

CALIFORNIA
EARTHQUAKE EARLY WARNING
ADVISORY BOARD

NOVEMBER 3, 2022
MEETING NOTICE



***Cal* OES**
GOVERNOR'S OFFICE
OF EMERGENCY SERVICES



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CALIFORNIA EARTHQUAKE EARLY WARNING ADVISORY BOARD MEETING

November 3, 2022
1:00 PM – 4:00 PM

In-Person Location:

3650 Schriever Avenue, MPR 1 & 2
Mather, California 95655

****Attendees will need to arrive 30 minutes before the meeting time to take a COVID-19 Rapid test.
These are self-tests and are administered in the lobby.

Zoom Video Conference Information

Participant Call-In Number: 1-888-788-0099 (Toll Free)
Meeting ID: 812 8804 7696 | Passcode: 77046675

Or, please click the link below to join the webinar:

<https://us02web.zoom.us/j/81288047696?pwd=NzBmZDNhL1p1M3lPSiswT2tsTXlQZz09>

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Or, One tap mobile:

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CALIFORNIA EARTHQUAKE EARLY WARNING ADVISORY BOARD MEETING

November 3, 2022
1:00 PM – 4:00 PM

MEETING AGENDA

- I. **CALL TO ORDER / INTRODUCTIONS**
- II. **REVIEW AND APPROVE MEETING MINUTES**
- III. **GENERAL PROGRAM UPDATE**
- IV. **SYSTEM OPERATIONS UPDATE**
 - Google Presentation on Android Integrated EEW Alerts
 - ShakeAlert License-to-Operate (LtO) Partners Update (USGS)
 - Discussion
- V. **RESEARCH AND DEVELOPMENT**
 - Distributed Acoustic Sensing (DAS) for Seismic Monitoring
 - Discussion
 - Public Comment
- VI. **FINANCE**
 - 2022-23 Budget Update
 - Spending Plan
 - Discussion
 - Public Comment
- VII. **GOALS FOR EEW IMPLEMENTATION**
 - Implementation Plan
 - Discussion
 - Public Comment
- VIII. **EDUCATION AND OUTREACH OVERVIEW**
 - Santa Rosa Earthquake Rapid Response
 - 2022 Great California ShakeOut
 - Discussion
 - Public Comment



IX. CLOSING STATEMENTS AND PUBLIC COMMENT

- Advisory Board Members
- Cal OES Director and/or Chief Deputy Director
- Public Comment

X. ADJOURNMENT

Individuals who require special accommodations, or to receive meeting materials, contact the individual below at least seven (7) days prior to the scheduled meeting date:

Phillip John Labra, Earthquake Early Warning
3650 Schriever Avenue, Mather, CA 95655
916-845-8420 / phillip.labra@CalOES.ca.gov

This meeting notice is made available online, please visit the Cal OES California Earthquake Early Warning Program, Advisory Board [webpage](#).

CALIFORNIA
EARTHQUAKE EARLY WARNING
ADVISORY BOARD

JUNE 29, 2022
MEETING MINUTES



***Cal* OES**
GOVERNOR'S OFFICE
OF EMERGENCY SERVICES



California Earthquake Early Warning Advisory Board

California Governor's Office of Emergency Services
3650 Schriever Avenue, Mather, 95655 California
Via Zoom

June 29, 2022

Meeting Minutes

Members Present:

In-Person Attendees

- Christina Curry, Chief Deputy Director, Governor's Office of Emergency Services
- Bryan Cash, Assistant Secretary, Designee of the Secretary of Natural Resources Agency
- Jeff Toney, Director, County of San Diego Office of Emergency Services, Designee of the Senate Committee on Rules Appointee Representing County Government

Remote Participants

- Julie Souliere, Assistant Secretary, Designee of the Secretary of the California Health and Human Services
- Lori Pepper, Deputy Secretary, Designee of the Secretary of the California State Transportation Agency
- Erica Gonzalez, Deputy Secretary, Designee of the Secretary of the California Business, Consumer Services and Housing Agency
- Lupita Sanchez-Cornejo, Corporate External Affairs for AT&T, Appointee of the Speaker of the Assembly Representing the Interests of Private Businesses
- Adam Wright, Executive Vice President of Operations and Chief Operating Officer of Pacific Gas & Electric, Governor's Appointee Representing the Utilities Industry
- Jack Andersen, Director of Architecture and Systemwide Chief Building Official, Designee of the Chancellor of the California State University

