanced information sharing and data orchestration) in advance of, and during, a disaster. The Clearinghouse practices the “whole community approach” to response, emphasized by FEMA <https://www.fema.gov/whole-community>. This approach recognizes preparedness is a shared responsibility and calls for the involvement of everyone. The Clearinghouse community includes Federal, State, and local levels of government, NGOs, the military, academia, and private industry, across multiple disciplines, and all are encouraged to participate in Clearinghouse activations and exercises.

The meeting opened with a summary of the origins of the Clearinghouse and short review of Clearinghouse functions; for the rest of the day discussion was focused on topics related to achieving improved information sharing to better support response, recovery and resilience.

Success in supporting decision makers has a lot to do with knowing how to access, use, and combine the most authoritative data available. This includes how to find, view, and use the scientific and engineering data from Clearinghouse partners in an agency’s own decision making. For the Clearinghouse to be successful, all participants need to learn how to use data and information properly. Clearinghouse collaborators recognize that in a major incident, data comes from many sources and in many formats.

In addition to the agenda topics identified in Appendix B, the discussion included:

- A review of the PowerPoint slide template used for nightly briefings conducted when the Clearinghouse is activated in response to an earthquake
- An overview of the latest updates and improvements to the Clearinghouse SpotOnResponse mobile application
- A summary of the types of information that will be available from the Clearinghouse when the Clearinghouse is activated in response to an earthquake
- The measures to optimize data and information so it can be used and understood by others
- The techniques to deliver timely, discoverable, accessible, and scalable data
- The means to grow a list of trusted resources for various types of data and information

In the afternoon, the CISCO TacOps team provided a tour of the NERV (Figures 3, 4, 5). The CISCO resources are available to the Clearinghouse at NO COST. Since 2005 the TacOps team has responded to a variety of natural and man-made disasters all over the world. In addition to the NERV, the TacOps resource can provide a wide range of communication capabilities, including portable emergency communications kits such as backpacks small enough to be transported as carry-on baggage on a commercial airline.





Figure 3: CISCO TacOps Team, Network Emergency Response Vehicle (NERV).



Figure 4: CISCO TacOps Team member Ron Snyder demonstrating NERV capabilities during the Clearinghouse HayWired exercise.

