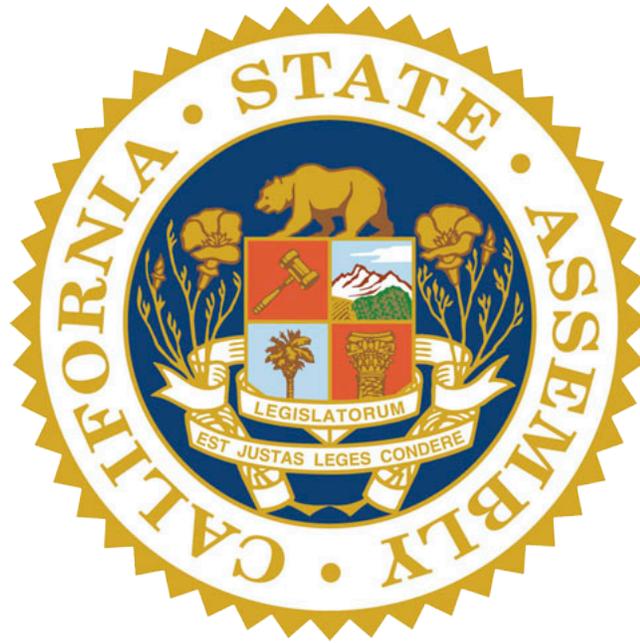


Assembly Select Committee on Local Emergency Preparedness

Freddie Rodriguez, Chair



Earthquakes – Going Forward, Lessons Learned from Napa

*Monday, October 20th at 10:00am
State Capitol
Room 126
Sacramento, California*

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“Earthquakes – Going Forward, Lessons learned from NAPA”

On August 24, 2014 at 3:20 a.m., a 6.0 magnitude earthquake struck the region around the City of Napa, California. The earthquake resulted in hundreds of injuries and at least one death, caused significant damage to buildings and infrastructure and was felt in many other areas of northern California.

As result of this earthquake, local, state, private organizations, utility companies, the local hospital, area emergency response units and others sprang into action in a comprehensive and coordinated response.

While the Napa earthquake was large, we were fortunate that it was not bigger and did not cause greater loss of life or cause greater economic damage. The Napa earthquake has presented California with a unique opportunity to learn about local, state and federal emergency responses and to discover what we might do better in the future to prepare us in the event of “the big one.” We can always do better. The Assembly Select Committee on Local Emergency Preparedness convened a hearing to gain input from those impacted by the Napa earthquake to help us plan for the future.

This legislative informational hearing, titled, “Earthquakes – Going Forward, Lessons learned from NAPA” was held on Monday, October 20th from 10:00am-1:00pm in the State Capitol, Room 126, Sacramento, CA.

For a more detailed discussion of the earthquake, please see the materials in the background section at the end of this report.

Responding to Earthquakes

Numerous California state and local government agencies have prepared to respond to emergencies, disasters and have comprehensive plans in place for earthquakes. During the Napa earthquake these entities responded quickly to mitigate the effects of the earthquake. From the testimony obtained from this hearing, the Committee was able to make a finding that the years of preparation, coordination, planning and implementation paid off in the response to the earthquake. There were however, glitches or problems that occurred that should be addressed to improve the response to future earthquakes.

Testimony and Issues

Napa Emergency Operations Center

The City and County of Napa testified regarding problems they experienced in establishing their emergency operations center (EOC). An EOC is a central command and control facility responsible for carrying out the principles of emergency preparedness and emergency management, or disaster management functions at a strategic level in an emergency situation. An EOC assists in ensuring the continuity of operation of a company, political subdivision or other organization.

An EOC typically is responsible for the strategic overview, or "big picture", of the disaster, and does not normally directly control field assets, instead making operational decisions and leaving tactical decisions to other commands. The common functions of all EOC's is to collect, gather and analyze data; make decisions that protect life and property, maintain continuity of the organization, within the scope of applicable laws; and disseminate those decisions to all concerned agencies and individuals. In most EOC's there is one individual in charge, and that is the Emergency Manager.

Under their existing plan, the Napa EOC was to be opened in the chamber of the Napa County Board of Supervisors in the Napa County Administrative Building. The chamber however, experienced significant damage from the earthquake and was not available for use. Fortunately, the Napa County Sheriff's Office volunteered available space in their facility and the EOC was subsequently established.

The damage to the planned EOC site and the resulting switch to an unplanned alternative site resulted in a modest delay in getting the EOC established. Local government cooperation, resiliency and adaptation contributed in getting this necessary emergency response facility up and running quickly.

EOCs, as well as emergency response agencies on other levels of government, should plan for facility or equipment failure or unavailability. Establishing levels of redundancy or alternative planning will be important in future earthquakes. The Napa EOC's staff responded quickly to the earthquake and were able to improvise in setting up in the Sheriff's Office.

When the computer equipment at the administrative building was not available, some EOC staff stated that they wished they had backed up these computers on flash drives. In a computer driven world, planning on redundancy in emergency situations should include ready availability of information and programs that exist on computer. Each agency should assess the ability to access programs and information should computer and communications equipment not be available in an emergency.

FEMA and Disaster Assistance.

Representatives from the City and County of Napa testified that eight weeks after the earthquake, FEMA has still not stepped in to provide assistance. There was frustration expressed that the process of providing disaster relief is slow and was retarding the ability of the community to recover.

The Federal Emergency Management Agency (FEMA) has several programs to provide assistance to local governments and individuals who have suffered losses in a declared disaster. Before FEMA steps in to help, teams of assessors have to determine losses and determine if the disaster meets certain criteria. These criteria will generally look at the amount of uninsured losses suffered. Those who have earthquake

insurance would be ineligible for assistance to pay for uncovered losses. It is estimated that only 3 to 5 percent of homeowners in the Napa area had earthquake insurance.

Earthquakes, unlike hurricanes and other natural disasters however, can be tougher to assess for losses because damage is often beneath the facade of a road or a building. Consequently, earthquakes generally take longer to deem official disasters and qualify for assistance.

After the August 24th quake, Napa City and County used their own inspectors while the state sent additional certified inspectors to assess damage. After a disaster inspections are performed in two phases. An immediate inspection is done to assess the safety of buildings, roads, other structures and facilities. For FEMA purposes a subsequent inspection must be conducted to assess the monetary damage suffered. The first safety inspection is reimbursable while the second damage assessment is not. Federal rules do not allow combining the two inspections in one.

While damage to the Napa region has been estimated at \$362.4 million plus in damage, the FEMA threshold for uninsured damage was \$52 million. Compounding the regions ability to qualify for FEMA assistance was the delay in private businesses and homeowners to request inspections for damages. Actual damage estimates were slow to come which hampered qualifying for FEMA assistance. Testimony revealed that one warehouse didn't even get looked at for a week. Some homeowners were afraid that their homes would be red or yellow tagged and did not ask for inspections. Some homeowners were not aware that their homes had sustained significant structural damage.

As a result there was no FEMA decision as to whether individuals could qualify for assistance for about ten weeks. Those testifying stated that people didn't know if they were eligible for individual or small business loans and after the disaster and that their lives were put on hold.

County and City officials stated that if there is one recommendation to be made as a result from the earthquake that it would be that the state needs to accelerate this process to help the recovery efforts. While FEMA is a federal agency and California does not have the ability to directly change the FEMA assistance process, California should examine if there are ways to assist in the process. The City and County of Napa were appreciative of OES's assistance in the FEMA process.

Building Standards

All 14 of the Napa County buildings in the county sustained damaged in the earthquake. A lot of the damage was the result of water damage. Several administration buildings were damaged when water lines to roof top chillers were broken. Damage to County buildings caused the displacement of 400 or approximately one third of county employees. Fortunately, places were found for these employees to work. If not these employees would have been forced to be laid off, further exacerbating the recovery.

Napa City officials testified that 153 buildings were red tagged and 110 yellow tagged. A red tag means that the building has been severely damaged and it is no longer safe. A yellow tag means that the building has been moderately damaged. Use of the building is limited. Residents may continue to live in a home that has a yellow tag, but they may have to avoid damaged areas. Commercial properties may be entered for the purposes of clean-up and repair, but may not be opened to the public.

Several older commercial buildings in downtown Napa had extensive external damage even though many had been retrofitted for earthquake safety protection. Problems from brick or masonry fronts were evident and many homes had chimney damages. In addition many homes had gas leaks from unsecured water heaters.

There were statements indicating that much of the damage might have been avoided. Businesses did not have access to shut off water lines that was causing flooding to their premises, water lines in government buildings, homes and businesses broke and caused damage that might have been prevented with automatic shut off devices. Historic brick buildings are not safe in a large earthquake even when retrofitted.

In light of what happened in Napa from the earthquake, building standards for government, businesses and homes should be reviewed to ascertain if construction standards, building retrofits and buildings standards should be changed to improve safety and structural survivability in an earthquake.

Testimony and Recommendations from OES

Mark Ghilarducci, Director of the Governor's Office of Emergency Services (OES), testified that within minutes of the earthquake, Cal OES, the state operations center and the Coastal Operations Center were activated. An initial concern of OES was that they were not able to immediately establish a communications link with the Counties of Solano, Sonoma and Napa.

OES has several redundancy communications methods, Satellite, radio and different kinds of phones. Immediately they assessed that since they didn't have communication they needed engage rapidly so OES dispatched resources to local governments to tie in and get an optic on the situation. In spite of these issues OES was able to establish communications with the affected areas pretty rapidly.

OES's primary role is to coordinate state, federal and local resources in support of local government to make sure they have everything they need. OES has communications capacity, mobile communications facilities. And resources and subject matter resource experts available to respond.

The state has a robust response capability system under the Standardized Emergency Management System or SEMS. California is one of the only states in the USA that has this. This was the basis for the National Incident Management System (NIMS) that was developed by federal government after 9/11. SEMS provides a clear detailed structure on the local level and on regional and state level. It is scalable and can tailor the response to meet all hazard needs from a disaster.

