

State of California Alfred E. Alquist Seismic Safety Commission



Annual Report for 2014



**CSSC 15-01**

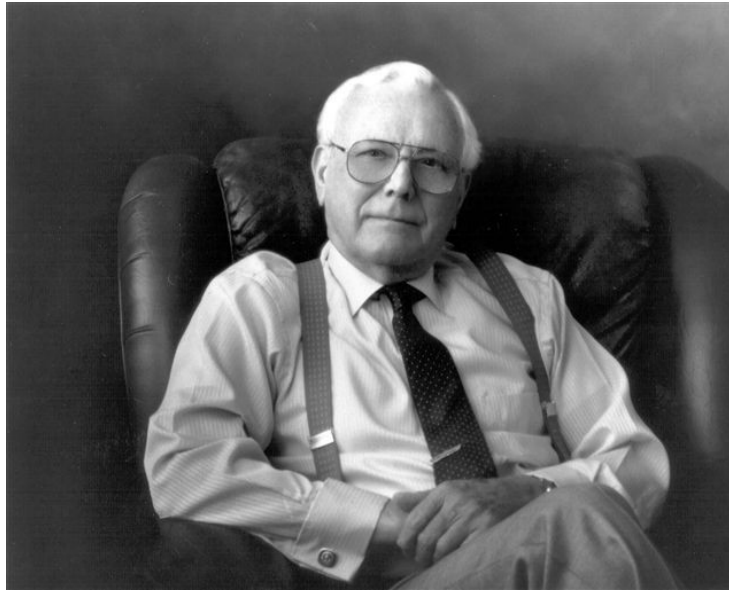
**California Seismic Safety Commission**

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(916) 263-5506

**Senator Alfred E. Alquist**  
**Seismic Safety Commission**  
*Founder*



**(1908-2006)**

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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**Mission Statement**

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

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**Vision Statement**

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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.

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## 2014 Membership

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

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## Commission Staff

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Richard J. McCarthy, *Executive Director*  
Karen Cogan, *Administrative Officer/Annual Report Editor*  
Salina Valencia, *Communications/Legislative Director*  
Robert Anderson, *Senior Engineering Geologist*  
Fred Turner, *Senior Structural Engineering*  
Henry Reyes, *Structural Engineer (Special Projects)*  
Sue Celli, *Executive Secretary/Office Manager*

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## **Commission Authority**

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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 chosen for their technical expertise and experience. The Governor appoints 15 commissioners, the Senate and the Assembly each choose a representative from their respective memberships (2), and three (3) state organizations are represented (*California Office of Emergency Services, California Building Standards Commission, and the Division of the State Architect*).

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## **Commission Funding**

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As of July 1, 2014, the Commission is supported by the Insurance Fund managed by the California Department of Insurance. The Commission's operational budget for fiscal year (FY) 2014/2015 was \$1.2 million. Occasionally, the commission will receive reimbursement funds for special projects. For projects supported by the California Earthquake Research Fund, the Commission is entitled to charge 10% overhead.

**2014 Annual Report**  
**Seismic Safety Commission**

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**Commission Projects Completed in 2014**

