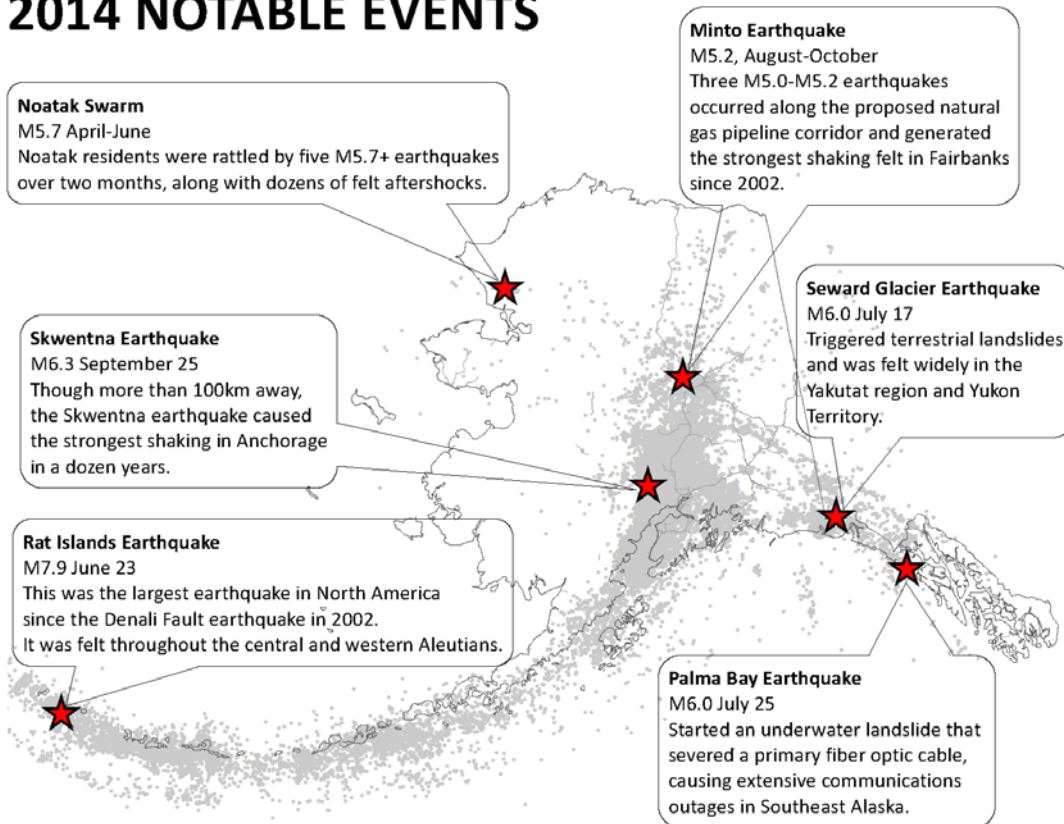


# ALASKA SEISMIC HAZARDS SAFETY COMMISSION

## ANNUAL REPORT TO THE GOVERNOR AND STATE LEGISLATURE FOR 2014

### 2014 NOTABLE EVENTS



The Alaska Earthquake Center located a record 40,686 earthquakes in 2014 (shown as light grey dots on the map), 12,000 more than in 2013.



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## EXECUTIVE SUMMARY

This report summarizes the Alaska Seismic Hazard Safety Commission's (ASHSC) business, activities, and accomplishments in 2014 as related to its statutory (AS 44.37.067) powers and duties on behalf of the Governor, Legislature, local governments, as well as public and private sectors.

Early in the year, Senate Bill 137 was passed and signed reauthorizing the Alaska Seismic Hazards Safety Commission through 2020. As an advisory body charged to recommend goals, priorities, and policies for mitigating seismic hazards, the Commission's work in 2014 continued to focus toward long-term goals to improve the safety of schools and public buildings at risk from earthquake damage; facilitate local earthquake scenario planning studies; and educate State government and public entities about the Alaska seismic environment. Over the course of 2014, the ASHSC:

- Maintained a full membership of 11 commissioners, conducted eight public meetings, and had no written determinations, requests for determinations, or suspected potential violations under the Ethics Act (AS 39.52);
- Adopted a plan for the Commission's actions following a damaging earthquake, and updated Charter;
- Adopted a new policy recommendation for the DGGs to develop an earthquake response and investigation guide;
- Implemented two previous policy recommendations, sending a position paper regarding the value of seismic instrumentation in critical facilities to 12 government and private entities responsible for critical infrastructure; and a position paper to three state agencies recommending they adopt regulations requiring designs of publically-funded buildings follow the seismic provisions in the 2012 IBC, versus the 2009 IBC currently enforced by the State;
- Continued work associated with its current major long-term projects to identify and prioritize seismically vulnerable schools in Alaska (i.e. initiated a pilot program to test Rapid Visual Screening methods for identifying the seismic vulnerability of several schools in the Matanuska-Susitna School District), and a scenario earthquake study for the Kodiak Island Borough;
- Produced a guide to help communities complete a concept-level earthquake scenario study, using existing resources;
- Received two special briefings from the DHS&EM regarding the Alaska Shield 2014 earthquake response exercise;
- Provided several public presentations regarding seismic risk issues;
- Responded to requests for reviews of seismic hazard mitigation related items from the Alaska Legislature and the Western States Seismic Policy Council; and,
- Partnered with numerous other organizations and government entities focusing on the mitigation of seismic risks.

The Commission welcomes the opportunity to discuss any issues within our purview at your request.

Robert L. Scher, Chair  
Richard D. Koehler, Vice-Chair

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### APPENDIX A - Policy Recommendations

#### *Abbreviations used in this report:*

AELS	Board of Registration for Architects, Engineers, and Land Surveyors
AEC	Alaska Earthquake Center
ASHSC	Alaska Seismic Hazards Safety Commission
DEED	Department of Education & Early Development
DGGS	Division of Geological & Geophysical Surveys
DHS&EM	Division of Homeland Security & Emergency Management
DMVA	Department of Military & Veterans' Affairs
DNR	Department of Natural Resources
EERI	Earthquake Engineering Research Institute
FEMA	Federal Emergency Management Agency
IBC	International Building Code
USCG	U.S. Coast Guard
USGS	U.S. Geologic Survey

# ALASKA SEISMIC HAZARDS SAFETY COMMISSION ANNUAL REPORT TO THE GOVERNOR & STATE LEGISLATURE FOR 2014

Early in the year, Senate Bill 137 was passed and signed reauthorizing the Alaska Seismic Hazards Safety Commission through 2020. This report<sup>a</sup> summarizes the Alaska Seismic Hazard Safety Commission's (ASHSC) business, activities, and accomplishments in 2014 as related to its statutory powers and duties (AS 44.37.067) on behalf of the Governor, Legislature, local governments, as well as the public and private sectors, including:

- *Recommending goals and priorities for mitigating seismic hazards (e.g. strong ground shaking, landslide, avalanche, liquefaction, tsunami inundation, fault displacement, and subsidence);*
- *Recommending policies including needed research, mapping, and monitoring programs;*
- *Reviewing the practices for recovery and reconstruction after a major earthquake; to recommend improvements to mitigate losses from similar future events; and,*
- *Gathering, analyzing, and disseminating information of general interest on seismic hazard mitigation to reduce the state's vulnerability to earthquakes.*

## INTRODUCTION

The 50th Anniversary year of the 1964 Great Alaska Earthquake proved to be an extraordinary earthquake year in its own right (cover figure). The largest earthquake, a June 23 magnitude 7.9 in the Rat Islands, was also the largest in Alaska since 2002. The most widely felt earthquake in 2014 was the September 25 magnitude 6.3 near Skwentna. It was felt in communities as distant as Homer and Fairbanks, but the greatest impacts were in Anchorage. Some buildings, including the Nesbett Courthouse, were evacuated, and there were many reports of minor damage such as toppled bookcases and fallen ceiling tiles.

Notable earthquakes struck all over the state in 2014. In Southeast, the July 25 magnitude 6.0 Palma Bay earthquake caused a submarine landslide that severed a major GCI fiberoptic cable. In Northwest Alaska, a three-month earthquake swarm generated five events with magnitudes of 5.7 and 5.8, causing considerable anxiety and some minor damage in Noatak.