As a result of the Napa Earthquake, OES Staff immediately conducted in person, air and ground surveys of the scene. Planning, training and exercises created a good result. Working with FEMA, state and local agencies, and the private sector all came together to respond to the Napa earthquake. At the state level and emergency centers more than 140 personnel participated. These included building inspectors, fire strike teams, urban search and rescue teams, the CHP and others.

OES spent time evaluating the lessons learned from the first earthquake they had to respond to in more than twenty years.

OES recommendations for earthquakes going forward

1. Continue training, planning in SEMS. There were some reports that some responders may not have followed the standardized process and there was confusion as to what should be done.
2. Public building assessments. OES worked with FEMA to conduct preliminary damage assessments were able to leverage this information rapidly to get public assistance declaration from the President. FEMA requires individual damage assessments prior to providing individual assistance. The State of California does not have an individual assistance program for disaster response. This starts at

individual building assessments. Once obtained, this information flows to the regional office in Washington D.C. where it is adjudicated at FEMA and the Office of Management and Budget. The federal government kept asking for more information to further justify the damage in order to qualify for assistance. OES believed that the information provided was clear but FEMA keeps asking for more. This has delayed the process. The process should be clarified and the state should be ready to respond more rapidly in the future to the FEMA process.

3. The state can better utilize data science and available geographic information system (GIS) mapping technology integration at all levels of government. It is currently available at some levels of government but it is not integrated.

Director Ghilarducci closed by stating that disaster recovery is a marathon, not a sprint. He added that it is critical to qualify for FEMA disaster designation because the Small Business Administration will provide low interest loans. Keeping small businesses working after a disaster is important to the economy.

Earthquake impacts on the Napa County Jail

The Napa County jail is run by the County Board of Supervisors. During the earthquake the county jail suffered severe damage that affected the operations of the facility. There were water leaks, power outages, elevator shutdowns, problems with automatic doors opening and closing and doors jammed because frames had moved. The facility had police waiting to book individuals but they could not be immediately processed because the effects of the earthquake.

Safety was compromised because of debris and officials were concerned not only about the structure of the jail itself but about inmates using concrete pieces and other materials from the damage as potential weapons. Because of the damage to the jail, the County had to transfer 70 to 75 inmates to Solano County. Existing law restricts transfers of inmates from a county jail only to a contiguous county. Napa County expressed concerns that the damage to their jail might be so severe that it would exceed the ability of contiguous counties to house Napa inmates. Napa initially considered seeking a legislative solution to the issue.

The state, cities and counties should review existing plans for disaster implementation and recovery at prisons and jails. A larger earthquake in more populous areas with either a large jail or large prison population could be severely impacted. Napa was fortunate. The damage was serious but did not completely shut the jail facility down. The inmates were well behaved and jail staff pitched in to make things work.

Napa recommended that in the event of a large earthquake, there should be additional planning with contingency options and the availability of a regional response to keep jails up and functioning.

Recovery

The Napa City Manager testified that the mobilization response to the earthquake went really well. The community, support groups and employees pitched in and even though unforeseen problems arose, the response overall was good. There were issues however with switching from response to recovery phases.

He indicated that there is a need to identify local resources and personnel to assist in recovery efforts. There was a definite need for professional and certified people such as structural engineers, building

inspectors and accountants. The nature of earthquakes makes it difficult to assess the damage even from air or the street and it takes a tremendous amount of time to do this. OES was on the scene and initially there were many building inspectors and others who came from out of the area to assist in the assessment. Unfortunately, these individuals had to leave and Napa was left several months later still trying to quantify the damage to qualify for FEMA assistance.

In looking at the damage to residences Napa County first looked to protect the lives and safety of its residents. Unfortunately the occupancy vacancy rate in Napa is only 1.7 percent so there is no place to send people who are displaced. Most can't relocate in Napa.

Wherever they could, Napa left people in their buildings. Many homes were yellow tagged. Many of the yellow tagged homes had more serious damage and will need to be re-inspected. Many residents left town and inspectors couldn't get in their homes to look at damage. Some people didn't want their homes inspected or tagged. Specific recommendations included:

1. Enact tax credits for businesses and individuals who suffered unreimbursed, out of pocket costs due to the earthquake.
2. The state should identify potential sources of funds to cover costs or damage not covered by the federal government. This could include the use of grants or federal funds to cover this gap.
3. The Small Business Administration will not provide loans until authorized to do so and damage assessments and qualifications are reviewed. This process is slow the impedes the process of recovery. While this is a federal program and issue, it would speed recovery if this process could be expedited.
4. Need to make earthquake insurance more affordable. Only 3 to 5 % of buildings in Napa City were covered by earthquake insurance. While earthquake insurance is available it is expensive and often beyond the means of many to afford it.

Recovery Discussion

The state could review the lists of professionals it maintains to respond to emergencies and disasters. Comprehensive lists are currently maintained for health care workers and others who stand ready to assist in the event of disasters. The state could look to extend this list to other professions such as accountants, inspectors and others. The licensing agencies could, on re-licensure or recertification forms, ask if the individual would be willing to volunteer in case of an emergency. Various locations around California have implemented FEMA Community Emergency Response Teams (CERTs) which provide training in emergency response. CERTs could be established that provide for pools of professionals.

Earthquake insurance is expensive. The cost of this insurance is primarily driven by location and the associated risks of exposure to earthquakes in that area. Also factored in are the type of structure and the value. Costs also reflect the catastrophic nature of large earthquakes and the tremendous dollar losses they can generate. Scientists at the USGS have stated that the likelihood of a major quake of magnitude 7.5 or greater in the next 30 years is 46%-and such a quake is most likely to occur in the southern half of the state. To insure the costs of a large earthquake, the California Earthquake Authority, which administers the insurance program, spends around \$250 million a year to purchase reinsurance to cover catastrophic losses.

This is the economics of earthquakes. There has been a discussion on how California could develop a pool to help cover reinsurance costs. California Senator, Diane Feinstein had proposed an Act that would allow well-capitalized state catastrophe insurance programs to lower costs by allowing the federal

government to guarantee bonds issued by these institutions, in lieu of purchasing reinsurance, which currently accounts for at least 40% of costs. It was estimated that the legislation, if enacted, would save the California Earthquake Authority (CEA) an estimated \$100 million per year and allow it to lower its rates by 20%.

California should continue to explore ways to reduce the expenses of earthquake insurance.

One thing the City of Napa did not plan on was the sheer volume of debris left by the earthquake. This is not a response issue, but one of recovery. What do we do with the mass volume of debris an earthquake generates in destruction? Napa helped resolve this issue by setting up locations for debris deposits at city schools. The schools were out for summer break and worked with the city on the issue. Napa was also fortunate that no major roads or bridges were out which would have complicated debris removal.

Representatives from the City of Napa Public Works Department recommended that all local water and waste water agencies should join CalWARN. This is the California Water/Wastewater Agency Response Network. CalWARN's mission is to support and promote statewide emergency preparedness, disaster response, and mutual assistance processes for public and private water and wastewater utilities.

They testified that within 24 hours there were 10 crews from other agencies ready to work with Napa Public Works Department crews. With this help they were able to quickly take care of the 177 water line breaks that occurred as result of the earthquake.

The City and County stated that they are spending a lot of money to fix infrastructure and buildings. They requested that it might be helpful to have a legislative review on issues surrounding rebuilding projects. They indicated that they have 60 days to develop damage assessment forms and that they are bound by these estimates. If actual costs go over the estimate they don't get additional money. They stated that they are having some difficulty with CEQA and NEPA requirements. Even when they get resource agencies to repair something there can be a lot of mitigation requirements tacked on. Often the damage assessment does not take into account the mitigation requirements. They asked if there is some way to get additional time so they could make sure their estimates are correct. They said that even if replacing in kind, a categorical exemption from CEQA and NEPA would be helpful after a disaster.

Health Care Issues

Emergency medical transportation

Ambulance service in Napa County and City is provided by contract with American Medical Response or AMR. Dispatch for services is handled by the county which directs AMR to where services are needed. Local fire personnel also provide assistance and backup on services provided by AMR. AMR testified that on the night of the earthquake they had five ambulances in service. When emergency calls for transport began to come in they were able to put another five ambulances in service.

There is one hospital facility in Napa, Queen of the Valley Hospital which has an emergency room and is designated as a trauma center. AMR stated that they had between 40 and 50 transports to the Queen of the Valley Hospital (Queen) and 18 transfers from the Queen to other facilities.

After the earthquake, two of AMR's ambulance supervisors went down to the EOC at Fire Station Number 1 in Napa and were asked to become dispatchers. For the rest of the event, for every medical aid

request that came through the 911 system, AMR employees employing a manual system that they developed on-the-spot, dispatched the appropriate resources.

Normally, for every dispatch in Napa there is also fire agency support, either an advanced life support or basic life support level that will also responds to the request for transport. There were many cases that night where that was not possible, with AMR ambulances going to calls just by themselves, evaluating the situation and responding to it as best they could.

Assemblymember Rodriguez is an Emergency Medical Technician. During the response to the disaster in New Orleans after hurricanes Rita and Katrina, the Assemblymember volunteered to help provide ambulance service in the City. The New Orleans' 911 emergency services system was so overwhelmed that emergency services communications were essentially nonexistent. The Assemblyman was told to take an ambulance and go out on his own and find people who needed help and transport.

While the situation in New Orleans cannot be compared to the earthquake in Napa, the response to 911 calls for service were affected similarly. In Napa, the modest increase in service requests caused the system to not break, but to bend. The EMS system must take a close look at what happened in Napa and plan for the future. It is highly likely that a Katrina, style New Orleans failure in the emergency medical 911 system could occur in San Francisco or Los Angeles as a result of a catastrophic earthquake.