- Amina Assefa, Program Manager of Emergency Management and Business Continuity, Designee of the President of the University of California

I. Call to Order / Introductions

- The meeting was called to order by the Advisory Board's Executive Officer Jose Lara. Roll call was taken, and a quorum was achieved.
- Chief Deputy Director Curry provided opening remarks and welcomed returning and newly appointed board members. She also invited board members to ask questions and provide feedback throughout the meeting on how we can leverage partnerships, integrate, bridge EEW technology and systems into business and industry, and continue to inform communities to better understand the benefits.
- Newly appointed Board Member Wright provided a brief introduction and informed the board about the role of the utilities industry and the importance of earthquake preparedness.
- Executive Officer Lara announced that public comment would open following updates from Research and Development.

II. Review and Approve – Meeting Minutes from October 27, 2021

- Executive Officer Lara asked board members to review the previous meeting minutes and provide any comments, questions, and/or changes.
- No comments were provided by the board. Motion to approve by Board Member Cash. The motion was seconded by Board Member Toney. Motion passed unanimously.

III. General Program Update

- Executive Officer Lara Program provided program updates regarding the 2022 Business Plan Update for the California Earthquake Early Warning Program. The business plan provides information on continued operations, goals and milestones that focus on infrastructure enhancements and innovation such as additional safety features and projects for automated actions within various industries.
- Executive Officer Lara also provided a summary of general updates on program staffing, system operations, research and development, finance, and education and outreach efforts.
- Lastly, Executive Officer Lara mentioned that Research and Development updates would be provided by Dr. Jennifer Strauss, Project Manager for MyShake, on HomeBase, a new feature within the

app. Additional topics covered during this meeting includes finance updates, education and outreach efforts, and progress on advancing technology within industry engagement, and plans for increasing end user enlistment.

IV. System Operations

- Executive Officer Lara reported that the number of contributing stations within CEEWS has increased from 843 to 871, which is an additional 28 units, since the last board meeting held in October 2021. There are 244 stations remaining of the California Earthquake Early Warning System (CEEWS) buildout. Once complete, there will be a total of 1,115 stations throughout the state.
- Cal OES, in collaboration with the U.S. Geological Survey (USGS), Department of Water Resources, Department of Conservation, Berkeley Seismology Lab and Caltech, have completed 399 of the Cal OES-funded 702 stations (out of the 1,115 stations). There are 303 remaining stations in various stages of build-out.
- In addition, Cal OES Public Safety Communications connected 63 additional stations to the state microwave network. There are 267 stations remaining that will be added to the microwave network for a total 330 stations.
- Approximately \$12.3 million has been allocated for the CEEWS 2021-22 Build Out. The funding includes stations builds and updates, software modernization, and equipment purchases, etc. This funding is set to expire in April 2024.
- Executive Officer Lara also briefed out on the seismic station build out challenges, which includes COVID-19 restrictions, equipment delivery delays, obtaining new and renewed land-use permits/lease negotiations, and wildfires. To streamline the permitting process, Cal OES recently established a permitting workgroup to coordinate resources, streamline processes, and identify system priorities. This workgroup is comprised of USGS, UC Berkeley, Cal OES, and Department of General Services.
- Chief Deputy Director Curry emphasized that amidst challenges, all planned and proposed seismic stations have been fully funded to ensure that California is sufficiently covered. She further detailed that station locations have been confirmed and Cal OES will continue to work with private landowners, local, state, and federal governments to ensure delivery of the signal via state microwave network.