All of these, along with the magnitude 6 Seward Glacier earthquake in June and a vigorous earthquake sequence near Minto, helped drive a record year for Alaska seismicity, with over 40,000 earthquakes recorded.

## COMMISSION BUSINESS IN 2014

This section summarizes the ASHSC's business conducted in 2014, including membership, meetings, ethics act, newly adopted operating procedures, and finances; with administrative support provided from the Alaska Department of Natural Resources (DNR) Division of Geologic & Geophysical Survey (DGGs) (e.g. meeting logistics, budget, travel, website, etc.). The ASHSC's documents associated with the following topics (e.g. meeting agenda and minutes, response plan, reports, etc.) are posted on its website: [www.seismic.alaska.gov](http://www.seismic.alaska.gov).

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<sup>a</sup> Annual reports from previous years are available on the Commission's website [www.seismic.alaska.gov](http://www.seismic.alaska.gov).

## MEMBERSHIP

The ASHSC maintained a full membership of 11 commissioners through 2014, listed below.

NAME/OCCUPATION	REPRESENTATION <sup>a</sup>	CONTACT
John L. Aho, Ph.D., Sc.D. Engineering Consultant; Anchorage	Public/Restricted	eqman39@gmail.com
Gary A. Carver, Ph.D. Geologic Consultant; Kodiak	Public/Restricted	cgeol@acsalaska.net
Bud Cassidy Borough Manager, Kodiak	Local Government	bcassidy@kodiakak.us
Mark J. Delozier Maritime Services, Valdez	Local Government	akmaritime@ak.net
Ann Gravier Hazard Mitigation Officer, Anchorage	Alaska Department of Military & Veterans Affairs	ann.gravier@alaska.gov
Laura W. Kelly, P.E. Civil Engineer, USCG; Juneau	Federal Agency	laura.w.kelly@uscg.mil
Richard D. Koehler, Ph.D. Research Geologist; Fairbanks	Alaska Department of Natural Resources	rich.koehler@alaska.gov
Robin J. McSharry State Farm Insurance; Anchorage	Insurance Industry	robin.mcsharry.chi7@statefarm.com
Jonathan Owen <sup>b</sup> Public Safety Director, City of Palmer	Local Government	palmeralpha1@gmail.com
Robert L. Scher, P.E. Geotechnical Engineer; Anchorage	Public/Restricted	bscher@rmconsult.com
Michael West, Ph.D. Alaska State Seismologist, Fairbanks	University of Alaska	mewest@alaska.edu

*a. All commissioners have completed FEMA's Introduction to Incident Command System training course.*

*b. As defined in AS 44.37.065(b)*

*c. Replaced former member David Miller early in 2014*

## MEETINGS

The ASHSC conducted eight public meetings in 2014, including six half-day teleconference meetings (January 9, February 20, May 22, August 14, and December 18), and two multiple-day 'face-to-face' meetings in Anchorage (April 21–22, and October 28–29).

## ETHICS ACT

The ASHSC submitted four quarterly ethics reports to the Department of Law. The Commission members had no written determinations, requests for determinations, or suspected potential violations under the Ethics Act (AS 39.52) in 2014.

## OPERATING PROCEDURES

The Commission adopted a plan in April defining a framework and schedule of the Commission's actions following a damaging earthquake or tsunami.

The Commission updated and adopted its Charter.

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## FINANCES

The ASHSC's expenditures (e.g. meeting and travel expenses, etc.) in FY14 totaled \$10,000; our allotted budget.

## ACTIVITIES & ACCOMPLISHMENTS IN 2014

This section summarizes the ASHSC's activities and accomplishments in 2014 including policy recommendations, progress on long-term projects, briefings and presentations, formal correspondence, partnering, etc. While these items generally involved the ASHSC as a whole, most were coordinated or implemented under one or more of the Commission's six standing committees, including: Earthquake Scenarios (*chair* Gary Carver), Education-Outreach-Partnering (Robert Scher), Hazards Identification (Rich Koehler), Insurance (Robin McSharry), Response and Recovery (Ann Gravier), and Schools (Laura Kelly).

