

**State of California
Memorandum**

To: Seismic Safety Commissioners

From: **Karen Cogan**
Seismic Safety Commission
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Sacramento, CA 95833 (IMS D-4)
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Date: January 8, 2014

Subject: **2013 Alfred E. Alquist Seismic Safety Commission Annual Report**

Background

As Stated in Section 8870.1 of the Seismic Safety Commission Act, the Seismic Safety Commission is required to report annually to the Governor and to the Legislature on its activities and progress relating to earthquake hazard reduction. The attached draft Annual Report covers the activities for calendar year 2010.

This report was circulated among commissioners and staff in December, taking their changes into consideration.

Recommendation

Staff requests the Commission approve the attached Annual Report for 2013 for submittal to Agency and the Governor and Legislature.

Attachment

CALIFORNIA CODES
GOVERNMENT CODE
SECTION 8870-8870.95

8870. The Legislature finds and declares as follows:

First, many different agencies at various levels of **government** have substantial responsibilities in the fields of earthquake preparedness and **seismic safety**.

Second, there is a pressing need to provide a consistent policy framework and a means for coordinating on a continuing basis the earthquake-related programs of agencies at all governmental levels and their relationships with elements of the private sector involved in practices important to **seismic safety**. This need is not being addressed by any continuing state **government** organization.

Third, through concerted efforts of broad scope, coordinated by a **seismic safety commission**, long-term progress should be made toward higher levels of **seismic safety**.

Fourth, to provide and maintain effective policy guidance and leadership on **seismic safety** issues, and to fulfill its duties under this chapter, it is imperative that the State **Seismic Safety Commission** carry out its mission as an independent state agency, with direct access and accountability to the Governor and the Legislature.

Fifth, it is not the purpose of this chapter to transfer to the **commission** the authorities and responsibilities now vested by law in state and local agencies.

8870.1. (a) (1) There is created in the state **government** the Alfred E. Alquist **Seismic Safety Commission** as an independent unit within the State and Consumer Services Agency.

(2) Any reference in statute or regulation to the **Seismic Safety Commission** shall be deemed to refer to the Alfred E. Alquist **Seismic Safety Commission**.

(b) The **commission** shall report annually to the Governor and to the Legislature on its findings, progress, and recommendations relating to earthquake hazard reduction, and any other **seismic safety** issues, as requested by the Governor or the Legislature.

8870.2. (a) The Alfred E. Alquist **Seismic Safety Commission** shall consist of 15 members appointed by the Governor and confirmed by the Senate, one member representing the California Emergency Management Agency, one member representing the Division of the State Architect in the Department of General Services, one member representing the California State Building Standards **Commission**, one member appointed by the Senate Rules Committee, and one member appointed by the Speaker of the Assembly. The **commission** shall elect annually from its membership its own chairperson and vice chairperson and may replace them with other commissioners by majority vote. **Commission** members shall be residents of California.

(b) A quorum shall consist of 11 members if there are no vacancies, or else a majority of the members of the **commission** at the time.

(c) The Legislature declares that the individuals appointed to the **commission** are intended to represent the professions of architecture, planning, fire protection, public utilities, structural engineering, geotechnical engineering, geology, seismology, local **government**, insurance, social services, emergency services, and the Legislature and that such representation serves the public interest. Accordingly, the Legislature finds that for purposes of persons who hold this office the specified professions are tantamount to and

constitute the public generally within the meaning of Section 87103.

(d) The **commission** exists as a separate unit within the State and Consumer Services Agency, and has the functions of prescribing policy, holding meetings and setting dates of the meetings, conducting investigations, and holding hearings insofar as those powers are given by statute to the **commission**.

(e) The decisions and actions of the **commission**, with respect to exercising its authority and carrying out its duties under this chapter, or any other applicable law, are not subject to review by the Secretary of the State and Consumer Services Agency, but are final within the limits provided by this chapter.

(f) The Legislature further declares that the highest level of service that the individuals appointed to the **commission** can provide to the residents of California is to offer professional, unbiased, scientifically based advice to the Governor and the Legislature. To maintain this quality of service, it is imperative that the **commission** retain its functional autonomy and access to the Governor and the Legislature. As such, the **commission** shall retain its existing authority to issue reports, publications, and literature, as well as to sponsor legislation, and to take official positions on proposed state and federal legislation.