Health Care

The Napa, Queen of the Valley Hospital (the Queen) stressed investing in and being prepared for disaster helped them provide medical services after the earthquake. The hospital underwent the required state earthquake retrofit and as a result, while the hospital received some yellow tags after the earthquake, there were no red tags. While they were focused on patient care they had the facility examined and by day break had structural engineers on site.

Within an hour of the earthquake the Queen had 70 people in their emergency room at 4:30 am. The hospital stated that 234 patients visited the emergency room within 24 hours, many with avoidable injuries. To handle the unusual volume of patients they employed a triage tag system to better track patients and provide care.

Shortly after the quake the hospitals elevators automatically shut down as a safety feature. During this time there was an emergency room patient that needed to be put on a ventilator in the ICU which is on a different floor in the hospital. This necessitated carrying a portable ventilator unit downstairs from the ICU to the emergency room in order to stabilize the patient.

The Queen stated that one of things they learned from the earthquake was that they must inventory critical equipment for an emergency and have this material at the proper elevation in the facility. They were fortunate in that their cache of supplies is stored outside in a mobile trailer and they did not have to rely on the elevator to bring suture kits and other supplies to the ER. The elevator shut down is a safety feature and requires resetting by an elevator technician. This occurred about an hour and half after the earthquake.

In a disaster, maintenance of standard procedures and operating methods in a health care facility are often not possible. Health facilities should review vital infrastructure and placement of facility departments, equipment and necessary modalities of treatment and prepare for a worst case scenario. If the earthquake had occurred twelve hours earlier at 3:20 p.m. when downtown Napa had up to 10,000 visitors, the injury and death toll would have been significantly worse. A dramatic increase of 5 to 10 times the patient load

from what the Queen saw the night of the earthquake could have easily strained or compromised resources or care.

While health facilities currently plan for emergencies, each facility should continue to review and run scenarios that take into account different variables that might occur during a disaster.

Seismic warning systems

The president of Seismic Systems Warning System testified on the earthquake early warning system that they operate. He stated that the system worked well. They have their system on the fire station doors in Vallejo. When the earthquake struck the system gave an advance warning of 2-3 seconds and began opening the doors of the fire stations to ensure that emergency equipment would not be trapped inside. Since the start of their system he indicated that they have not had a false positive.

The amount of time an early warning is given depends on a number of factors. First of which is distance from the epicenter. While Vallejo had a 2 – 3second warning, the City of Napa would not have received an appreciable warning. Other factors include the type of earthquake and the surrounding geologic structures. This is a developing technology and improvements and application developments are planned.

While an advance warning of 5 to 15 seconds may not seem like much of a warning, it can be used to great effectiveness. Besides fire station doors, hospitals, trains, businesses and others could benefit from a system that automatically mitigates the effects of damaging earthquake. The state should continue to explore the benefits of seismic early warning

Conclusions

From testimony received at the hearing, the emergency response system worked well. The Office of Emergency Services, local governments and their emergency personnel and first responders, utilities, private businesses, health care providers, aid organizations, volunteers and even the citizens of Napa County, Napa City and the City of Vallejo all pitched in to respond quickly and effectively.

The American Red Cross and the Salvation Army were on the scene almost immediately dispensing aid, serving meals, providing shelter and assisting residents to find aid and care.

PG&E, the utility company serving the Napa area, was on site almost immediately with what was described as an “army” of workers to restore power to the region. The utility company described their emergency plans and how these were used to respond to the outages that Napa experienced during the and after the earthquake.

The state and local plans worked well together responding to the earthquake.

It must be remembered however, that the Napa earthquake, for all the damage and injuries that occurred, was not the “big one” and it was not in a high density, high population center. It has to be assumed that the response to a 8.0 magnitude or greater earthquake in the Los Angeles or San Francisco areas would not be as smooth or as manageable as the Napa 6.0 quake. Various studies that have examined the possible outcomes of such earthquakes have predicted that there could be widespread loss of life and injuries that could overwhelm ambulance, medical and hospital capabilities.

Damages to infrastructure and buildings might be so severe that it could devastate these areas and render tens of thousands and more; homeless, out of work and without basic services for extended periods of time. This might include loss of communications, electricity, water and transportation and effectively cripple the economy of the stricken region for years to come.

The Select Committee finds that existing emergency services response and the coordination with state, local and others worked in Napa. It cautions however that the results in Napa may not translate to an earthquake on a massive scale in the future. California needs to continue to plan, prepare, train and upgrade its emergency response capacities and recovery programs to be ready for the inevitable catastrophic earthquake.

Background on the Napa Earthquake

The 2014 South Napa earthquake occurred in and around the city of Napa, California on August 24 at 3:20 a.m. local time, measuring at 6.0 on the magnitude scale. The tremor's epicenter was located south of Napa, approximately 3.7 miles (6.0 km) northwest of American Canyon near the West Napa Fault, beneath the Napa Valley Marina on Milton Road, just west of the Napa County Airport.

The Napa earthquake was the largest in the San Francisco Bay Area since the 1989 Loma Prieta earthquake which measured a 6.9. As a result of the Napa earthquake there was extensive damage and several fires reported in the southern Napa Valley area. There was also significant damage in the nearby city of Vallejo, in Solano County. The quake killed at least one person, injured over 200, and interrupted power to more than 69,000 Pacific Gas and Electric Company customers in the area. Early estimates by California officials indicated that the earthquake caused over \$400 million in damage, of which only \$87 million may be eligible for federal reimbursement. Later estimates stated that the overall damage could be closer to \$1 billion.

The main earthquake was magnitude 6.0, with a depth of 10.7 km. The United States Geological Survey (USGS) estimated that 15,000 people experienced severe shaking, 106,000 people felt very strong shaking, 176,000 felt strong shaking, and 738,000 felt moderate shaking. The earthquake lasted from 10 to 20 seconds, depending on location. At least twelve aftershocks followed, including one of magnitude 3.9.

On September 11, 2014, U.S. President Barack Obama declared the Napa earthquake a major federal disaster. Governor Jerry Brown declared a state of emergency shortly after the earthquake due to the severity of damage and the possibility of aftershocks. The President's action, in coordination with the Federal Emergency Management Agency (FEMA), made federal funding available to state and eligible tribal and local governments and certain private nonprofit organizations on a cost-sharing basis for emergency work and the repair or replacement of facilities damaged by the earthquake in Napa and Solano counties.

Federal funding is also available on a cost-sharing basis for hazard mitigation measures for all counties and tribes within the state.

Governor Brown declared a State of Emergency shortly after the 6.0 magnitude South Napa Earthquake on August 24, 2014 and issued an executive order to provide additional financial assistance to local agencies and non-profit organizations. The order ensured residents can replace important documents and access key services without shouldering additional costs or other burdens.

Two hundred thirty four injured people were treated at Queen of the Valley Medical Center in Napa. Thirteen of those injured were admitted. One individual was severely injured when bricks from a chimney fell on him. Many of the reported injuries were lacerations and abrasions from fallen debris. At least six of the injuries were classified as critical. In Vallejo, 49 people were injured, including two who were hospitalized. One person died September 5 as a result of injuries sustained from the Napa earthquake.

Following the earthquake, several older commercial buildings in downtown Napa had extensive external damage even though many had been retrofitted for earthquake safety protection. The Goodman Library, Sam Kee Laundry Building, Downtown U.S. Post Office, Alexandria Hotel and

Annex, and First Presbyterian Church all suffered moderate to extensive damage. All of these buildings are listed on the National Register of Historic Places. The structure of the Uptown Theater was determined to be sound but the building was red tagged due to damage to the theater's ceiling. Several newer commercial buildings also suffered damage as a result of the earthquake.

Six major fires broke out as a result of the earthquake. Four homes in Napa Valley Mobile Home Park located in north Napa were destroyed by fire. Firefighters were hampered in their efforts to fight this fire by a broken water main. Following the first round of building inspections by the City of Napa inspectors, a total of 613 structures had been tagged; 113 were red tagged and 500 had been yellow tagged. Pavement on several roads in Napa, Solano and Sonoma Counties buckled and cracked during the quake.

Within days, County officials estimated the damage at \$362 million. According to an early estimate by the USGS, the economic costs to Napa County and the region may go as high as \$1 billion. Several wineries in the Napa area suffered damage to buildings, infrastructure and inventory. Several wine storage facilities also suffered damage and loss of property. Estimates of the damage to the wine industry resulting from the earthquake were downgraded to between \$80 and \$100 million in a September 5, 2014 report from Silicon Valley Bank to the Napa County Board of Supervisors.

On September 16, 2014 in a report to the Napa City Council, members were briefed on the status of damages sustained in the earthquake. City Staff reported that 156 commercial and residential structures had been red tagged and 1398 had been yellow tagged. It was also reported that the estimate for earthquake damage to the City's infrastructure had reached \$57.9 million. This total includes repairs that had to be made to 144 water mains, repair or replacement of a compromised water tank in Brown's Valley that is part of the City's water system and repair of 294 locations where streets and sidewalks had been damaged.

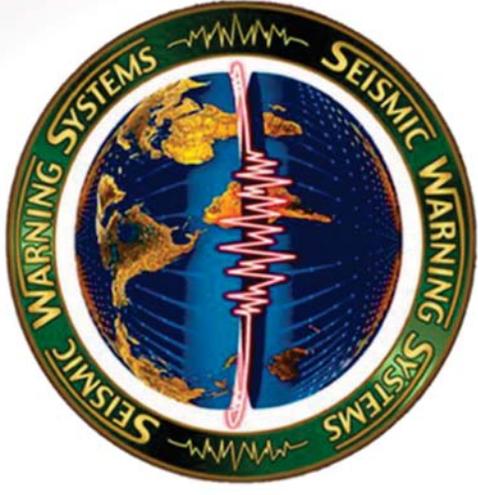
In Vallejo, hundreds of storefront windows shattered and walls tumbled down in buildings. On Mare Island, water mains broke during the earthquake.