## POLICY RECOMMENDATIONS

The Commission adopted and implemented one new *Policy Recommendation* (PR) in 2014, and implemented two *PRs* from 2013.

- **PR 2014-1 *EARTHQUAKE-RESPONSE AND INVESTIGATION GUIDE***: Adopted and sent to the DNR-DGGS this PR recommends they develop a post-earthquake response and investigation field guide for conducting post-earthquake field investigations, coordinating geoscience activities with other emergency response entities, and reporting investigation results. A copy of this PR, including a discussion of need, basis, and implementation strategy, is provided in Appendix A.
- **PR 2013-1 *VALUE OF SEISMIC INSTRUMENTATION IN CRITICAL FACILITIES***: The Commission prepared a position paper to PR 2013-01 for owners and the public discussing the practical pre- and post-earthquake benefits of installing and maintaining seismic instrumentation in critical facilities. To date the position paper has been sent to numerous entities responsible for critical buildings, bridges, airports and industries including the DOT&PF (Statewide Public Facilities, Bridge Design, Ted Stevens Anchorage International Airport, Fairbanks International Airport), the Municipality of Anchorage (Public Works, Port of Anchorage), the City of Fairbanks (Building Official and Public Works), the University of Alaska (Anchorage and Fairbanks), the Alaska Aerospace Corporation, and Alyeska Pipeline Service Company.
- **PR 2013-2 *SEISMIC PROVISIONS FOR DESIGNING SCHOOLS AND PUBLIC BUILDINGS***: Alaska presently follows the 2009 International Building Code (IBC). However, the seismic design provisions in the 2012 IBC are much more appropriate and current for Alaska, versus the similar provisions in the 2009 IBC. Therefore, following PR 2013-2 the Commission prepared and submitted a position paper to the Alaska Department of Education and Early Development, Department of Public Safety (Division of Fire Safety), and the Department of Transportation & Public Facilities recommending those entities adopt a regulation requiring designs of publically-funded buildings follow the seismic provisions of the 2012 IBC, until such time as the State adopts the 2012 IBC.

## LONG-TERM PROJECTS

- Identification and Mitigation Prioritization of Seismically Vulnerable Schools:
  - Initiated a pilot program, funded through EERI, to test *Rapid Visual Screening* methods for identifying the seismic vulnerability of several schools in the Matanuska-Susitna School District. *The results of this pilot program will be used to support planning and funding for*



*larger scale projects aimed at identifying and prioritizing seismically vulnerability schools and public buildings throughout Alaska.*

- Sent a letter to the DEED requesting a list of school projects funded through its *Capital Improvements Projects* program since 2010 that involved seismic improvements or mitigation.
- Kodiak Scenario Earthquake Study:
  - Continued work on a scenario earthquake study for eastern Kodiak Island (devastated by tsunamis generated during the 1964 M9.2 Great Alaska Earthquake), including assisting FEMA in the completion of a probabilistic risk assessment for the project. The Commission sent several letters to FEMA (Region 10) providing comments and FEMA’s draft reports.
- Advocate for Alaska Earthquake Research:
  - Continued work on an informational report summarizing the known earthquake sources and seismicity across the state.
- Scenario Earthquake Studies:
  - Prepared a guide intended to help communities complete a concept-level earthquake scenario study as a means to qualify, using existing resources, the more likely types of geologic hazards and extent of local ground failures in their area, and to improve local long-term development and emergency response planning. The concept-level scenario studies can also be used to determine the need for and justification of funding for more extensive, full-scale studies.