8870.3. (a) The membership of the Alfred E. Alquist **Seismic Safety Commission** shall be appointed by the Governor and confirmed by the Senate from lists of nominees submitted by organizations as listed below:

(1) Four members appointed from established organizations in the fields of architecture and planning, fire protection, public utilities, electrical engineering, and mechanical engineering.

(2) Four members appointed from established organizations in the fields of structural engineering, geotechnical engineering, geology, and seismology.

(3) Four members submitted by the League of California Cities and the California State Association of Counties.

(4) Three members appointed from established organizations in the fields of insurance, social services, and emergency services. One of these members shall be a building official.

(b) One member shall be appointed from the Senate by the Senate Rules Committee, and one member shall be appointed from the Assembly by the Speaker of the Assembly. Each of the members appointed pursuant to this subdivision may designate an alternate who shall be counted toward a quorum, who may vote, and who may receive the expenses specified in Section 8870.4.

8870.35. The term of office for each member of the **Seismic Safety Commission** shall be four years and each shall hold office until the appointment and qualification of his or her successor. However, of the initial commissioners, the Governor shall appoint seven members whose terms will expire two years after appointment and seven members plus the chairperson whose terms shall expire four years after appointment. All initial appointments shall be made by July 1, 1975. Any vacancies shall be immediately filled by the appointing power for the unexpired portion of the term in which they occur.

8870.4. (a) Except as provided in subdivision (d), the members of the Alfred E. Alquist **Seismic Safety Commission** shall serve without compensation but shall be paid per diem expenses of one hundred dollars (\$100) for each day's attendance at a meeting of the **commission**, plus actual necessary travel expenses as determined by Department of Personnel Administration rules.

(b) The members of the **commission** who represent the California Emergency Management Agency, the California Building Standards **Commission**, and the Division of the State Architect shall be

employees in good standing of those respective entities. Any per diem and travel expenses of those members of the **commission** shall be paid by the agencies that they represent on the **commission**, in compliance with applicable conditions or regulations set by the Department of Personnel Administration.

8870.5. The **commission**, in the discharge of its responsibilities, may do any of the following:

(a) Accept grants, contributions, and appropriations from public agencies, private foundations, or individuals.

(b) Appoint committees from its membership, appoint advisory committees from interested public and private groups, and appoint ex officio members who shall not be entitled to vote, to advise the **commission**.

(c) Contract for or employ, with the approval of the Director of Finance, any professional services and research required by the **commission** or required for the performance of necessary work and services which, in the **commission**'s opinion, cannot satisfactorily be performed by its officers and employees or by other federal, state, or local governmental agencies.

(d) Enter into agreements to act cooperatively with private nonprofit scientific, educational, or professional associations or foundations engaged in promoting **seismic safety** in California. These associations or foundations may furnish materials for sale, and the **commission** may provide personnel services and office space therefor. Subject to rules and regulations adopted by the **commission**, all moneys received from the sale of publications or other materials provided by an association or foundation shall be returned to the association or foundation for use in furthering **seismic safety** programs.

(e) Do any and all other things necessary to carry out the purposes of this chapter.

8870.55. The **commission** shall initiate, with the assistance and participation of other state, federal, and local **government** agencies, a comprehensive program to prepare the state for responding to a major earthquake prediction. The program should be implemented in order to result in specific tools or products to be used by governments in responding to an earthquake prediction, such as educational materials for citizens. This program may be implemented on a prototypical basis in one area of the state affected by earthquake predictions, provided that it is useful for application in other areas of the state upon its completion.

8870.6. The **commission** shall appoint an executive director who shall be responsible for managing the affairs of the **commission**, subject to the direction and policies of the **commission**.

The executive director shall appoint such employees as may be necessary to carry out the functions of the **commission**.

8870.7. The **commission** is responsible for all of the following in connection with earthquake hazard mitigation:

(a) Setting goals and priorities in the public and private sectors.

(b) Requesting appropriate state agencies to devise criteria to promote earthquake and disaster **safety**.

(c) Scheduling a report on disaster mitigation issues from the California Emergency Management Agency, on the **commission** agenda as required. For the purposes of this subdivision, the term disaster refers to all natural hazards which could have an impact on public **safety**.