An experimental earthquake warning system alerted seismologists ten seconds before the quake struck. This system currently being developed by the Berkeley Seismological Laboratory and they issued a warning upon detecting the P-waves generated by the earthquake. P-waves are measurable prior to the actual energy waves of an earthquake. The earthquake early warning system gave seismologists an alert 10 seconds before the earthquake's slower, more destructive waves reached them. The system is being developed to provide a warning system that could potentially give people time to take cover, preventing injuries caused by falling debris, automatically stopping trains or shutting off gas lines.

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City of Napa – Power Point Presentation



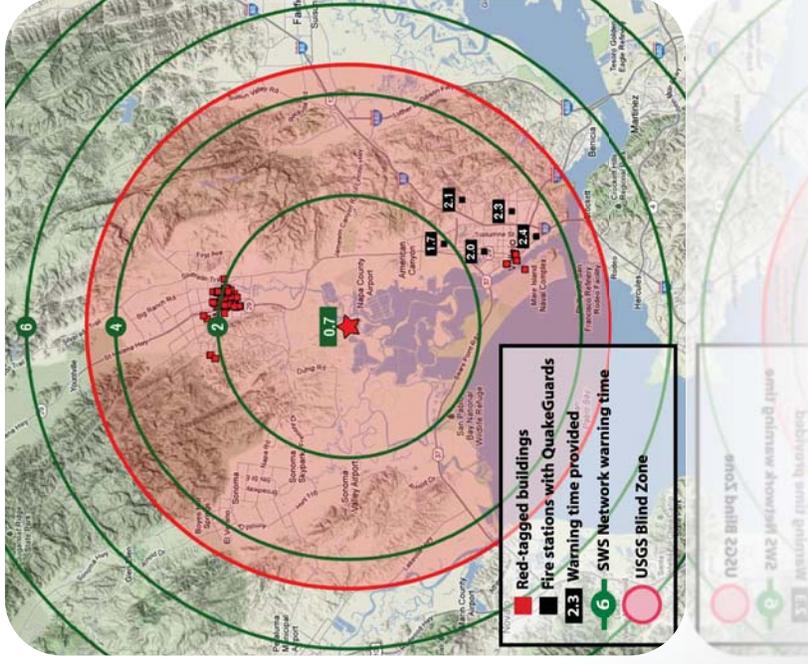
Select Committee Local Emergency Preparedness

Industry Recommendations – Lessons Learned

October 20th 2014

So. Napa EQ Warning Performance

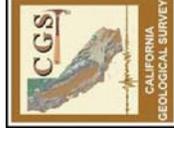
Warning & Automation Prior to Shaking



- 5 Vallejo Fire Stations
- 5-7 Mi. from Epicenter
- 1.7-2.4 Sec. Warning
- Audio Alerts
- Automation of Station Doors

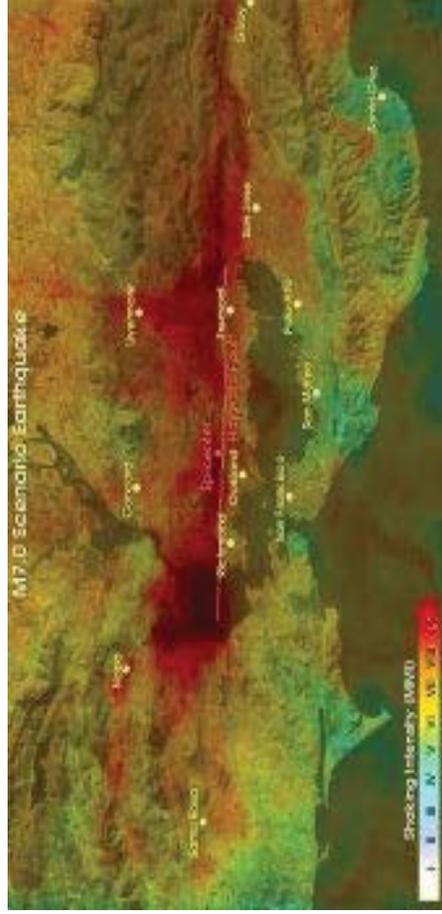


State Priority Risks



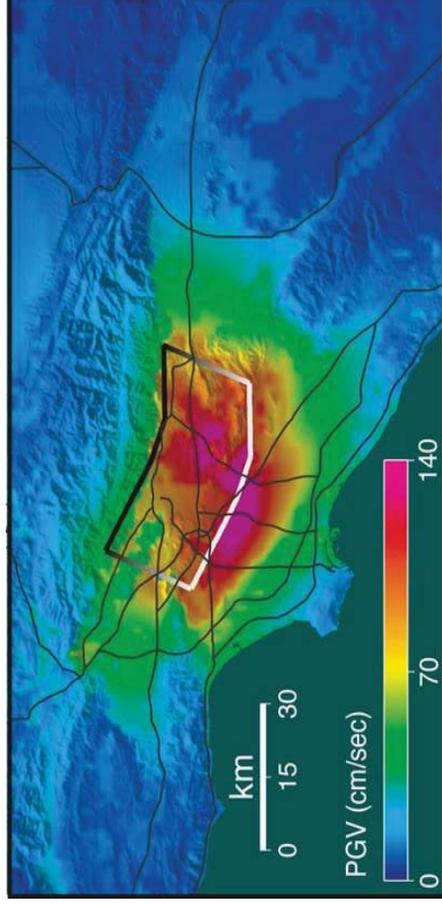
Northern California

- Repeat of 1906 Event - \$84B
- Hayward-Rogers Creek Event - \$39B
- Peninsula SAF Event - \$36B

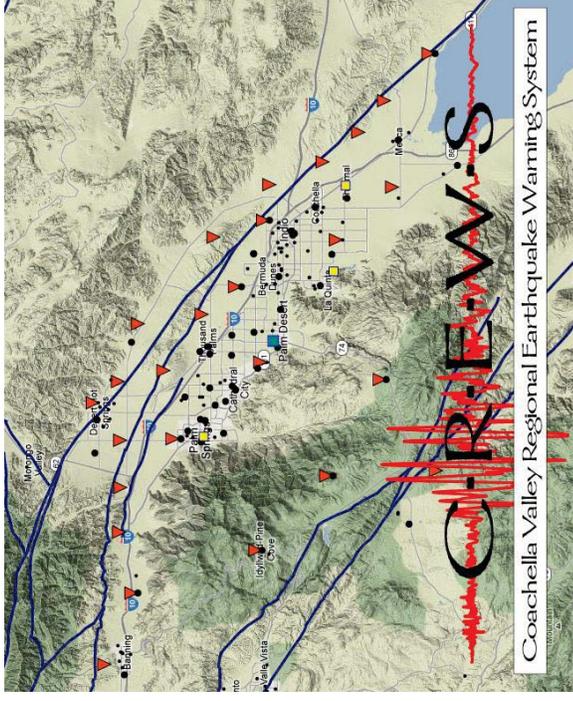
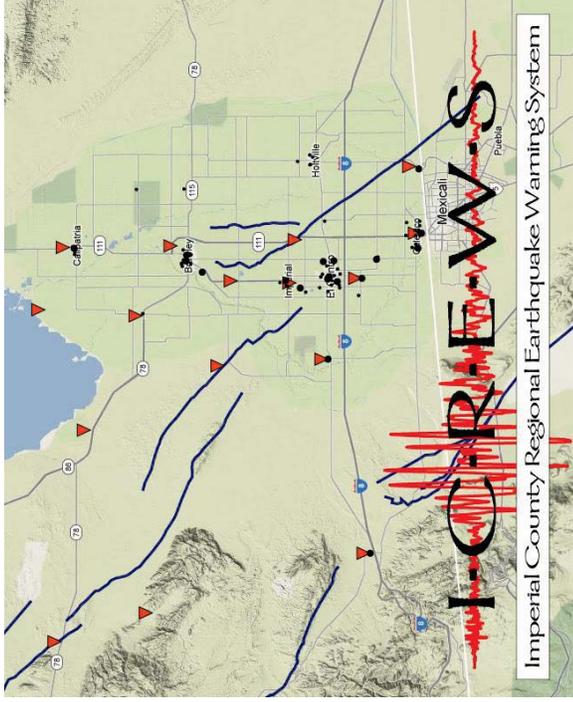


Southern California

- Puente Hills - \$82B
- Newport-Ingelwood Fault - \$34B
- Palos-Verde Fault - \$20B



Sustainable Public-Private Solutions



Regional PPP Model



- A collaboration of regional stakeholders.
- Networked earthquake warning applications focused on the needs of the region.
- An emphasis on education, training, and outreach as vital components of effective warning system.
- A sustainable funding model for on-going warning and education

Jobs and the Economy



Create sustainable private sector jobs while providing a significant public value.



Fostering innovative mitigation technologies that reduce economic losses.



Attracting investment and manufacturing by becoming an earthquake resilient community.



Promote development of important safety and security infrastructure for our public and civic assets.