- It is anticipated that permitting will continue to bring challenges and may become more complicated. Cal OES will look to the board for solutions and recommendations for potential locations.
 - Comment: Board Member Cash inquired if any of the seismic stations are located within properties owned by agencies and/or departments within the California Natural Resources Agency (CNRA).
- Executive Officer Lara responded that there may be stations located within these areas and assistance would be appreciated. Cal OES will provide a list of pending stations to CNRA.
 - Comment: Board Member Toney asked if all site locations have been identified.
- Executive Officer Lara confirmed that all site locations have been identified.
- Chief Deputy Director Curry indicated that there is flexibility in site location changes; however, it is important to keep in mind that there is a specific distance that stations must be in relation to other stations.
 - Comment: Dr. Strauss provided additional details regarding seismic station density requirements, and the required distances between the stations that are located in rural and/or urban settings for optimal coverage.
 - Comment: Deputy Director Nezhura also added that Southern California has a higher density of stations compared to Northern California, thus the focus of permitting and site assessments have been in Northern California.
 - Comment: Board Member Pepper also offered to work with Cal OES through the permitting process if there are any sites located on Caltrans property.
- Dr. Strauss provided updates on system operations for the MyShake app, which is funded by Cal OES as part of the California Earthquake Early Warning System (CEEWS) and powered by ShakeAlert. Updates included the following: alert details issued between October 2019 and June 2021, overview of station spatial coverage, alert/warning latencies, and app privacy policy.
 - Comment: Board Member Cash asked if the MyShake team had received and/or collected any experiences or anecdotal evidence of instances where users had received an alert from the app and shared their experience.

- Dr. Strauss commented that no feedback has been provided to that extent, but the MyShake team does receive general questions and feedback from users via email and Twitter.
 - Comment: Chief Deputy Director Curry added that during the Portola earthquake an individual with a large following on social media posted their experience while in their car.
- Dr. Strauss indicated that the main goal for MyShake is to provide EEW alerts to citizens of California who have downloaded the app. In addition, there is also a research aspect and a citizen science effort to utilize the accelerometers on cell phones to monitor earthquake motions.

V. Research and Development

- Dr. Strauss provided updates on MyShake research and development progress, which included information on alert arrivals, HomeBase, and monitoring phone accelerometer activity to determine potential use and applications during future shake events.
- Dr. Strauss announced the future release of two publications regarding MyShake app user experience of early warning delivery and earthquake shaking, as well as crowdsourcing felt reports using the MyShake app. She also indicated that UC Berkeley will be working with Cal OES to provide additional language support within the MyShake app in Chinese, Korean, Tagalog, and Vietnamese. Lastly, MyShake will be using waveform data/shaking intensities to validate alerting areas.
 - Comment: Board Member Toney inquired about the MyShake HomeBase feature and wanted to confirm if it was developed for users that did not want to share their location within the app.
- Dr. Strauss indicated that HomeBase has two purposes. This feature was developed for app users that generally do not want to share their location. The secondary purpose is for users that have constant changes in location services that may go into areas where location services are not connecting, or users that are in rural areas that may not have a stable internet connectivity to update their location services. The HomeBase feature allows them to set a default location where they can receive alerts and warnings.
 - Comment: Board Member Wright inquired about the alert arrivals chart that depicted the number of alerts that were delivered to MyShake users during the September 2020 El Monte earthquake. This graphic categorizes the users into two groups: (1) Users that received alerts before shaking; and (2) Users that received alerts during or after shaking. He asked how the

MyShake team is approaching this to ensure that all alerts arrive prior to shaking and if there is a target goal established.