(d) Recommending program changes to state agencies, local agencies, and the private sector where such changes would improve earthquake hazards and reduction.

(e) Reviewing the recovery and reconstruction efforts after damaging earthquakes.

(f) Gathering, analyzing, and disseminating information.

(g) Encouraging research.

(h) Sponsoring training to help improve the competence of specialized enforcement and other technical personnel.

(i) Helping to coordinate the earthquake **safety** activities of **government** at all levels.

(j) Establishing and maintaining necessary working relationships with any boards, commissions, departments, and agencies, or other public or private organizations.

8870.71. To implement the foregoing responsibilities, the **commission** may do any of the following:

(a) Review state budgets and review grant proposals, other than those grant proposals submitted by institutions of postsecondary education to the federal **government**, for earthquake-related activities and to advise the Governor and Legislature thereon.

(b) Review legislative proposals related to earthquake **safety** to advise the Governor and the Legislature concerning the proposals and to propose needed legislation.

(c) Recommend the addition, deletion, or changing of state agency standards when, in the **commission's** view, the existing situation creates undue hazards or when new developments would promote earthquake hazard mitigation, and conduct public hearings as deemed necessary on the subjects.

(d) In the conduct of any hearing, investigation, inquiry, or study that is ordered or undertaken in any part of the state, administer oaths and issue subpoenas for the attendance of witnesses and the production of papers, records, reports, books, maps, accounts, documents, and testimony.

(e) In addition, the **commission** may perform any of the functions contained in subdivisions (a) to (d), inclusive, in relation to disasters, as defined in subdivision (c) of Section 8870.7, in connection with issues or items reported or discussed with the California Emergency Management Agency at any **commission** meeting.

8870.9. Prior to July 1, 2010, the Legislature shall hold public hearings to receive testimony from the Alfred E. Alquist **Seismic Safety Commission**, any interested organizations, and members of the public or private sector. At the hearing, the Legislature shall receive testimony and other information concerning the mission, membership, duties, and operations of the **commission**.

8870.95. The Hospital Building **Safety** Board established in Section 129925 of the Health and **Safety Code** shall report annually to the Alfred E. Alquist **Seismic Safety Commission**.

State of California
Alfred E. Alquist



Annual Report for 2013 - DRAFT



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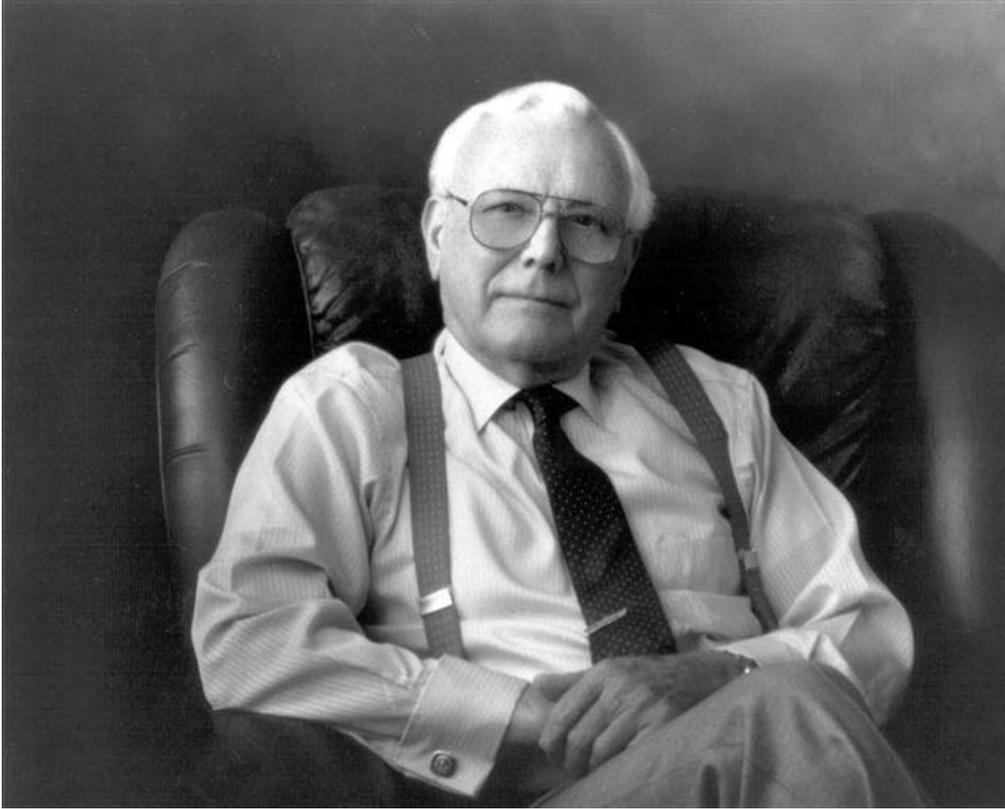
California Seismic Safety Commission