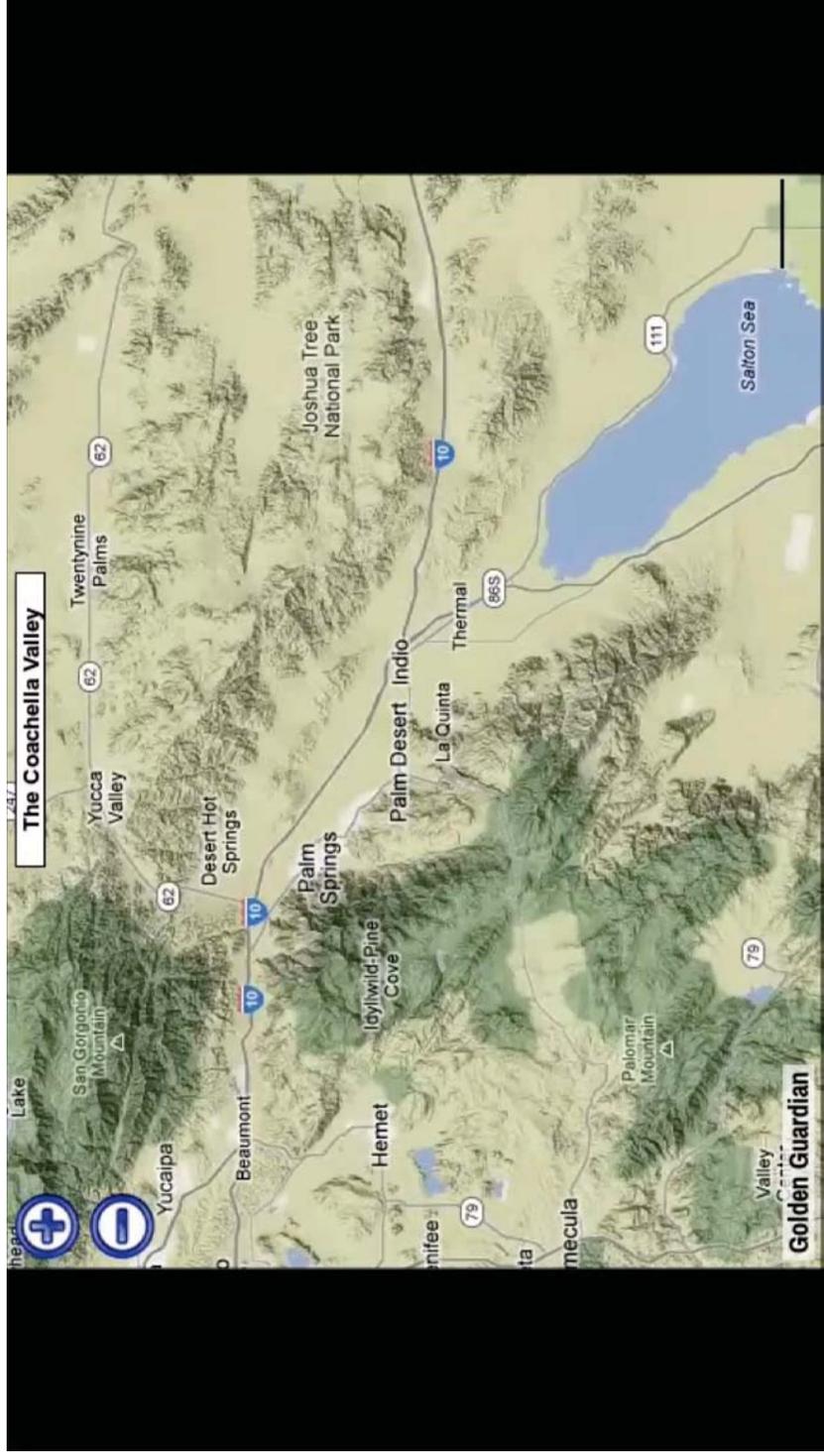
Moving Forward

Expedite award of approved REWS funds

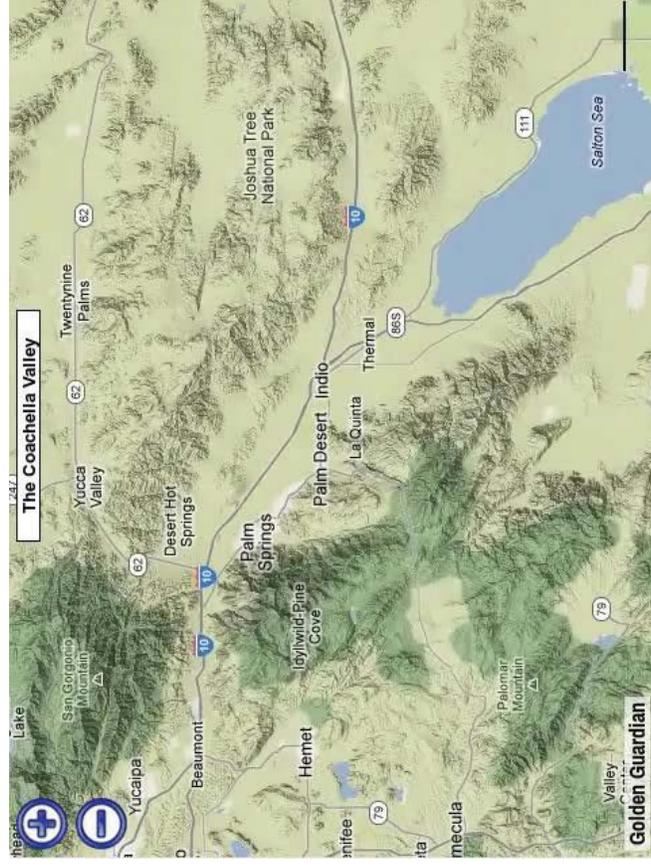
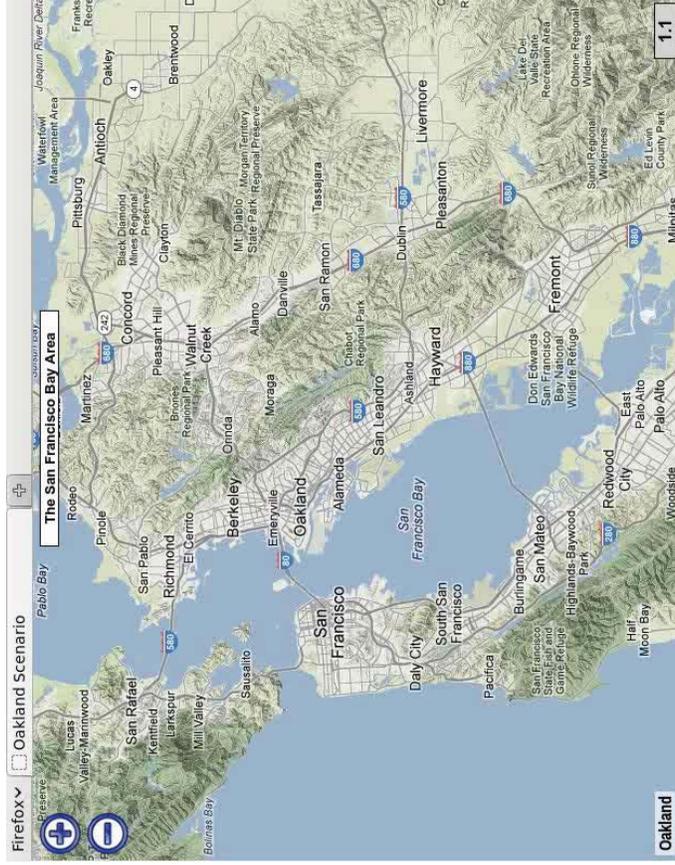
Act decisively to dedicate recent HMPG funds to enhance REWS Projects

Readdress SNIP Funds and redirect towards CEEWS Goals

CREWS Simulation

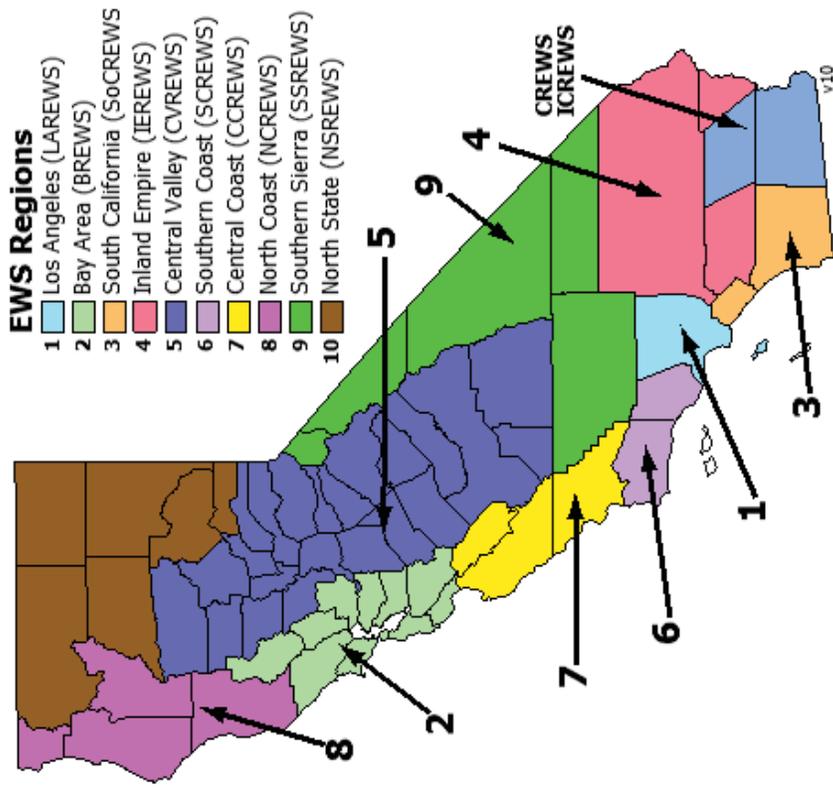


Bay Area Simulation



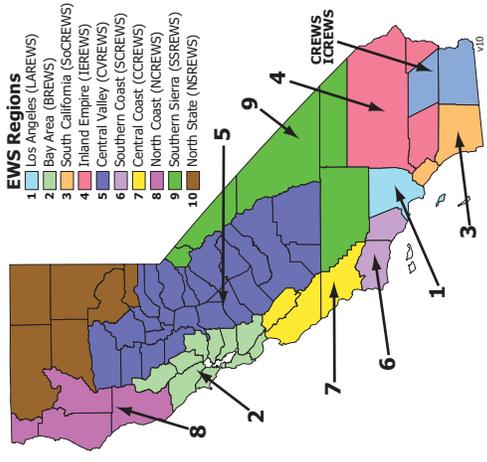
Statewide EQ Warning Working Group

1. *The State via Gov. Office of Emergency Services is committed to Public-Private Partnership to achieve statewide earthquake warning*
2. *Industry is a viable technology partner and is already engaged in deploying Regional EQW systems*
3. *The established Regional Public-Private Partnerships (CREWS /ICREWS) are good demonstration projects*
4. *CA leadership within a Public-Private EQW solution will migrate nationally with FEMA collaboration*