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- **California Small Business Develop Centers' Economic Survey and Business Disaster Resource Guide** – Produced a small business economic recovery survey to understand the needs of California small businesses. The guide was created by collecting best practices from sister small business development centers nationwide that had encountered natural disasters.
- **Earthquakes and California Agriculture: Where are the Vulnerabilities?** – Reported on the earthquake risk and vulnerabilities to California's agricultural, dairy, poultry, and livestock industries.
- **Final Report on Seismic Hazard Investigation of Lake Tahoe Dive Test** – The report presented the first step in using a more sophisticated Remotely Operated Vehicle (ROV) technology previously deployed at Lake Tahoe. A broader object is developing research methodologies that can be used elsewhere, such as along the California coast looking for geologic hazards (faults, slumps) on the bottom of Lake Tahoe. A remotely operated vehicle was used to gather data and a report presented findings of the survey.
- **The Totally Unprepared Tribal Community Initiative** – Designed to help the Native American communities in California become better prepared for disasters and more resilient to earthquake impacts. The project was funded by the Commission, Emergency Services, and the California Earthquake Authority.
- **Seven Year Extension of the Commission Review of San Francisco Public Utilities Commission (SFPUC) Water System Improvement Retrofit Project** – The State Water Code Section §73502 required the Commission's oversight of the public safety implications of delays and project deletions of the SFPUC's seismic retrofit program. The section was amended to extend the Commission's involvement in this program to the year 2022.
- **Participated on California Governor's Office of Emergency Services Earthquake Early Warning Working Group**
- **Participated in the 20 Year Anniversary Symposium of the Northridge Earthquake**
- **Conducted a joint meeting with the Nevada Earthquake Safety Council**
- **Held Hearings on the August 2014 South Napa Earthquake**

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## **California Small Business Development Centers' Economic Survey and Business Disaster Resource Guide**

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In an effort to increase awareness of disaster preparedness for the State's small businesses, the Commission contracted with the Small Business Development Center (SBDC) to assess the extent to which California small businesses are prepared in the event of a natural disaster.

Products produced with the SBDC included:

- A survey of California small businesses asking them to identify their greatest risks
- The creation of the California Small Business Disaster Resource Guide

The survey was distributed in December 2013 and completed in March 2014. A 19 question survey provided a framework for the needs experienced by small businesses following a natural disaster. The business surveys were a diversified group with statewide participation by organizations such as Hispanic, Asian and Black Chambers of Commerce, and the Small Business Development Centers.

The survey was a first step to understanding the ongoing need of California small businesses. The results of the survey highlighted the following:

- The need for small business to be more aware of the tools that is available to assist them to create and implement a disaster recovery plan.
- The resources available to them following a disaster.

The Disaster Resources Guide was developed for small businesses and identifies information on natural disaster funding made available by the U. S. Small Business Administration and Federal Emergency Manage Agency. This Guideline draws on collecting best practices from sister Small Business Development Centers across the United States, and the Federal Emergency Management Agency. This Guideline draws on collecting best practices learned from Hurricane Katrina, the Joplin, Missouri tornadoes and Hurricane Sandy.

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## Earthquakes & California Agriculture: Where are the Vulnerabilities?

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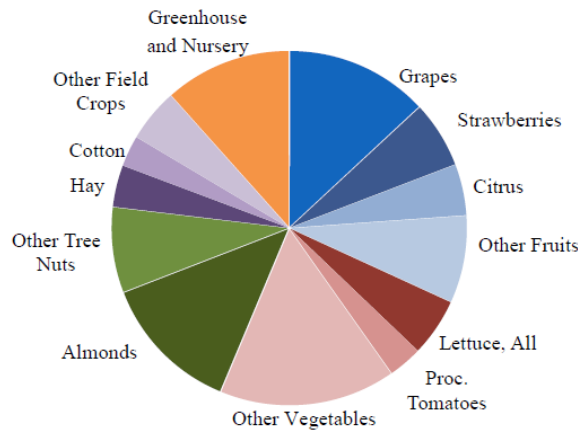


Figure 1.1. California Crops Cash Receipts, 2010-2012. Average total crop cash receipts = \$29.4 billion

California agriculture is especially vulnerable to damage from earthquakes for three main reasons. First, a substantial share of farm production and the associated marketing and processing activities are located in regions particularly susceptible to seismic activity. Second, agriculture relies on public infrastructure, especially for power and transportation, that is likely to suffer disruptions following earthquakes, and redundancies are few in the rural systems. Third, much of California agriculture is devoted to highly perishable commodities and farm and marketing activities, such as milking cows and processing milk or harvesting and shipping fresh vegetables that must be done without delay. In addition to these concerns, long-term capital losses to the soil itself remain a concern in some regions.