- Dr. Strauss indicated that due to the physics of earthquakes, user location, and the EEW system, individuals at and/or near the epicenter will not receive alerts prior to shaking. She stated that if an earthquake starts about 7 to 9 kilometers below the surface of the earth, the shaking must reach the surface to be recorded by seismometers around the area. In addition, four sensors must be triggered for an event to be declared. Once identified, the EEW system will analyze the data from the triggered sensors to run algorithms and determine the size and location of the earthquake. This information is then packaged into a series of XML files and sent to licensed operations to redistribute the alerts to end users.
 - Comment: Board Member Wright inquired if there are targeted alert times and whether these alert times are continually reviewed, evaluated, and assessed to learn from these events to improve the system.
- Dr. Strauss responded that the MyShake app has a target of alerting users in less than five seconds and that these alert arrivals are reviewed and measured in terms of the time domain, as opposed to distance. The team continues to assess these target alerting times and continue to reduce seconds where possible.
 - Comment: Chief Deputy Director Curry expresses her appreciation for the board member comments and agrees that the goal is to have more alerts arrive prior to shaking, even for users that are closer to the epicenter. She also added that the technology will continue to improve, in terms of increased reliability, accuracy, and speed, which is critical for life safety, earthquake safety, and decision making.
- Dr. Strauss added that MyShake was developed to be able to get feedback from users that received alerts, which is valuable to see how the app is performing and is used to continue learning and evolving. Tests measuring latency have been conducted daily since October 2019.
 - Comment: Board Member Pepper expressed her thanks to the team and acknowledged the progress of the MyShake app and how it continues to evolve and grow. She also followed up with a question regarding the HomeBase feature, and if it only captures the user location and is not tied to certain personal information such as a user's profile and/or phone number.

- Dr. Strauss stated that Board Member Pepper's understanding is correct. The MyShake app does not require a user profile or registration information to receive alerts. The phone is logged as a token in the backend. The user's location that is used during an alert is stored in the Amazon-cloud temporarily for 2 weeks, while the HomeBase ID tag is stored for longer. The only time that locations are stored is specific to active earthquake monitoring. There is no Personally Identifiable Information (PII) stored within the app. She denoted that utilizing the HomeBase feature will require you to input an address, however, it will not be stored and is only used for the user's phone to perform a function that assigns the user to a MGRS (Military Grid Reference System) square.
 - Comment: Board Member Wright suggested to reorient targets through either time or distance, and percent notifications, which should be used to measure performance. He indicated that in his experience it has shown that improvement happens when there is an appropriate target, measure performance against that target, identify when there's a gap to that target and then identify the drivers for the gap and problem solve to close them.
- Executive Officer Lara acknowledged the comment and that it would be followed up by the MyShake team.
 - Comment: Board Member Assefa asked if MyShake utilizes geofencing to provide notifications, if the user enables location services within the app. If the user disables the location services within the app does MyShake notify the user using the location that was provided via the HomeBase feature.
- Dr. Strauss indicated that Board Member Assefa is correct, and added that it is not precise location services that is being used within the app. If the user enables both location services and HomeBase, MyShake will be able to provide alerts to users at either location.
- Executive Officer Lara announced that public comment is open for participants attending the meeting in-person and virtually.
 - Public Comments: None

VI. Finance

- Deputy Director Nezhura provided an overview of finance updates for the current and budget year allocations. For the 2021-22 Budget Allocation, a one-time amount of \$17.283 million was appropriated to finish out the CEEWS buildout, which included new and updated seismic station installation, improved telemetry, education and outreach, and research and development. She further clarified that

the program would have one year to encumber the funds, 1.5 years to expend, and another half year to close out appropriated funds - for a total of 3 years.

- For the 2022-23 Proposed Budget Allocation, the program received \$17.1 million ongoing General Fund to continue supporting education and outreach, system operations and research and development. This includes seismic station maintenance, continued telemetry project, concentration on EEW automated actions adoption, research and development to enhance public alerting, two new staff in EEW, and a dedicated public information officer. In addition to the Budget Act, there is trailer bill language that will require a report next year on efforts to seek other private and public funding sources.
- Deputy Director Nezhura also clarified that the warning system within California is statutorily referred to as the California Earthquake Early Warning System, or CEEWS, which is powered by ShakeAlert.
- Chief Deputy Director Curry spoke to the progress of the CEEWS program from the initial program investment in 2016-17 to receiving ongoing support from the Legislature and the Governor. This is due to the promise and success of the system, as well as ensuring the system maintenance, consistency, reliability, and stability. This will also provide additional assurance to potential adopters of the system that the state is committed to continuing this program beyond its current use.
 - Board Member Toney asked if the \$17.1 million amount of ongoing funding to the program for 2022-23 will be appropriated on an annual basis.
 - Deputy Director Nezhura confirmed that the amount will be appropriated on an ongoing annual basis.
- Public Comment: Executive Officer Lara opens the floor for public comment to participants attending the meeting in-person and virtually.
 - Public Comments: None