Partnership Approach

A Scalable model for Statewide Earthquake Warning



STATE CAPITOL
P.O. BOX 942849
SACRAMENTO, CA 94249-0052
(916) 319-2052
FAX (916) 319-2152



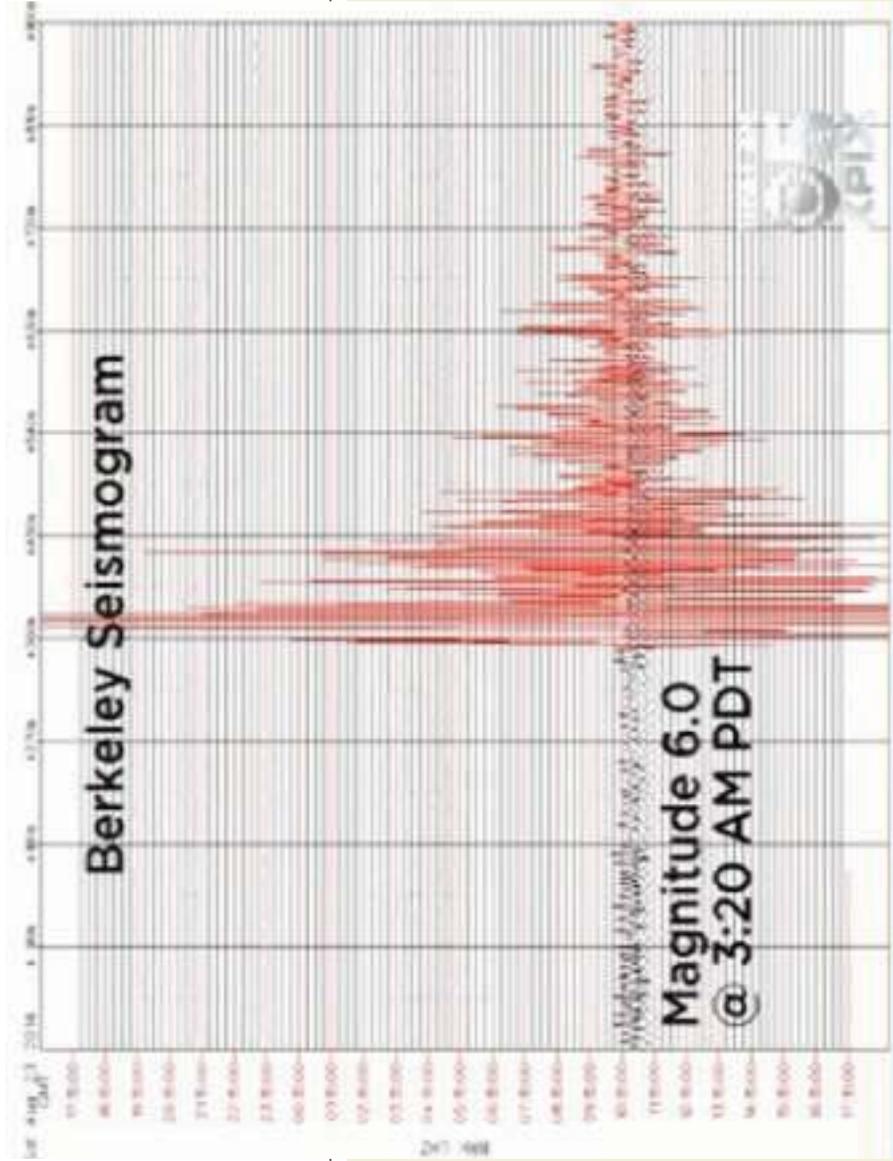
Seismic Warning System – Power Point Presentation