The Commission contracted with the University of California Davis to identify earthquake vulnerabilities to the agriculture industry, the state's largest and predominant industry. This study considers the vulnerability of California agriculture to earthquake losses by considering three examples that focus on specific industries in locations of known seismic activity.

This report is available on the Commission's website ([www.seismic.ca.gov](http://www.seismic.ca.gov)).

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## Final Report on Seismic Hazard Investigation of Lake Tahoe - Dive Testing

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The objective of this investigation was to partially characterize seismic hazards of Lake Tahoe during testing of experimental Remote Operated Vehicle (ROV) technology intended for use in Antarctica. The ROV mission was launched at Lake Tahoe on July 2013 and a final report was completed on January 2014.

Lake Tahoe is a high altitude alpine lake formed by faulting and capped by volcanic deposits. McKinney Bay on Tahoe's west shore was formed by a landslide that generated a tsunami in the



lake. Lake Tahoe is one of the deepest lakes in the United States at a depth of over 1,600 feet and has an average depth of 500 feet. Previous investigations had identified several active faults and landslides in Lake Tahoe. None of the earlier vessels and tools used to investigate seismic, landslide and tsunami hazards in the lake had the ability to dive and directly observe or sample within the deeper part of the lake.

Investigations took place at two dive sites where the ROV observed and/or sampled fault and landslide targets (figure1). The project was partially successful in observing faulting and landslide debris in the western part of the lake near and south of McKinney Bay. However, the ROV was unable to dive to below 500 feet due to technical issues with equipment housings exposed to pressure while the ROV was submerged.

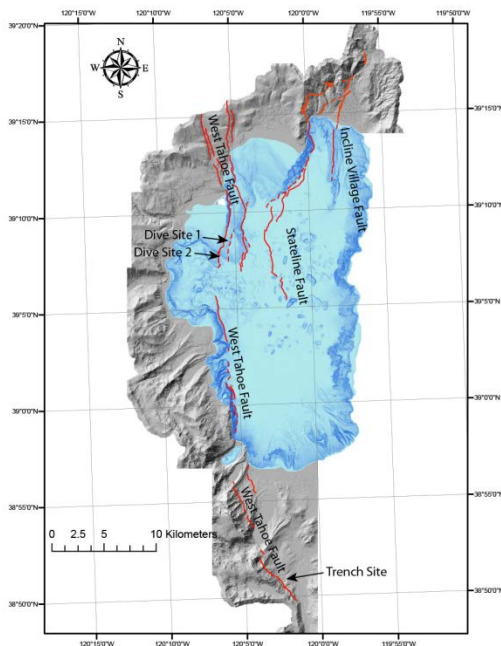


Figure 1 Map showing dive locations and faulting in and around Lake Tahoe.

Two reports for the CSSC were prepared by the Principle Investigators for the project: *Concurrent Investigation of Seismic Hazards of the Lake Tahoe Basin: Dive Test in Support of the WISSARD Project Final Report* and a follow up report *Seismic Hazard Investigation of Lake Tahoe Using New Remote Operated Submarine: Dive Test in Support of Antarctic Subglacial Research (WISSARD)*. Testing of the ROV sensors was done on a second vehicle in depths up to 1150 feet. The observations made using these ROVs has increased the overall understanding of seismic, landslide and tsunami hazard in Lake Tahoe. Although only partially successful, the project demonstrated the value of using ROVs for seismic,

landslide and tsunami hazard assessment.

The reports are available on the Commission's website (<http://www.seismic.ca.gov/pub.html>).

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## The Totally Unprepared Tribal Community Initiative Pilot (Phase II Project)

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This project was a web site designed to help the Native American communities in California become better prepared for disasters and more resilient to earthquake impacts by:

- Effectively reaching these communities and helping them become more prepared.
- By emphasizing cooperation with their representatives and public safety personnel.
- Working with the American Red Cross, nationally and in San Diego, and leverage their experience and training materials and volunteer work force.

This project distributed preparedness products previously developed in Phase I of the “Totally Unprepared” campaign.