VII. Goals for EEW Education, Outreach, and Expansion

- Executive Officer Lara restated the overarching goals of the program, which is to ensure that EEW is available to all Californians and diversifying the ways communities' benefit from EEW technology. The program has also taken steps to advance, inform, progress EEW with other state agencies, create partnerships, and explore automated actions in all industries.
- Cal OES, in coordination with the Advisory Board, disseminated letters to the Governor's Cabinet Members, as well as various agencies and

associations to encourage individuals to download the MyShake app on all state-owned mobile devices. In addition, information regarding EEW technology and earthquake safety was provided to various state employees through emails, intranet articles, and other means of communication.

- Executive Officer Lara mentioned that another round of letters will be sent out to constitutional offices and other appointed executive branch leaders. The purpose would be to engage state agencies, industry and private sector, stakeholders, and the public through these representatives to adopt EEW technology and encourage end user enlistments.
- Cal OES hosted an earthquake preparedness tour in April 2022 to provide California communities information on how to be prepared before an earthquake strikes and what to do during and after.
- Cal OES is developing the initial phase of outreach packages to the medical, transportation, and utilities sectors. The intent is to focus efforts in these sectors while developing a methodology that best fits each area. This outreach effort will eventually cover all key sectors within the state to advance EEW system uptake and other successful implementation as seen in California, Washington, and Oregon.
- Executive Officer Lara opened the floor to board members for targeted discussion regarding recommendations and feedback on how to best engage with stakeholders and industries that may be represented from within the group.
- Chief Deputy Director Curry indicated that a benefit analysis was conducted five years ago that incorporated interviews from various businesses, private and public, and critical infrastructure to develop business cases for EEW use in different industries and sectors. These early efforts pointed towards getting the EEW signal out to the public initially and would be the best place to start since the majority have mobile phones.
- Chief Deputy Director Curry also stated that the program is looking to expand efforts beyond public alerting, which has been a priority for the last few years. This same technology can be leveraged into more sophisticated operations and actions such as automatic shutoffs, stopping trains and elevators, etc; however, this technology is not one size fit all. The key is to ensure that organizations, industry, and various industries understand that this technology exists and is up to each sector to determine what the appropriate pathways and uses will be.

- Cal OES will continue to work closely with each board member, as well as other key partners and stakeholders to set goals, identify specific sector pathways and needs to increase adoption of EEW technology, and determine where we can assist users to leverage EEW technology.
 - Comment: Board Member Andersen recommended conducting outreach in-person at the various CSU campuses. Partnering with various majors to conduct outreach efforts. He also stated that face-to-face outreach is encouraged and is preferred by the students.
 - Comment: Board Member Pepper indicated there are roughly 600-700 transit agencies in California that operate independently and are smaller operations. CalSTA has leveraged the California Integrated Travel Project (CALITP) to assist these smaller transit agencies through Master Service Agreements to assist purchasing hardware/software, consulting services, etc. She indicated that CALITP could potentially be used to assist in the uptake and integration of the EEW system within the transportation industry throughout the state.
 - She also suggested reviewing funding guidelines for the various funding programs within CalSTA to help with prioritizing potential sectors and projects. She also recommended attending CalSTA board meetings, commissioner meetings, executive meetings, as well as working with agencies such as Caltrans, CTC, CHP, High-Speed Rail Authority to help start the conversation of EEW integration.
 - Comment: Board Member Gonzales expressed her appreciation regarding the tailored toolkits for specific industries that have been developed and for offering them in multiple languages. She inquired whether financial institutions, like banks and credit unions, are included in planned target outreach packages and efforts because they have a broad reach within communities.
 - Board Member Gonzales also mentioned that the California Business, Consumer Services and Housing Agency (BCSH) oversees the Department of Financial Protection & Innovation and offered to make a connection.
 - Comment: Board Member Cash inquired about the progress of MyShake downloads, as well as overall goals for the app.
- Deputy Director Nezhura stated that there are over 1.8 million downloads, and the program continues to promote MyShake in outreach efforts. In addition to app downloads, another area of focus