A Tradition of Stewardship
A Commitment to Service

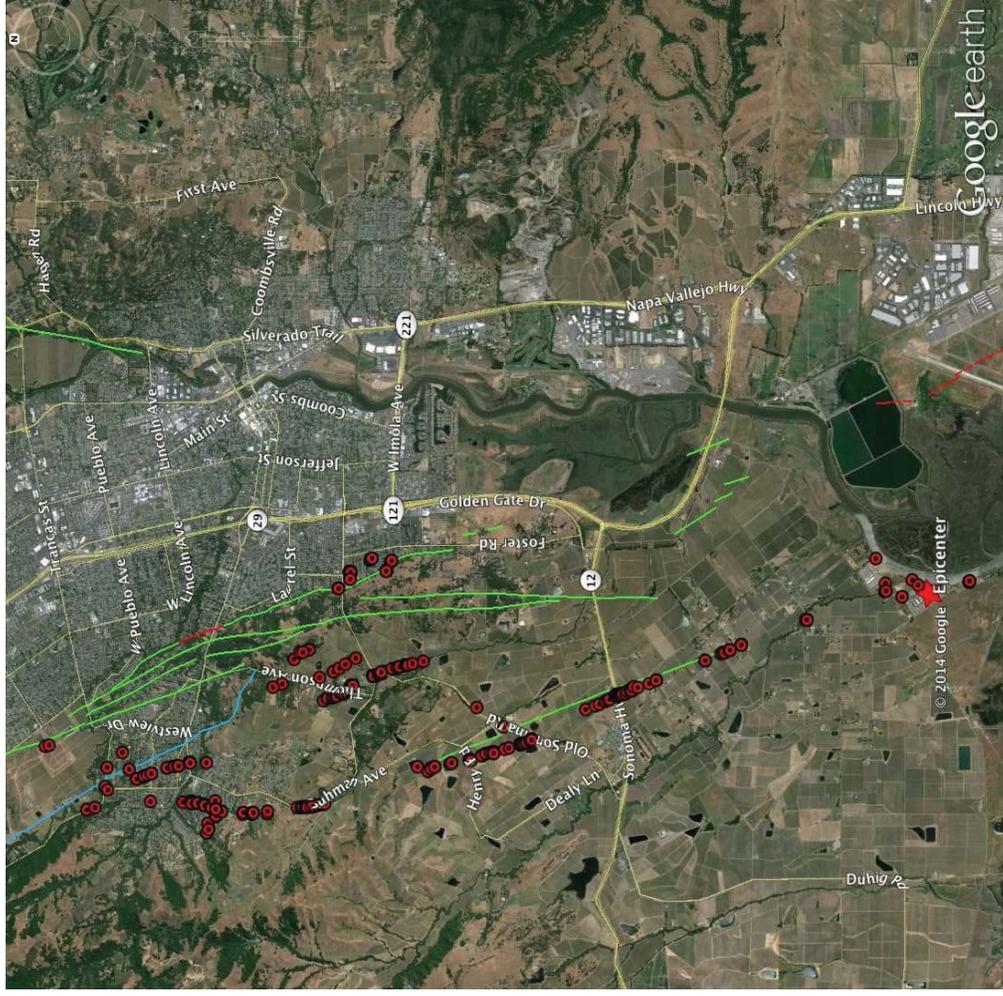


CITY of NAPA



The South Napa Quake

AUGUST 24, 2014



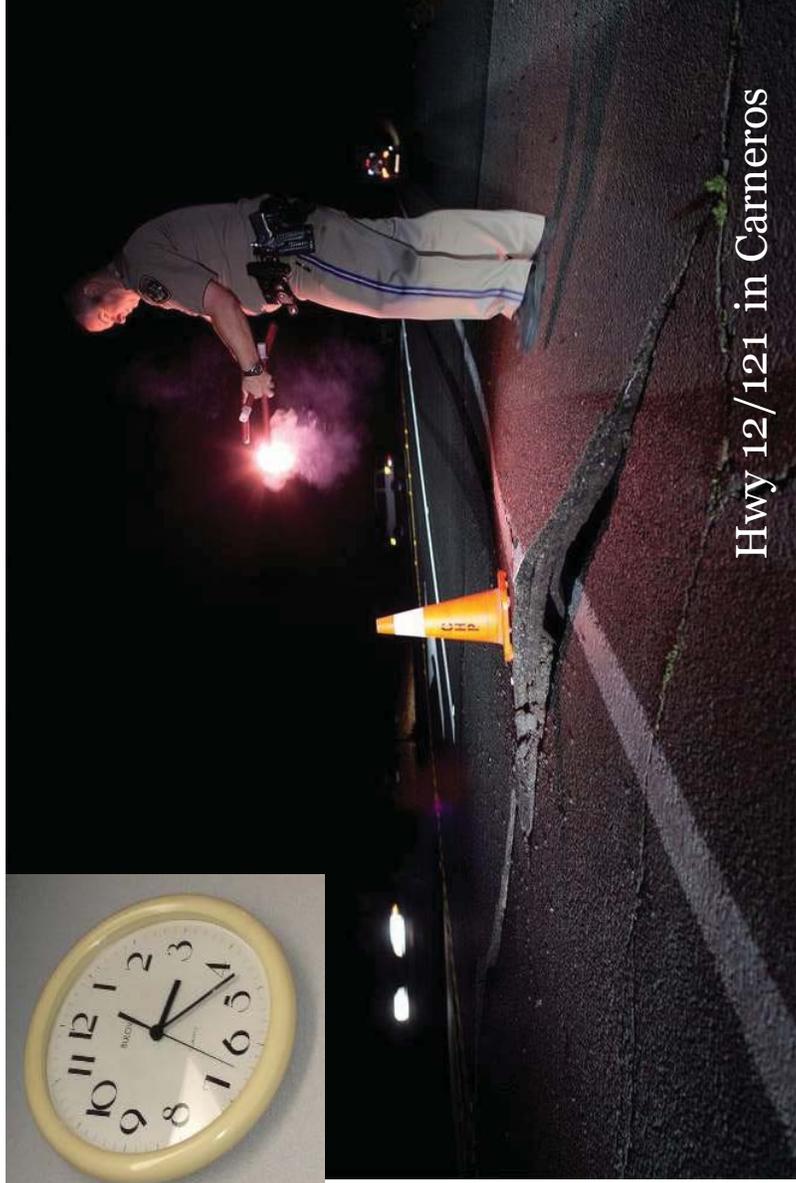
3:20am

6.0 magnitude - largest quake in the Bay Area since 1989

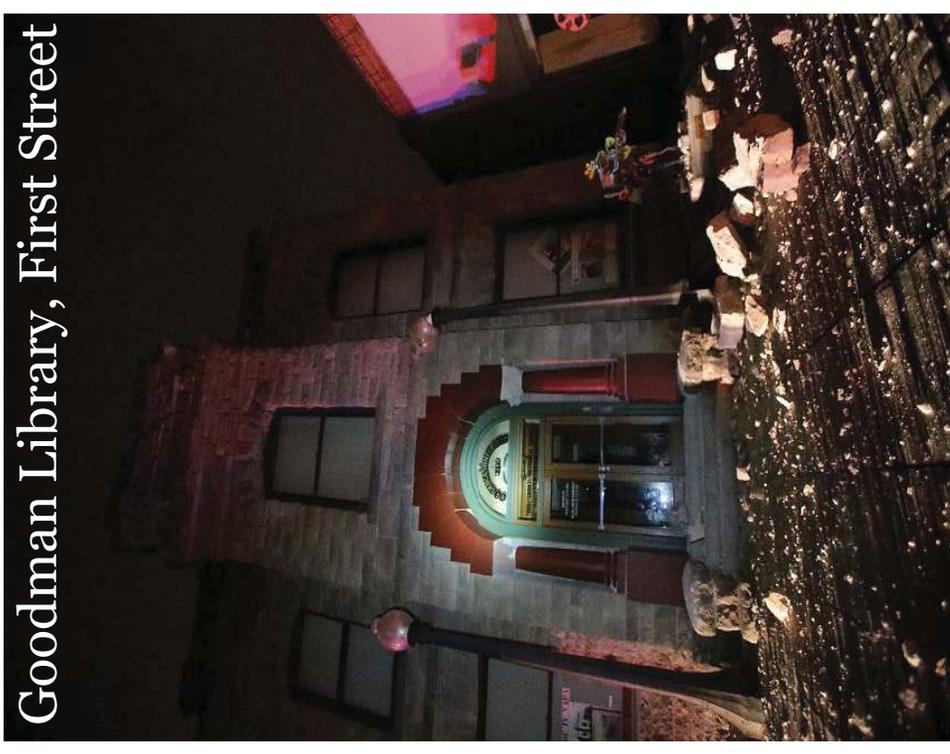
★ Epicenter 5 miles S/SW of the City of Napa, on the West Napa Fault, 7 miles below Napa Valley Marina

📍 Surface fractures indicate underlying faults, as of 8/26. (USGS)

Immediately evident damage to roadways, water lines, buildings...



Hwy 12/121 in Carneros



Goodman Library, First Street

PHOTOGRAPH BY PETER DASILVA, EPA

Hotel guests were displaced due to some Napa hotels being evacuated due to damages



Justin Sullivan / Getty Images

Three structure fires were caused by broken gas lines – the worst at Napa Valley Mobile Home Park on Orchard Ave – broken water lines led to 6 destroyed homes



Napa Valley Register photos

Napa City and County
opened Emergency
Operations Centers (EOCs)
around 6:00 a.m.



City of Napa EOC at Police Department Building

Napa County EOC located at the Sheriff's Office



When the sun came up, the extent of the damage was more apparent...



Old Sonoma Road
Napa Valley register photo



Old Town, City of Napa *Meg Ragan*



Browns Valley residential area



First United Methodist Church, Old Town, City of Napa

Hardest hit areas

West side of town in
Browns Valley and
Westwood

Older buildings
Downtown and Old
Town



177 water system
breaks Countywide
discovered

Main transmission
line and both City
treatment plants
undamaged

Up to 600
customers without
water service for an
extended time

1 million gallon “B Tank” in
Browns Valley suffered
extensive damage



283 injuries reported
Countywide

234 patients treated at
Queen of the Valley
Hospital, 12 at St.
Helena Hospital

18 admitted, 4 in critical
condition at QVH

1 fatality



ABC 7 News photo

*Many injuries occurred hours
after the quake during cleanup*

153 buildings were red tagged at some time.
More than 1,100 were yellow tagged.

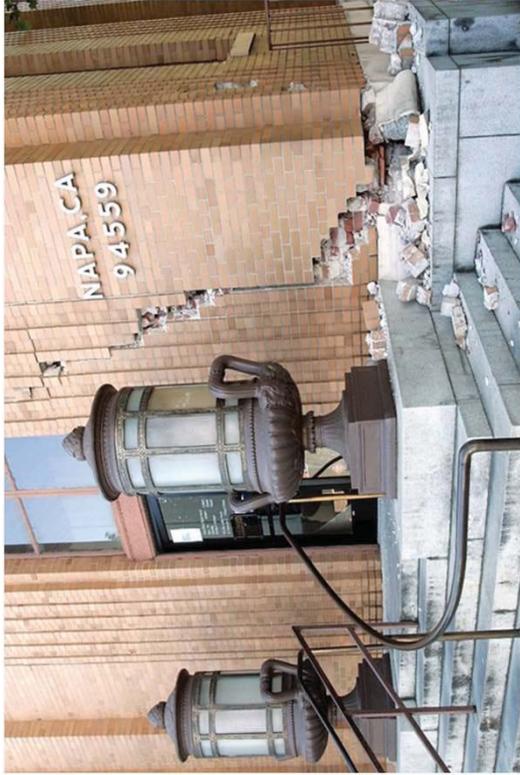


Bay Area News Group photo



FEMA photo

Napa Valley Register photos



Downtown Historic
Post Office



Noah Berger/AP



A Tradition of Stewardship
A Commitment to Service



A Tradition of Stewardship
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A Tradition of Stewardship
A Commitment to Service



- Damage estimate** (Napa City and County; likely to increase as inspections continue)
- \$362.4 million damage to private property & public infrastructure



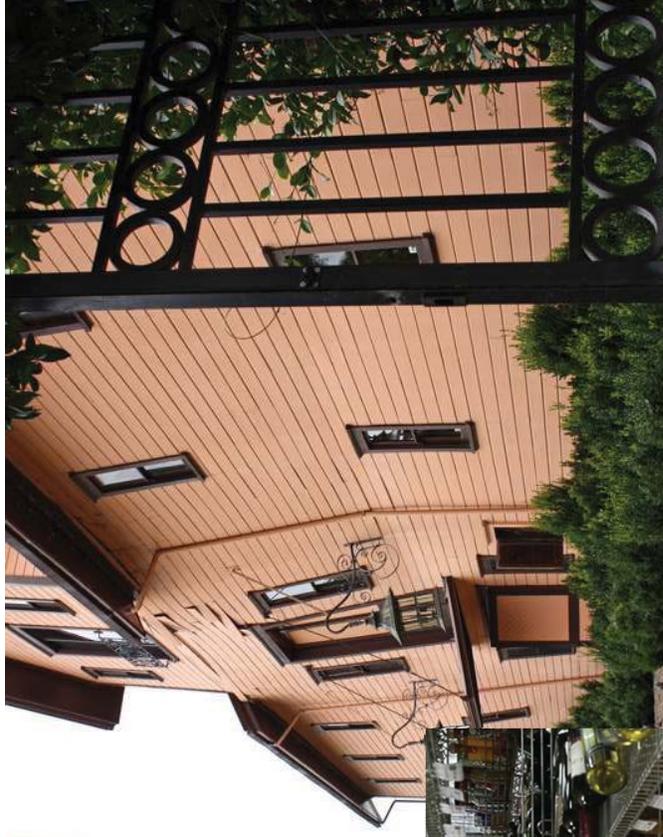
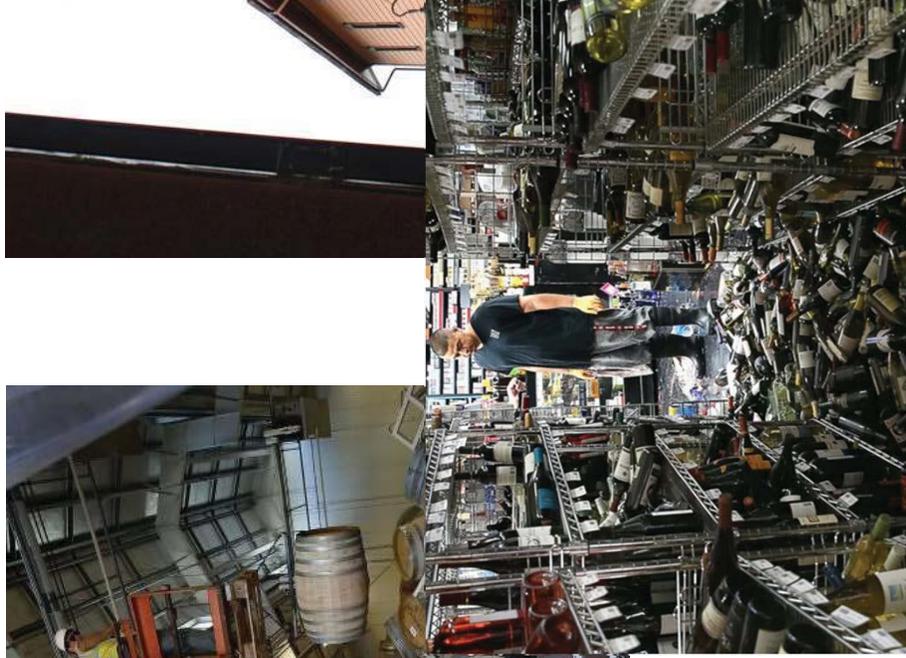
Historic Courthouse