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Senator Alfred E. Alquist
Seismic Safety Commission
Founder



State Senator Al Alquist was born on August 2, 1908 in Memphis, Tennessee. Senator Alquist was elected to the State Assembly in 1962, and four years later, the State Senate, where he served for 30 years.

The Commission will not let his legacy be in vain, but will continue supporting his efforts. He laid a strong foundation and his courage and leadership will be profoundly missed by all whose lives he touched.

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UPDATE HERE ONCE REPORT IS FINALIZED

DRAFT
2013 Annual Report
Seismic Safety Commission

Executive Summary

The Alfred E. Alquist Seismic Safety Commission (Commission) is the primary seismic resource for the State of California and acts as adviser to the Governor, the Legislature, and the public on earthquake policy, providing California with cost-effective recommendations to reduce earthquake losses and speed recovery. The strategies created by the Commission will significantly affect economic impact in the earthquake recovery phase. Dedicated to reducing earthquake risk for the people of California since 1975, the Commission investigates earthquakes, reports on earthquake-related issues, and evaluates and recommends to the Governor and Legislature policies needed to reduce earthquake risk and to ensure a coordinated framework for establishing earthquake safety policies and programs in California. Notably, the plans and programs for recovery following a major seismic event are applicable to other disasters, both natural and man-made, and can assist in recovery from those events as well.

In 2012, California ranked 10th largest economy in the world, with a GDP of \$2.003 trillion -- all the more reason to focus on preparing our industries and sharpening our recovery goals.

The following is a summary of the major accomplishments in 2013:

- Released the “*California Earthquake Loss Reduction Plan – Post Earthquake Economic Recovery*” report.
- Collaborated with Northern Illinois University and the California Geological Survey to send a remotely operated vehicle to observe faults and landslides in Lake Tahoe, allowing the Commission to obtain data pertinent to seismic and tsunami hazards in the Lake Tahoe basin.
- Participated in an independent peer review panel for the Diablo Canyon and San Onofre Nuclear Power Generating Stations.
- Collaborated with Global Earthquake Model Foundation (GEM) in two projects that will help cities and counties in California become more prepared for a disaster.
- Examined ways to reduce the “fire following earthquake” risk to the citizens and the State environment.

The Commission’s goals for 2014 are:

- Speed recovery of California’s building stock through work with Global Earthquake Model Foundation (GEM).
- Assist the agricultural (livestock, poultry, and dairy) industries to better prepare for and recover from disasters.
- Continue working with the Governor’s Office of Business and Economic Development to seek partnerships and projects that further the recommendations in the latest Commission report on post - earthquake economic recovery.
- Develop risk management guidelines for collapse-prone buildings
- Assist CalOES with establishing and funding an “Earthquake Early Warning System” for California.

Mission Statement

To provide decision makers and the general public
with cost-effective recommendations to reduce earthquake losses
and expedite recovery from damaging earthquakes.

Vision Statement

To provide leadership in implementing and achieving the goals and objectives in the *California Earthquake Loss Reduction Plan*, including to advance learning about earthquakes and risk reduction in both the short and long term, advance the earthquake-resistant designs of buildings and other important structures, and advance the preparedness and emergency response systems for earthquakes.