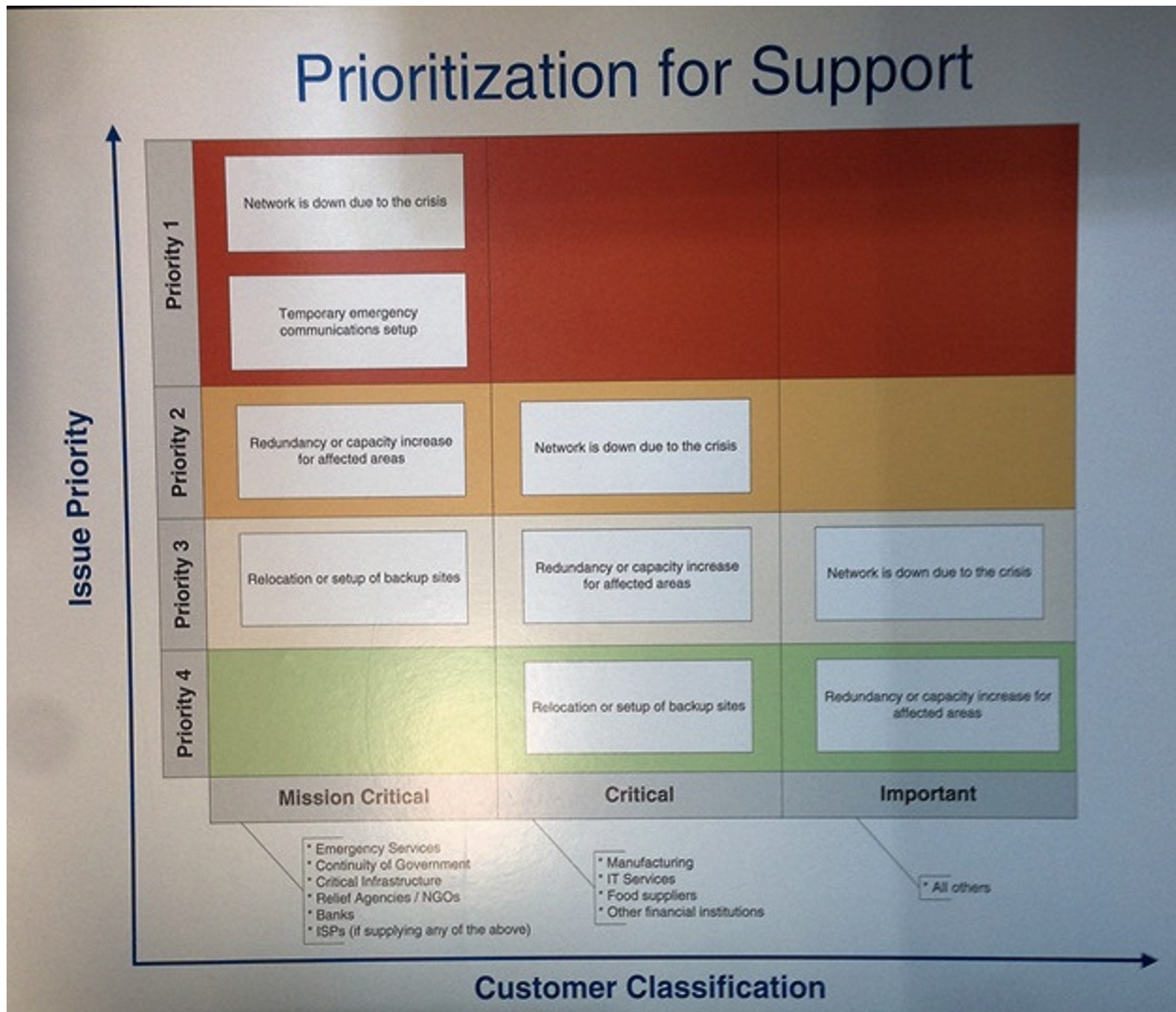


Figure 5: Prioritization matrix for deploying CISCO NERV.

## DISCUSSION OUTCOMES

At the end of the exercise, participants were asked to provide thoughts and comments regarding areas of improvement, information sharing, and suggested action items about the day's events. The comment period about the exercise remained open through August 24, 2018. The comments received are broadly grouped into three categories, and summarized below:

### Room for improvement:

- The amount of information presented during the day was good. A Clearinghouse partner requests more participation from Caltrans, CA Dept. of Water Resources (DWR) GIS team, and DWR CA Data Exchange Center (CDEC).
- Make sure Clearinghouse partners are not duplicating efforts.
- What happens if there is no power? How will data be shared in or out of the Clearinghouse and between Clearinghouse partners? Which agencies have access to data? Who are the contributors of authoritative data?
- A participant was expecting more of a “functional” exercise. This participant wanted to see more examples of how to combine and use specific data sets together.
- Some people on the phone found it hard to hear comments from people participating in person.

### Information sharing capacity building (data, tools, technology):

- Identify sources of data on the Clearinghouse XchangeCore webpage.
- A partner agency expressed a goal to learn about various tools for GIS, collaboration and data collection, and how to use various tools.
- A partner agency stated it's important to understand how incident and other data are going to be disseminated.
- The highest priority for the Clearinghouse is getting the information out to end-users.
- It is important for Clearinghouse partners to each have a baseline of important data in place ahead of a response.
- The Clearinghouse should prioritize capturing perishable geologic and engineering information to give to emergency managers.
- What are the needs of dam Emergency Operations Center (EOC) people (think Oroville dam)? Are there any Clearinghouse partners who could provide information specifically needed by dam engineers (e.g., soil properties of levees)?
- A Clearinghouse partner expressed strong support for the GeoJSON file format. The partner clarified that the GeoJSON file format is a very flexible language to use. The KML file format is hard to work with, e.g., the file size for KML is very limited and it provides only a very limited ability to edit data or perform any analysis on data.

- All data sets shared through the Clearinghouse and its partners must include complete metadata. Having contact information for someone at the organization providing the data is among the most important categories of metadata.

Action items:

- The Clearinghouse should “get their name out more” (be advertised better, and more widely).
- A partner requests the USGS to develop a ShakeCast model for levees.
- A partner requests Clearinghouse partners to collaboratively develop Best Practices to locate a city/county user base of information.
- The best part of the meeting was the opportunity for face-to-face contact with other Clearinghouse partners.
- The Clearinghouse should purchase mobile speakerphones that allow pairing a smart phone via Bluetooth.
- The Clearinghouse should develop an email list of partners, and store this information on a database. The database should identify two levels of participation: major contributing partners (those who are contributing data, analysis, and information), and end-users of information. There is an overall need to share the contact information of the Clearinghouse partner organizations (import to establish trusted relationships).
- The Clearinghouse should continue to refine and develop content on its website.
- The Clearinghouse organizational chart should include a Public Information Officer (PIO). Having a PIO can help the Clearinghouse more accurately identify its target audience, and foster participation in Clearinghouse activations. Although the Clearinghouse nightly briefings are not open to participation by the public, press briefings are important to publicize availability of information that can be helpful to emergency response organizations. A PIO can help coordinate press briefings. A Clearinghouse partner offered their services as a PIO for the Clearinghouse.
- A Clearinghouse partner requested more exercises that are “hands-on.” Exercise suggestion: Using the Clearinghouse activation organizational chart and practice cross-training Clearinghouse partners on Clearinghouse activation duties.
- Using drones in disaster response is becoming more common. Regional flight managers need to work with Air Coordinators.
- Clearinghouse exercise participants expressed appreciation for a revitalized Clearinghouse and Clearinghouse exercise activities.
- Follow up with NASA team on how to fill out a request for NASA remote sensing resources. How will data collected by NASA be shared out? Some organizations such as utilities may require a non-disclosure agreement to be in place. During a disaster is not the time to sort out requirements for collecting aerial and remote sensing information.
- Follow up with CISCO TacOps Team regarding the procedure for the Clearinghouse to request this resource.