Napa wine industry losses estimated at \$80.3 million
(in addition to \$362.4 million public/private property estimate)



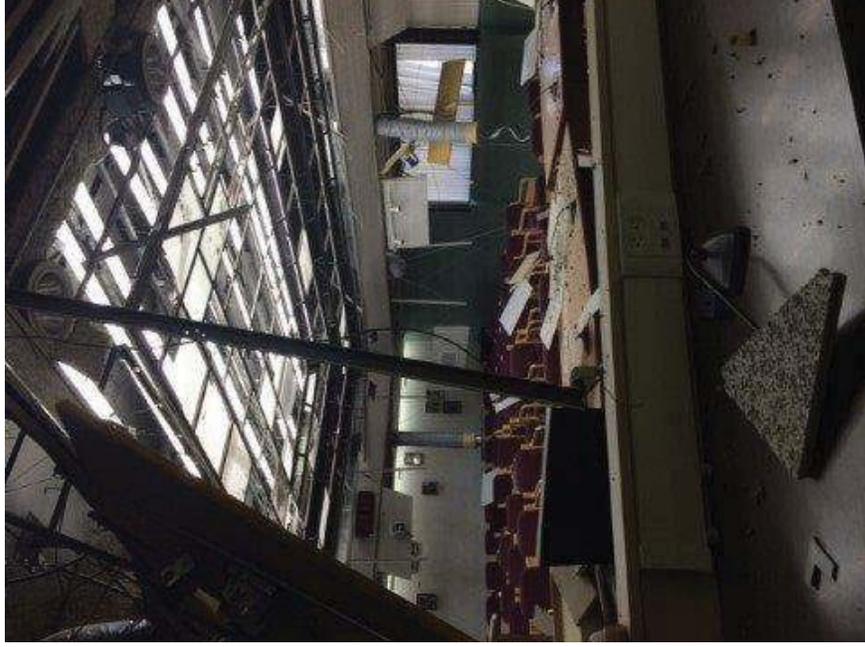
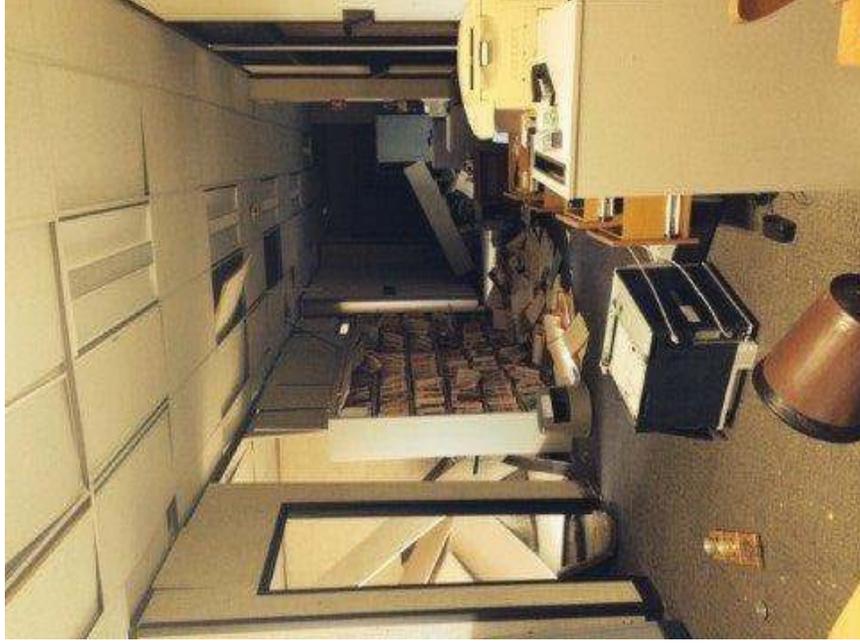
Starmont Winery
SF Chronicle photo



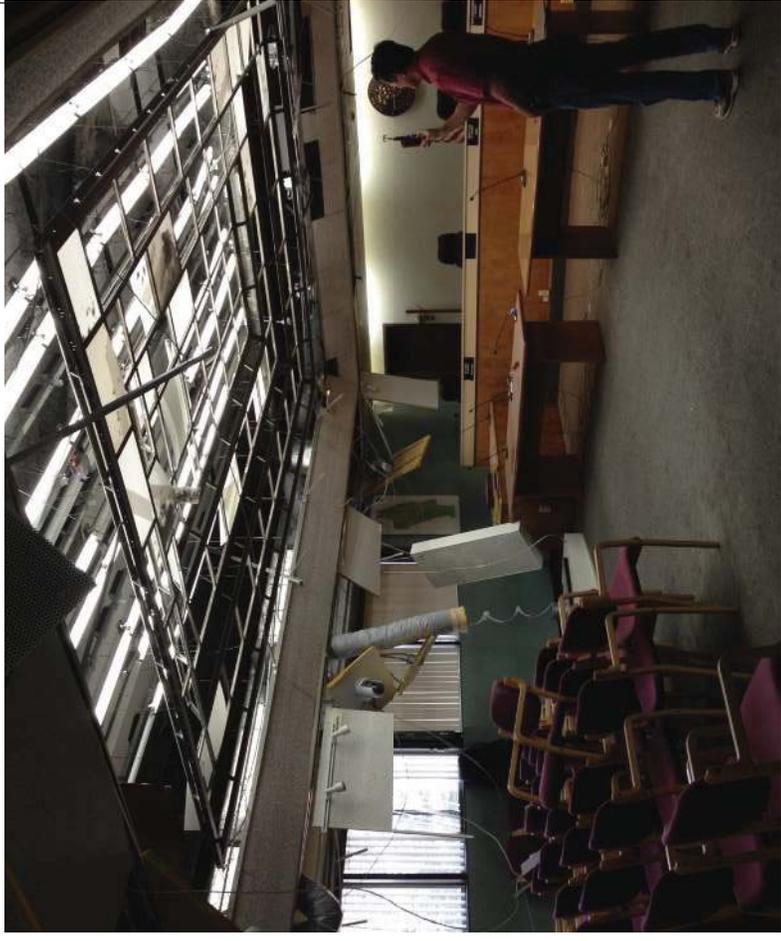
Trefethen Winery *Trefethen Winery website*

Val's Liquors
Justin Sullivan/Getty Images

14 County Buildings Damaged 400+ Employees Relocated



Board of Supervisors hearing room



HHS – Building B (below)

Library (left)



Stone Bridge School in Carneros – close to epicenter





Many structures, like Napa High School (at left), suffered ruptures of cold joints that run through entire buildings

Milliken – 16-inch raw waterline

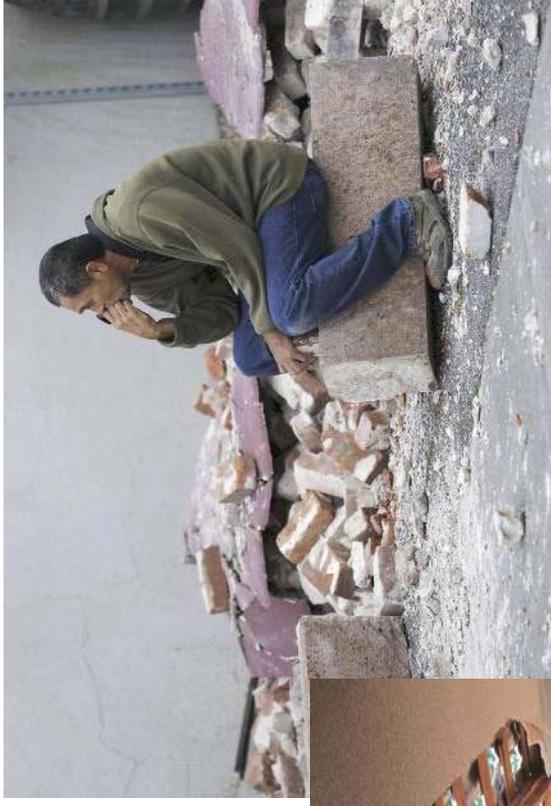
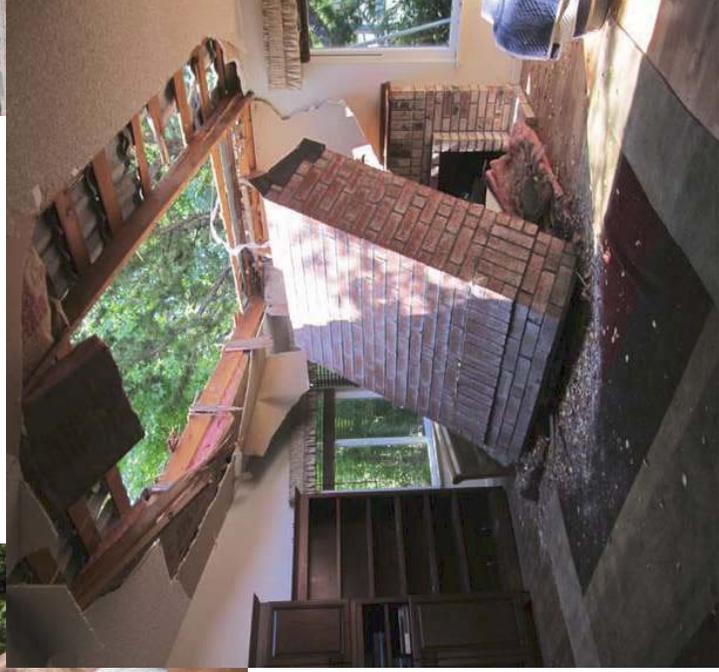


Joint City County Local Assistance Center



Photo Credit: Molly Rattigan

- 4,060 phone calls
- 2,100+ in person visits
- 50 to 80 new inspection requests per day
- NapaQuakeInfo.com has received 14,400+ hits to date and is receiving visibility across the world



*All photos taken by
San Francisco Chronicle*