2013 Commission Membership

1. Honorable Michael Gardner, Chair	<i>Local Government</i>
2. Sheriff Mark Pazin, Vice Chairman	<i>Emergency Services</i>
3. Senator Ellen Corbett	<i>State Senate</i>
4. Assembly Member Ken Cooley	<i>State Assembly</i>
5. Mark Ghilarducci, <i>State Representative</i>	<i>Cal EMA</i>
6. Dr. Kit Miyamoto	<i>Structural Engineering</i>
7. Chester Widom, <i>State Representative</i>	<i>State Architect</i>
8. Jim McGowan, <i>State Representative</i>	<i>Building Standards Commission</i>
9. Vacant	<i>Local Building Official</i>
10. Dr. Emir Jose Macari	<i>Geotechnical Engineering</i>
11. David Rabbitt	<i>Local Government</i>
12. Honorable Salud Carbajal	<i>Local Government</i>
13. Dr. Margaret Hellweg	<i>Seismology</i>
14. Helen Knudson	<i>Social Services</i>
15. Timothy Strack	<i>Fire Protection</i>
16. Tracy Johnson	<i>Public Utilities</i>
17. Fuad Swiss	<i>Mechanical Engineering</i>
18. Dr. Gregory Beroza	<i>Geology</i>
19. Randy Goodwin	<i>Architectural Planning</i>
20. Vacant	<i>Insurance</i>

Richard J. McCarthy, *Executive Director*
Karen Cogan, *Administrative Manager*
& *Annual Report Editor*
Robert Anderson, *Senior Engineering Geologist*
Sue Celli, *Executive Secretary and Office Manager*
Dave King, *Legislative & Special Projects Manager*
Henry Reyes, *Structural Engineer (Special Projects)*
Fred Turner, *Senior Structural Engineer*

Commission Authority

The California Seismic Safety Commission was established in 1975 to advise the Governor, Legislature, state and local agencies, and the public about strategies to reduce earthquake risk (Government Code §8870, et seq.). The Commission reports through the State Business, Consumer Services and Housing Agency and consists of 20 commissioners. (The Governor appoints 15 commissioners of those, chosen for their technical expertise and experience; the Senate and the Assembly each choose a representative from their respective memberships; and three State organizations are represented. The State reps are the *California Office of Emergency Services, California Building Standards Commission, and the Division of the State Architect.*)

Commission Funding

As of July 1, 2013, the Commission is now supported by the Insurance Fund, managed by the California Department of Insurance. The operational budget for fiscal year (FY) 2013/2014 is \$1.2 million. Occasionally, the Commission will receive reimbursement funds for special projects. In 2013, the San Francisco Public Utilities Commission, on two occasions, requested the Commission's review of the *San Francisco Public Utilities Commission's Water System Improvement Plan*. For projects supported by the *California Earthquake Research Fund*, the Commission's overhead is restricted to 10% of research funded.

Commission 2013 Projects

California Earthquake Loss Reduction Plan – Post Earthquake Economic Recovery

California is the most productive state in the Union and is the 10th largest economy in the world, and 88% of the State's economy is derived from the private sector. Because of these two factors, the Commission updated the *California Earthquake Loss Reduction Plan*, and focused on restoring California commerce after earthquakes. The *California Earthquake Loss Reduction Plan – Post Earthquake Economic Recovery*” report looked at past elements within the Plan and identified how those initiatives support economic recovery. This project identified billions of post-disaster dollars to be saved through reduced business market share after disasters.

The *California Earthquake Loss Reduction Plan 2013* was devoted to developing a comprehensive post-earthquake economic recovery plan that will enable California to continue maintaining its economic vibrancy and leadership, and continue to provide employment and services for its residents.

Issues highlighted in the new plan include:

- Agriculture is the State’s largest industry.
- Small businesses are a very important part of the State's economy.
- The current interdependent global economy can impact many national economies should a disaster strike one nation. The interdependent nature of the global economy can impact national economies should a disaster occur.
- Previous loss reduction plans have focused on the built environment and the public sector, with insufficient attention paid to the needs of the private sector, including small businesses.

A more comprehensive study of past earthquakes worldwide should be undertaken next to examine economic recovery measures taken by various local and national governments. This information could be used to develop a comprehensive strategic plan for California's rapid economic recovery after an earthquake.

Although California has made great strides towards improving seismic safety, much remains to be achieved.