- will be in system integration in the form of automated actions within industries, businesses, and services such as rolling up bay doors at fire stations and public address systems (PA systems). She also stated that target goals and metrics are currently being developed, which will also be industry specific.
- Chief Deputy Director Curry added that the initial target goal for the MyShake app was 4 million downloads, roughly 10% of the populations. Although, downloads are below that goal with 1.8 million downloads – MyShake is not the only way the public is receiving alerts. Google has integrated EEW alerts into their operating system (Android-enabled devices), and San Diego County developed ShakeReadySD that also provides EEW alerts to their residents through a mobile app.
 - She stated that it was important for the state to demonstrate its commitment early on by encouraging state employees to download the app on state-owned mobile phones. This serves as an entry point for the program and encourages partners to promote workplace safety throughout the state. She also mentioned that there are more opportunities for this program to approach these sectors and industries to employ EEW, as well as promote the development of this technology with technical partners and operators in areas like fire services, public safety, utilities, and engineering.
 - Comment: Board Member Cash stated that outside of the Department of Motor Vehicles (DMV), the Natural Resources Agency has one of the most public facing organizations and would be a great opportunity to partner and conduct outreach with State Parks. He also inquired about posters with QR codes or other materials that could be provided to the public.
 - Cal OES shared a 30-second video clip of the Los Angeles Unified School District highlighting successful industry implementation of EEW. The program informed the board members that there will be additional videos available on the Earthquake Warning California webpage demonstrating more industry implementation success stories such as Menlo Park Fire District, and Cedars-Sinai Hospital,
 - Interim Deputy Chief Operating Officer Luis Carrasquero, Southern California Regional Rail Authority (Metrolink), provided an overview of the EEW implementation project with the positive train control (PTC) system. This project automates the stopping or slowing of trains through the Commuter Railway Seismic Interface (CRSI), which integrates California Earthquake Early Warning System (CEEWS) notifications with the Authority's PTC system.

- Comment: Chief Deputy Director Curry asked if there were any occurrences and/or events that deployed EEW notifications to the PTC system.
- Comment: Mr. Carrasquero responded that no shaking events, above the threshold of a M3.5 earthquake, have occurred and/or triggered the system since deployment.
- Comment: Board Member Assefa suggested developing a toolkit and outreach package specifically for educational institutions, such as UCs and CSUs, that not only house and educate students but also conduct research. She stated that some of these types of EEW applications and mitigation strategies could be written and funded into grants.
- Public Comment: Executive Officer Lara opens the floor for public comment to participants attending the meeting in-person and virtually.
 - Public Comments: None
- Due to time, Executive Officer Lara asked the board if they would like to proceed with the next presentation on education and outreach efforts, or have it tabled until the next board meeting to continue discussions regarding system implementation.
 - Comment: Chief Deputy Director Curry suggested providing a quick overview of the education and outreach efforts with the time remaining.

VIII. Education and Outreach Overview

- Yvonne Dorantes, Education and Outreach Coordinator, provided an overview of the earthquake preparedness tour. In recognition of Earthquake Preparedness Month in April, Cal OES travelled across California with an earthquake simulator and experts on hand to provide California communities information on how to be prepared before an earthquake and what to do during and after one. The team visited five major cities including: San Diego, Los Angeles, Sacramento, Berkeley, and Salinas.
- The outreach team also targeted both English and Spanish news media outlets to reach a wider audience and help increase awareness in earthquake safety, encourage emergency preparedness, and use of the MyShake app.
 - Comment: Board Member Anderson suggested that these types of outreach programs on CSU campuses would be the most effective to students.

IX. Closing Statements and Public Comment

- Chief Deputy Director Curry provided closing comments and extended her thanks to the team, as well as to the advisory board members for offering good ideas during the meeting and to continue these efforts and discussions outside of this meeting to continue building the pathway for what comes next. She also announced that the next board meeting will be scheduled within the next 3-4 months.
- Executive Officer Lara announced that public comment is open for participants attending the meeting in-person and virtually.
 - Public Comments: None

X. Adjournment

- The meeting was adjourned by Executive Officer Lara.