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## **Seven Year Extension of Seismic Safety Commission Review of San Francisco Public Utilities Water Delivery System Improvement Retrofit Project**

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The San Francisco Public Utilities Commission (SFPUC) is seismically retrofitting and replacing major portions of the Hetch Hetchy water transmission system from Yosemite to the San Francisco Bay Area in a \$4.8 billion effort.

The State Water Code Section §73502 requires the Commission’s oversight of the public safety implications of delays and project deletions of the SFPUC’s program. The Commission provides comments about the public safety implications of delays or deletions in the program to the Joint Legislative Audit Committee. Since 2006, the Commission has generated eight reviews of the program.

In 2014, Section §73502 was amended to extend the Commission’s involvement in the SFPUC’s program to 2022.

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## **Commission Participation on California Governor’s Office of Emergency Services’ Earthquake Early Warning Working Group**

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California state law (Government Code Section §8587.8) required the California Office of Emergency Services (CalOES) will, in collaboration with the California Institute of Technology, the California Geological Survey, the University of California, the United States’ Geological Survey, the Seismic Safety Commission, and other stakeholders, develop a comprehensive statewide earthquake early warning system in California through a public/private partnership. In addition, CalOES will identify funding sources for the earthquake early warning system that does not specify the State General Fund as a funding source.

To meet statutory requirements, the working group described above developed a Charter that serves as a blueprint for developing an implementation plan for a California Earthquake Early Warning System (CEEWS).

The Charter was completed in February 2014 and called for the following six committees to develop the Implementation Plan:

1. Steering
2. Stakeholder Liaison
3. Funding Options
4. Standards
5. Model
6. Education and Training

Once the committee work is complete and the implementation plan is drafted, it will be presented to the appropriate bodies for review and comment. These bodies include:

1. CEEWS Implementation Steering Committee
2. CalOES Executives
3. California Integrated Seismic Network Steering and Advisory committees
4. Seismic Safety Commission
5. State Emergency Management System Advisory Board and Mutual Aid Regional Advisory Committees
6. Other bodies as defined

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## **20-Year Anniversary Symposium of the Northridge Earthquake**

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The Commission participated in the “Northridge Symposium” held at UCLA in January, 2014. The purpose of this two day symposium was to identify progress made in California earthquake policy development since the 1994 Northridge earthquake.

The conference hosted over 600 attendees and included structural engineers, emergency managers, scientists, state and local government officials, and representatives from the financial and insurance sectors. The attendees heard presentation at a general meeting and panel discussions by policy makers. The second day consisted of break-out sessions that engaged the attendees in detailed discussions.

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## **Joint Meeting with the Nevada Earthquake Safety Council**

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In August 2014, the Commission held a first time meeting with the Nevada Earthquake Safety Council (NESC). The purpose of the meeting was to learn about the Council’s goals and priorities, and to begin to identify common areas where both organizations could participate in partnerships to reduce the earthquake risk to California and Nevada. Mr. Ron Lyn, the NESC’s Chair, stated “The NESC’s goal is to work with its neighbors and share information for the benefits of citizens in the western United States and that a disaster in one state will take resources from all its neighbors in order to recover in an effective manner.”

The NESC made presentations on historical earthquakes on the California-Nevada border and the earthquake potential in the Tahoe-Truckee corridor. The Commission made presentations on two of its research projects. Representatives from the Global Earthquake Model discussed its release of “OpenQuake,” a software program that estimates the consequences of a hypothetical or historical earthquake and compare and compare costs and savings. This planning tool will estimate the effects of policy decisions and actions taken before an earthquake on recovery time, resulting in identification of specific actions and evidence of their effectiveness.

Presentations were also made from NASA’s Jet Propulsion Laboratory regarding new space based technologies and how they may be applied to earthquake risk reductions and recovery. Commission staff presented its latest projects which included “The Disaster Resource Guide for Small Businesses” and the “Guidebook to Identify and Manage Seismic Risks of Buildings for Local Governments.”

Both organizations made a commitment to identify areas of mutual concern and develop a cost-effective partnership to address them.