Some other important facts to consider are:

- As of July 2012, the total non-farm employment was 14.3 million individuals, and those employed in the agricultural sector was approximately 2.5 million.
- Key among California’s industrial sectors are information technology, microelectronics, and biomedical technology. Recognizing California’s global leadership in these areas, several

multinational companies have located their research and development facilities in California.

- One important reason for California’s leadership in high-tech is the fact that it is home to over 400 public and private colleges and universities which produce more than 200,000 graduates annually.
- According to the United States Geological Survey, “California has more than a 99% chance of having a magnitude 6.7 or larger earthquake within the next 30 years.” The likelihood of an earthquake greater than magnitude 7.5 occurring is 46% over the next 30 years.

Commission Review of San Francisco Public Utilities Commission’s Water System Improvement Plan

The San Francisco Public Utilities Commission (SFPUC) initiated a \$4.6 billion project to retrofit its water delivery system from Hetch Hetchy and other reservoirs. This program calls for the construction of a new dam and pipelines, repair of existing pipelines and facilities, and earthquake fault crossings. Enabling legislation would require the SFPUC to make annual reports and provide notice to the California Seismic Safety Commission (CSSC) of any changes that result in delays or deletions of work in its Water System Improvement Program (WSIP). When completed, this project will significantly reduce the risk from major earthquakes to the water supply for over 2.5 million people in the greater San Francisco Bay region. Any delays in construction would postpone improvement to the reliability of the Bay region’s water supply.

In May and September 2013, the Commission conducted independent reviews of additional delays in the WSIP. The State Water Code requires the Commission to report to the Joint Legislative Audit Committee regarding the public safety implications on the delays and changes. The Commission’s review informed the Legislature and assisted the SFPUC to manage the Water System Improvement Program.

Independent Peer Review Panel Participation Diablo Canyon Nuclear Generating Station

The Commission is a member of the California Public Utilities Commission (PUC) Independent Peer Review Panel (IPRP) to review new geologic information obtained by Pacific Gas & Electric (PG&E) Company regarding seismic hazards that could impact the Diablo Canyon Nuclear Power Plant (DCNPP) owned and operated by PG&E. The IPRP is tasked with reviewing PG&E’s seismic and geological information related to a new seismic hazard assessment of the DCNPP. The IPRP also advises the PUC regarding the reasonableness and adequacy of the collection of new seismic and geologic data regarding nearby seismic hazards that impact the DCNPP.

The new information is being gathered and analyzed by PG&E and its consultants to identify or confirm existing and new potential seismic hazards that may impact the DCNPP as well as California’s electric transmission system. New geologic and seismic data are proposed to be gathered by extensive onshore and offshore geophysical surveys. The IPRP members include the California Geological Survey, the California

Coastal Commission, San Luis Obispo County, and the California Energy Commission and the IPRP works under the leadership of the PUC. PG&E received approval from the State Lands Commission.

Permits for conducting an offshore high-energy seismic survey at Morro Bay were denied by the California Coastal Commission. The Coastal Commission denial was based on the belief that the high-energy seismic surveys (noise from air guns towed behind the survey ship) would have a negative impact on marine mammals and fish. PG&E was informed by the Coastal Commission that, should they re-apply for a permit, the application would most likely once again, be denied. Meanwhile, PG&E continues to compile and analyze low-energy offshore seismic data.

Partnering with Other Agencies

The Commission invested in a partnership with the California Earthquake Authority (CEA) and the California Geological Survey to provide technical assistance to the CEA on the development of the first update to the Uniform California Earthquake Rupture Forecast (UCERF) and the Next Generation Attenuation West 2 programs, which will be needed to assess seismic shaking hazards by loss modeling companies and earthquake insurance companies throughout California.

The UCERF program covers several critical issues that were observed during recent earthquakes in Chile, China, California, Mexico, Japan and New Zealand. This will lead to a much greater understanding of the relationships between the physical aspects of faults and earthquakes, ground motion potential, and will assist loss modeling companies and insurance companies in setting premium rates. Results from both projects will be used by the United States Geological Survey in 2014 to update California's portion of the National Seismic Hazard Map and then later be integrated into United States' building code.