CALIFORNIA
EARTHQUAKE EARLY WARNING
ADVISORY BOARD

OCTOBER 27, 2022
MEETING MINUTES



***Cal* OES**
GOVERNOR'S OFFICE
OF EMERGENCY SERVICES



Previous Meeting Minutes

California Earthquake Early Warning System Advisory Board

California Governor's Office of Emergency Services (Cal OES)

3650 Schriever Avenue
Mather, 95655 California
Via Zoom

October 27, 2021

Previous Meeting Minutes

Members Present:

- Mark Ghilarducci, Director, Governor's Office of Emergency Services
- Lori Pepper, Deputy Secretary, Designee of the Secretary of the California State Transportation Agency
- Bryan Cash, Assistant Secretary, Designee of the Secretary of Natural Resources Agency
- Lupita Sanchez-Cornejo, Corporate External Affairs for AT&T, Appointee of the Speaker of the Assembly representing the interests of private businesses
- Melinda Grant, Undersecretary, Designee of the Secretary of the California Business, Consumer Services and Housing Agency
- Jack Andersen, Director of Architecture and Systemwide Chief Building Official, Designee of the President of California State University
- Alicia Jensen, Program Manager of Emergency Management and Business Continuity, Designee of the President of the University of California
- Holly Porter, Deputy Chief Administrative Officer for the County of San Diego, Senate Committee on Rules Appointee representing county government



Members Absent:

- Julie Souliere, Assistant Secretary, California Health and Human Services
- Vacant, Governor's Appointee representing the utilities industry

I. Welcome / Call to Order / Introductions

- Meeting called to order by the Advisory Board Executive Officer. A quorum was achieved.
- Director Ghilarducci welcomed the Advisory Board members and announced important new hires at Cal OES.

II. Review and Approve – Meeting Minutes from August 5, 2020

- Previous meeting minutes were approved by Advisory Board members, Assistant Secretary Cash and Deputy Secretary Pepper.

III. General Program Update

- General updates regarding the California Earthquake Early Warning Program, Earthquake Warning California, and the MyShake app were provided by Advisory Board Executive Officer Nate Ortiz.
 - Comments: None.
- Doug Given, US Geological Survey (USGS), provided updates on the M6.0 Antelope Valley Earthquake event that occurred on July 8, 2021. In addition, USGS provided general updates on the earthquake early warning (EEW) system.
 - Comment: Ms. Holly Porter, Chief Administrative Officer (CAO), San Diego County, asked for details regarding lessons learned from the Antelope Valley earthquake and the Ridgecrest earthquakes. She also inquired about streamlining station acceptance, and whether different station locations and densities were considered to improve system performance.
- USGS provided additional details regarding what was learned post-event from the Antelope Valley and Ridgecrest earthquakes, as well as status of station location and density for improved system performance. Additional information regarding streamlining station acceptance and target density was provided to the Advisory Board. USGS indicated that issues encountered were not due to the target density but due to the current buildout at that point in time.



- USGS indicated that certain locations will have slight information and telemetry delays. Post-Ridgecrest Earthquake event, significant changes occurred to ensure that the EEW algorithms are more tolerant when data arrives, especially if they arrive out of order. Additionally, station acceptance deals with noise around the site that could cause false alarms.
- USGS informed the board that various stations did not pass quality control after install, which may have caused issues if they had been online. Staffing shortfalls was also cited that contributed to the delay of this work.
 - Comment: Deputy Director Nezhura asked about the process to make algorithms and what an appropriate timeline would be to make necessary changes.
- USGS provided additional details regarding the EEW system algorithms and indicated that scientific partners continue to work on system improvements through the EEW working groups. USGS explained that once new algorithms are coded, they go through a testing performance working group and codes are compared to the baseline of current performance. The duration it takes to modify algorithms depend on the complexity of the change and are tested extensively, over 100 events that also include earthquakes in Japan. The algorithms are routinely checked and modified after earthquake events to ensure they are working appropriately.
 - Comment: Ms. Alicia Jensen, Program Manager of Emergency Management and Business Continuity, asked Mr. Given to repeat the information provided about logic and wanted to know how long it takes for changes to occur.
- USGS indicated that some changes in coding have already been made. The next quarterly cycle begins on November 1 and the additional codes will be submitted. Testing will take approximately 2-3 weeks, and the latest updates will launch in early December if testing is successful.