## APPENDIX A: EXERCISE PARTICIPANTS

Participating Organizations
<b>Federal Government</b>
National Aeronautics and Space Administration (NASA)
United States Geological Survey (USGS)
<b>State Government</b>
Arkansas Geological Survey (AGS)
CA Dept. of Public Health (CDPH)
CA Dept. of Water Resources (DWR)
CA Geological Survey (CGS)
CA Office of Emergency Services (Cal OES)
CA Public Utilities Commission (CPUC)
CA Water Resources Control Board (WRCB)
<b>Local Government</b>
City of Carmel-by-the Sea
City of Hayward
City of Livermore
City of Walnut Creek
County of San Bernardino
<b>Other</b>
CA National Guard (CANG)
CISCO Tactical Operations Team (TacOps)
Earthquake Engineering Research Institute (EERI)
Southern California Earthquake Center (SCEC)
San Diego Law Enforcement Coordination Center (SDLECC)

## APPENDIX B: SUGGESTED BEST PRACTICES

California Earthquake Clearinghouse August 2018 HayWired Exercise:  
Suggested Best Practices for Emergency Response and Recovery for Geospatial Collaboration  
**DRAFT** by Phil Beilin, 04/03/18

PLEASE SEND YOUR FEEDBACK TO: [PBeilin@walnut-creek.org](mailto:PBeilin@walnut-creek.org)

### GIS Metrics

#### Process

- Is there a system to discover:
  - Data being used by one agency, but of use/interest to others?
  - Data being requested by one agency, but also needed by others?
  - Data requested/used for response, but also useful for recovery?
- Does your agency have its own Essential Elements of Information (EEI) matrix to guide situational awareness at the agency's Emergency Operations Center (EOC)/Department Operational Center?
  - Are GIS analysts/specialists familiar with these EEIs?
  - Is the appropriate EEI data staged and shareable?
  - Who has access to the EEI matrix and appropriate data?
- ★ Use Case — HAZMAT: Will hazmat incident data be shared geospatially?
  - If not, what is the hazmat data format and is there a process to geo-enable the data to enhance situational awareness?
  - Is there a process by which city/county hazmat incident data is shareable between response agencies across city/county border (e.g., Alameda/Contra Costa counties)?
  - Is there a two-way movement of data between utilities and government agencies for damage data collection?

#### Use Case Success:

CalEPA completed an EEI development process to understand its incident data needs. The Agency convened a multi-disciplinary subject matter expert (SME) group (internal staff, partners from other State and local agencies), took a generic EEI template available from Cal OES and reviewed every single item from the perspective of "What do we, at CalEPA EOC, need for incident-specific situational awareness?" The result is a customized and well developed EEI matrix that will guide internal EOC processes during CalEPA activations.

#### Technology

- Do GIS analysts/specialists have computers with sufficient processing power to handle large vector and raster data sets?
  - ★ Use case — Cal EOC (Web EOC; system of record): What is the ability to export a live feed of incident locations to other Web EOC implementations and to non-Web EOC technologies?
    - If this is not possible, do local agencies have the ability to export a list of regional incidents to develop appropriate situational awareness?

#### Data

- Is the metadata describing the fields and values for Homeland Infrastructure Foundation-Level Data (HIFLD) Open Data and county/city data easily available and socialized with the GIS analysts/specialists?
- Is there a list of available data layers describing critical infrastructure, incident boundary, damages, and other EEIs?
- Have appropriate GIS layers been organized by response type theme (e.g., CalEPA suggesting all things water, soil, air, hazmat)?

#### Analysis

- Do GIS analysts/specialists know how to perform some of the basic analyses appropriate for the incident at hand, using appropriate data (web services, local data sets, paper maps, etc.)?

#### Contacts and Networking

- Do the emergency management GIS Analysts/Specialists in the Bay Area know each other, especially those in neighboring cities and counties?
- Is there a process to update the emergency contact names and phone numbers for utility companies? Where is the list?
- Are CA Regional Intelligence Centers (CRIC) contact names/numbers known, to vet information about critical infrastructure priorities to assist decision makers?
- Do utilities and government agencies know how to contact each other for situational awareness of incident-specific damage and outage?
- Do neighboring cities'/counties' EOCs have enough of each other's spatial data, and/or the ability to share incident data to create an acceptable level of regional situational awareness?