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## **Special Hearing on South Napa California (Post August 24, 2013 - 6.0 Earthquake) Emergency Response Recovery and Lessons Learned**

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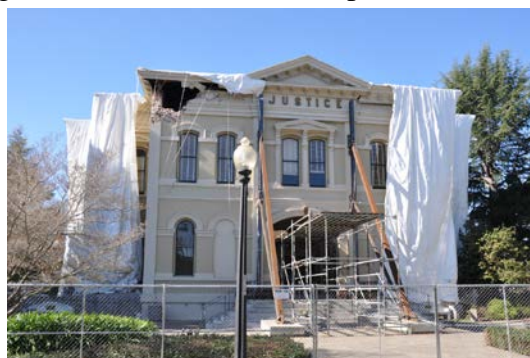
The 2014 South Napa earthquake occurred on August 24 at 3:20 a.m. local time, measuring 6.0 on the moment magnitude scale. The tremor’s epicenter was located south of Napa,



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, but was felt as far as throughout the Bay Area and in Sacramento.

This earthquake was the largest in the San Francisco Bay Area since the 1989 6.9 magnitude Loma Prieta earthquake. Significant damage and several fires were reported in the

southern Napa Valley area, as well as damage in the nearby city of Vallejo, in Solano County. The quake killed one person, injured about 200, and interrupted power to more than 69,000 Pacific Gas and Electric Company customers. An experimental earthquake warning system provided several seconds of warning to select Bay Area locations before the strong shaking arrived. A Presidential Disaster Declaration was announced on September 11, 2014. Early estimates by California officials indicated that the earthquake caused more than \$400 million in damages, of which \$87 million may be eligible for federal reimbursement.



Several dozen previously-retrofitted unreinforced masonry buildings experienced mixed performances, with a few suffering life-threatening damage.

In October 2014, the Commission held hearings in American Canyon and San Francisco to hear testimony on the emergency response/recovery/lessons learned from the 6.0 magnitude South Napa earthquake. Testimony was provided by the cities of Napa, San Francisco, Vallejo, American Canyon, Sonoma, and Solano Counties, the State Senate, FEMA, and others. A presentation of the performance of earthquake early warning systems during this earthquake was also included.

The Commission approved a contract with the Pacific Earthquake Engineering Research Center to develop a report “Policy Lessons from the South Napa Earthquake.” This report will cover the following topics:

1. Seismological and geotechnical implications, including early warning systems
2. Earthquake effects on the build environment
3. Lifelines, and lifeline interdependencies
4. Fire following earthquakes
5. Economic impacts
6. Develop policy implications

This report is intended to be used by decision-makers to better enable them to develop policies and laws that will reduce the earthquake risk to the State and to help with post-earthquake economic recovery. The report will be completed in early 2016.

### **Commission Earthquake Risk Reduction Goals for 2015**

1. Produce report with recommendations on the lessons learned from the South Napa Earthquake.
2. Implement the Governor’s Executive Order to provide outreach to Native Americans.
3. Speed recovery of California’s building stock through work with the Global Earthquake Model Foundation (GEM).
4. Assist the agricultural livestock, poultry, and dairy industries to better prepare for and recover from disasters.
5. Continue working with the Governor’s Office of Business and Economic Development (GoBIZ) to seek partnerships and projects that further the recommendations in the latest Commission report on post-earthquake economic recovery.
6. Complete a guidebook to assist local governments to identify and mitigate the risk presented by collapse prone buildings.
7. Assist California Office of Emergency Services (CalOES) with developing and funding a comprehensive earthquake early warning system in California.

- 8. Identify opportunities to partner with the Nevada Earthquake Safety Council on projects that will reduce the earthquake risk to both states.
- 9. Partner with the NASA’s Jet Propulsion Laboratory to apply space based technology to reduce earthquake losses.

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**Commission Budget Summary**

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**Budget Year 2013/2014**

Staff	California Insurance Fund
6.5	\$1.2 million