## **BRIEFINGS & PRESENTATIONS**

- Kathy Cavyell, Lead Exercise Planner, DHS&EM, briefed the ASHSC in April and October regarding the Alaska Shield 2014 response exercise, and the ‘after action’ conclusions and lessons.
- John Madden, Director, DHS&EM, briefed the ASHSC in December regarding that division’s forthcoming plans to form a science and engineering taskforce, involving the Commission, for developing post-earthquake recovery strategies.
- Commissioner Scher testified in a Legislative hearing in support of House Joint Resolution 23 proclaiming March 27, 2014 as “Good Friday Earthquake Remembrance Day”.
- Commissioner Scher testified in multiple Legislative hearings during the processing of SB 137, regarding re-authorization of the ASHSC.
- Commissioners Kelly and Cassidy delivered presentations as part of a panel discussing school safety in a special session at the 10<sup>th</sup> National Earthquake Engineering Conference in Anchorage.
- In association with activities commemorating the 50<sup>th</sup> anniversary of the 1964 M9.2 Great Alaska Earthquake, Commissioner Koehler developed field guidebooks for the Seismological Society of America annual meeting, and another for the 5<sup>th</sup> International Conference of the International Geoscience Program; Commissioners West and Scher presented lectures as part of a summer program in Anchorage organized by the USGS discussing the impacts and effects of that earthquake today; and Commissioners Aho, Koehler, Scher and West participated in a special TV program titled “Unstable Ground” produced by KTUU.
- Commissioner Koehler delivered several presentations including a talk on tsunami hazards in Alaska at the tsunami operations workshop in Kodiak sponsored by the DHS&EM; two

community workshops on new tsunami inundation maps in Gustavus and Hoonah; and a presentation on seismic hazards field investigations in Alaska at the WSSPC annual awards luncheon.

### RESPONSES TO REQUESTS BY OTHERS

- The ASHSC provided written comments to the Western States Seismic Policy Council (WSSPC) on its draft 2014 policy recommendations applicable to Alaska, including 14-1 (Improving tsunami public education, mitigation and warning procedures for distant and local sources); 14-3 (Earthquake monitoring networks); 14-5 (Earthquake emergency handbooks for first responders and incident commanders); and 14-7 (Earthquake early warning systems).
- Provided Representative Millett supporting information pertaining to her draft bill establishing March 27 as *Great Alaska Earthquake Remembrance Day*, in perpetuity.

### PARTNERING

- Commissioner Aho served on the EERI national organizing committee, and chaired the local organizing committee for the 10th National Conference on Earthquake Engineering, held in Anchorage during July. Commissioners Carver, Gravier, Kelly, Koehler, and Scher also participated on the local organizing committee. The ASHSC was a non-financial sponsor of the conference.
- Commissioner Aho continued to represent the ASHSC on the DMVA's *Alaska Partnership for Infrastructure Protection* (APIP) organization.
- Commissioner Scher was invited to join in the Seismological Society of America's Government Relations Committee annual meeting, held in May in Anchorage.
- Commissioners Gravier, Koehler, and Scher represented the ASHSC during the 2014 annual meeting of the Western States Seismic Policy Council (WSSPC) in Anchorage – [ASHSC, DNR-DGGS, and DMVA-DHS&EM are all members of WSSPC]. Commissioners Gravier and Koehler continued to participate on the WSSPC Tsunami Hazards Mitigation Committee, and Commissioner Scher continued to participate on the WSSPC Engineering, Construction and Building Codes Committee.
- Commissioner Kelly participated in EERI's *School Seismic Safety Initiative* to create a nation-wide program to inventory schools.
- Commissioner Gravier continued to represent the ASHSC and DHS&EM on FEMA's National Earthquake Hazard Reduction Program (NEHRP) and attended the National Earthquake Program Managers Meeting in May 2014. FEMA sponsored the ASHSC's "Schools RVS Pilot project" (2014).

### MISCELLANEOUS

- Commissioner Koehler, with input from the Commission, facilitated work by the DGGS to restructure and update our website.
- Commissioner West authored a paper published in the *Seismological Research Letters* titled, "Why the 1964 Great Alaska Earthquake Matters 50 Years Later"; with the ASHSC as a co-author.



- Contacted State Senator Olson, Representative Nageak, and the Kotzebue Legislative Information Office offering the Commission’s help, if desired, during the swarm of earthquakes near Noatak from April to June.
- Sent a letter to Governor Walker recommending his support of the University of Alaska Fairbanks’ “Closing Alaska’s Earthquake and Tsunami Safety Gap” project in their proposed FY16 capital budget request.