Agriculture Disaster Preparedness

The Commission is working with the Governor's office of business and Economic Development to identify projects to assist in post earthquake economic recovery and propose ways to mitigate damage and economic losses. Agriculture is uniquely vulnerable to earthquakes and other natural and man-made disasters. Studies are needed to determine potential impacts from those hazards and identify ways to mitigate them. The geographic dispersion of agriculture in the State presents challenges. By being geographically diverse, farms and ranches may seem less vulnerable than some industries to seismic disruptions. However, agricultural products are marketed and exported through the rural and urban infrastructure, and often rely on lifelines such as water distribution systems and port facilities that are highly susceptible to earthquake damage. Therefore, understanding vulnerabilities of agriculture to infrastructure disruption is crucial.

Much of California farm output is highly perishable. Farmers often have little flexibility in the timing of harvest, processing or marketing. This applies to milk, many fresh fruits and vegetables, and some nursery and greenhouse items. These commodities face severe losses from disruptions in harvest, transport, processing, and marketing services. The livestock industries also raise animal welfare concerns. For example, in case of power failure, living conditions of confined livestock deteriorate and daily harvest of milk or eggs will be disrupted. The extent and scope of the effects of potential earthquake damage vary by region. Quantifying damage requires systematic analysis based on information on seismic activity and impacts linked to data on agricultural activities.

The goals of this project are to: (a) identify the most vulnerable areas within the agricultural industry to seismic shaking; (b) project potential losses quantitatively; (c) assess potential ways to mitigate seismic damage; (d) suggest ways that farmers and others in agriculture might be better prepared for earthquakes; and (e) identify information, past disaster economic needs, and roles for local, state and federal governments.

**Engaging Californians in a Shared Vision for Resiliency:
Practical Lessons Learned from the Great California Shakeout**

In February 2013, the Commission released a report which summarized the history and development of the Great California ShakeOut drill, and made recommendations to guide future planning and coordination of earthquake drill activities in California with emphasis on preservation of economic health.

The ShakeOut Drill is an annual community-wide event begun in 2008. The goal of the drill is to provide Californians with an opportunity to learn what to do before, during, and after an earthquake. Since first being implemented, the Shakeout drill has spread to other states and several countries as well.

Key findings from the report include:

- Just as real earthquakes prompt preparedness behavior, simulated events like the ShakeOut drill also prompt information-seeking and preparedness action.
- California schools remain an underutilized resource for promoting household earthquake preparedness and can do more to encourage staff and student families to prepare for disaster at home and provide support materials for doing so.
- Stakeholders such as business and non-profits also remain underutilized in promoting household preparedness and can have a tremendous impact on the level of preparedness as well as the rate of recovery in local communities.
- The Shakeout drill has been successful in promoting earthquake safety and preparedness and has proven to be an effective strategy for motivating household preparedness.

The entire report with recommendations can be viewed at the Commission's website. The report was prepared by Michele M. Wood, Ph.D, CSU Fullerton, Department of Health Science with Deborah Glik, Community Health Science, University of California, Los Angeles, and supported by the Seismic Safety Commission.

**The Seismic Safety Commission
Earthquake Research Fund**

In 2007, the Commission received a \$6.5 million settlement for seismic projects from the California Research Assistance Fund (now referred to as *California Earthquake Research Fund*). The Commission has achieved a leveraging ratio of 2.1 to 1 over the life of the program (five years). These non-General Funds are designated for earthquake risk reduction projects. Projects in 2013 included:

Lake Tahoe Hazard Survey

In 2010, the Commission entered into agreements with Northern Illinois University (NIU) (\$49,900) and the California Geological Survey (\$25,700) to co-fund the use of a new submersible remote operating vehicle (ROV) (a remote-controlled submarine) that was field tested at Lake Tahoe before being sent to its research site in Antarctica. The ROV's purpose was to observe faults and landslides in Lake Tahoe allowing the Commission to obtain data pertinent to seismic and tsunami hazards in the Lake Tahoe basin. Previous studies documented evidence of past earthquake activity in the Lake Tahoe region that suggests a magnitude-7 earthquake potential. Data suggests past earthquakes produced a nearly 4-meter-high offset of the Lake Tahoe floor, creating a seiche many years ago. (*A seiche is a wave that oscillates in lakes, bays, or gulfs from a few minutes to a few hours as a result of seismic or atmospheric disturbances*). This research can be utilized not only in the Lake Tahoe area, but findings can be applied to other underwater landslide risks that could result in a tsunami or seiche, for example, along the coast. Testing of instrumentation and sampling equipment was completed in August 2012. This information will be used to gauge the seismic hazard risks in the Lake Tahoe Region and communicate those risks to local officials and the public so they will be better prepared against earthquake and seiche threat. The ROV mission was launched at Lake Tahoe July 2013 and a final report is expected January 2014. The NIU report was posted on the commission website in November, 2013. The CGS Lake Tahoe report was completed in December, 2013.