# **APPENDIX A**

## **2014 POLICY RECOMMENDATIONS**

POLICY RECOMMENDATION PR 2014-1

## **POLICY RECOMMENDATION 2014-1**

### **EARTHQUAKE-RESPONSE AND INVESTIGATION GUIDE<sup>1</sup>** **(ADOPTED 21 APRIL 2014)**

Documenting the geologic, geotechnical, and engineering effects of earthquakes are a critical element of post-earthquake response investigations. These data can increase the information available to public officials managing response and recovery and can expand upon lessons learned that can be incorporated into standards and practices for future hazard reduction. Currently, the State of Alaska does not have an earthquake specific plan outlining documentation procedures essential for investigation teams to quickly and efficiently evaluate aspects of destructive earthquakes. Therefore the Alaska Seismic Hazards Safety Commission recommends that the Alaska Division of Geological & Geophysical Surveys develop a field guide for earthquake-response and investigations.

#### **INTRODUCTION**

The State of Alaska Division of Geological & Geophysical Surveys is the lead state scientific agency responsible for understanding and documenting geologic hazards, including the primary and secondary effects of earthquakes (Alaska Statute 41.08.017b). Although the State of Alaska has developed an emergency operations plan (State of Alaska, 2011), it does not currently have a response plan specific to earthquakes that outlines procedures for:

- *Conducting post-earthquake field investigations;*
- *Coordinating activities with other emergency-response and geosciences professionals; and,*
- *Reporting investigation results.*

The following position statement lends support to the Alaska Seismic Hazards Safety Commission's Policy Recommendation 2014-1, and presents justification for the development of such a post-earthquake response and investigation field guide specific for Alaska.

#### **POSITION STATEMENT**

Field investigations in the aftermath of damaging earthquakes are now common practice and typically conducted by multiple state and federal agencies, university researchers, and other professionals. These investigations provide the opportunity to collect information related to surface rupture processes, secondary ground deformation effects, and the response of the engineered or built environment to seismic shaking. Subtle geologic effects are often rapidly destroyed due to rebuilding efforts and other natural processes, and thus it is critical to archive the information in a timely and organized framework. The information can be useful to public

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<sup>1</sup> This expands upon elements of the Western States Seismic Policy Council (WSSPC) Policy Recommendation 13-3, *Post-Earthquake Technical Clearinghouses*, adopted by unanimous vote of the membership in May 2013; which included the Alaska Division of Geological & Geophysical Surveys, Alaska Division of Homeland Security and Emergency Management, and Alaska Seismic Hazards Safety Commission.

officials in response and recovery efforts immediately following an earthquake and is valuable for developing standards and practices for future hazard reduction including improved seismic hazards maps and development decisions.

Due to differing priorities, compromised communication systems, and “on-the-fly” coordination, the effectiveness of post-earthquake studies often suffers from poor organization. General post-earthquake field guides have been published outlining the types of data that should be collected, and recommended methods for data access and organization (e.g. EERI 2003; 1996; Holzer, 2003). The Utah Geological Survey has published a post-earthquake action guide outlining the relative roles of staff in coordinating activities with other investigators and has developed field investigation guidelines and data forms to record observations (Solomon, 2001). These publications provide excellent resources for planning post-earthquake field investigations; however, rugged topography, poor access, and other logistical constraints may limit the usefulness of some aspects of these guides in Alaska. Therefore, it is essential that an Alaska specific post-earthquake investigation field guide be developed before the next major destructive earthquake occurs.

## CONCLUSION

Post-earthquake response, recovery efforts, and planning to mitigate the effects of future earthquakes in Alaska will all benefit from the coordinated and systematic investigation and documentation of damage caused by a specific earthquake. Therefore, the Alaska Seismic Hazards Safety Commission recommends that the Division of Geological & Geophysical Surveys develop a post-earthquake response and investigation field guide as part of its efforts to characterize geologic hazards.

## REFERENCES

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**POLICY RECOMMENDATION 2014-1  
EARTHQUAKE-RESPONSE AND INVESTIGATION GUIDE  
ADOPTED 21 APRIL 2014**

**INTERNAL SECTION**

***Implementation & Assessment***

The Commission will submit the policy recommendation to the Director of the Division of Geologic and Geophysical Surveys.

Measure of this policy recommendation will be gauged by its acceptance and funding requests for FY16.

The Commission's Earthquake Hazards Committee will be responsible for the tracking this policy recommendation.

***History***

PR 2014-1 was adopted on 21 April 2014 by a unanimous vote of 6-0.