Fire Following Earthquake Risk Phase II Will Water Be Available for Firefighters?

The risk of fires following urban earthquakes present a significant threat to California. Fire services in California have not been tested by a major earthquake since 1906. The Commission's Fire Following Earthquake -Phase I Study showed that significant earthquakes in major metropolitan cities in California will result in simultaneous ignitions and water distribution breaks. This study identified the vulnerabilities in the water supply and mitigation actions that can be developed to reduce the loss of life and property in California.

Phase II of this project provides for cooperation with key urban fire departments and water districts in California in order to encourage coordinated planning and preparedness for fire following major earthquakes. This study also identified the carbon emission footprint caused by post-earthquake fires from a magnitude 7.8 on the southern part of the San Andreas Fault. Work on this project was conducted by the Pacific Earthquake Engineering Center (PEER). This report was released in December, 2013.

Totally Unprepared Phase II Project

The "Totally Unprepared Phase I Program" of individual and community engagement around the topic of disaster preparedness, with an emphasis on earthquake risks, has been successful in raising

the awareness of the public about earthquake risks and preparedness activities. Targeting the channels of social media, online content, and mobile applications, with the use of broadcast interstitials and advertisements to drive traffic, it broke new ground in preparedness media.

“Totally Unprepared Phase II” extended the usefulness of the media already produced (under Phase I) and utilized multiple channels to reach a broader, more diverse audience with a series of outreach efforts and expanded public relations and partner programs. This expanded program continued the use of live outreach; business, non-profit, and government partner recruitment; and digital outreach including website refinement and mobile applications.

Specifically, the Commission supported the development of a new mobile application that provides a local copy of many first aid and disaster tips downloaded from Wikipedia. This allowed the public to have access to a number of important recovery documents locally on their handheld device in case the Internet was unavailable.

The Commission partnered with the California Office of Emergency Services in both Totally Unprepared projects.

Global Earthquake Modeling Foundation (GEM) – Back to Normal

The California Seismic Safety Commission has identified a serious lack of seismic research in the area of post-disaster economic recovery. This is especially true for the speedy recovery of the State’s building stock. Current computer earthquake programs (models) perform simulations that estimate consequences. Unfortunately, current loss models used around the world are “closed models”, that is, the mathematics used to run the model are “proprietary”.

The Global Earthquake Model Foundation (GEM) is an organization focused on developing damage models and sharing information on earthquake hazards to vulnerable communities worldwide. GEM’s own computer earthquake model (OpenQuake) is NOT proprietary and users can review the mathematics and assumptions that drive the model. Currently, models can account for social consequences and resilience, but only approximately – like applying a “fudge factor” to an otherwise complicated calculation. In particular, models can NOT yet reliably estimate the amount of recovery time for a community or region to “get back to normal.”

The Commission partnered with GEM in 2013 to produce an earthquake model that will benefit California. This is a unique opportunity for the Commission. It will bring products and services to California that otherwise would not be available. GEM will quantify the effectiveness of specific actions, now or in the future, to speed recovery. Additionally, this project will produce the technical basis for models to estimate recovery times. Currently, models are used only to estimate earthquake damage.

Note: The Commission became a nonvoting government member on GEM’s Board of Directors in 2012, along with the World Bank and many other prominent organizations. GEM benefits from California’s knowledge and resources while providing good exposure and educational materials for California by disseminating information on California’s earthquake hazards and structural vulnerabilities.

Budget Year	Staff	Budget Year	Staff
2012/2013	2012/2013	2013/2014	2013/2014
Last Year	Last Year	Current	Current
\$1,245,000	6.5	\$1,122,000	6.5