IV. System Operations

- Cal OES Earthquake Early Warning Program provided updates on System Operations.
 - Comments: None



V. Research and Development

- Dr. Jennifer Straus, MyShake Project Manager, UC Berkeley provided updates on the MyShake application platform, blind zone issue factor, and alert notification processes and times, as well as a demonstration of alert notification within the MyShake application.
 - Comments: Ms. Tina Curry, Chief Deputy Director, Cal OES asked for Dr. Strauss to expand on the blind zone factor, and what does the data from the accelerometer inform us about our assumptions.
- UC Berkeley indicated that the Caron earthquakes confirms the previous knowledge that it takes seconds for all information to transmit to the alert centers to process and deliver to devices. In some areas, it can take shorter or longer amounts of time. Additionally, MyShake must receive the alert, process 1.5 million registrations, take the subset in the area, and push to Google Firebase, which launches the push notifications. There is an additional layer within Google Firebase that may push alerts before, during, and after the events.
 - Comments: Igor Stubailo, Research Engineer, California Institute of Technology (Caltech), stated that phone companies need to send a certain number of texts to comply with industry standards. He also asked if sending earthquake alerts during an actual event is scalable, if it would be limited, and if alert messages have higher priority.
- UC Berkeley indicated that push notifications from the app are based on tokens, which do not share the same threshold as sending a text. Token notifications have a different threshold. UC Berkeley also indicated that the app notifications has not reached a ceiling for alert dissemination, even after largescale, rapid-fire tests. This may be due to app messaging having a high priority and approvals in place for critical alerts. UC Berkeley will continue to monitor the situation.

VI. Finance

- Deputy Director Nezhura provided updates and held discussions regarding the California Earthquake Early Warning System budget allocations.
 - Comments: Director Ghilarducci indicated that the \$17.283 million annual allocation will help to fund one-time



programmatic costs. There is an expectation to continue funding the system, and to secure sustainable, long-term, robust funding, as opposed to one-time allotments. He expressed that this will continue to be discussed further in future meetings.

VII. Education and Outreach Overview

- Ms. Katherine Carlson, Education and Outreach Program Manager, Pulsar Advertising provided updates on the Earthquake Warning California campaign that launched in August 2020.
 - Comments: Director Ghilarducci expressed his appreciation of the results and inquired further about the number of impressions and user interface. At 1.5 million users, he commented that he thought there would be a larger number in app usage considering there are 40 million people in California. He continued by asking about the challenges of getting individuals to download the app and why there are not more MyShake app users.
- Pulsar Advertising responded by indicating that industrywide, people are app fatigued and may be wondering how much value an app will provide. She added that there is over proliferation of downloading apps, especially if people think they can receive alerts in different ways. From an exposure standpoint, it is important to continue to influence and encourage people to take action. She also added that additional exposure should continue to move the team forward in the campaign.
 - Comments: Director Ghilarducci inquired if there is other areas for improvement that would result in additional downloads.
- Pulsar Advertising responded by stating that a number of different messaging was tested that directed individuals to the app store instead of a website, which reduced the number of steps to download the app.
- Pulsar Advertising indicated that continued exposure, diverse messaging, and other creative products would assist to increase impressions, site visits, and app downloads.
 - Comments: Ms. Porter asked how much of the efforts are centered on expectation management because earthquake early warning has made significant progress with public alerting,



and that the system continues to be built and algorithms adjusted.

- Pulsar Advertising stated that expectation management is important and is something that continues to be improved. Earthquake Warning California encourages individuals to learn about earthquake preparedness and to have a plan, as well as to download the MyShake app. The messaging is centered on encouraging people to be prepared for an earthquake.
 - Comments: Ms. Porter asked if participation in the app would increase if MyShake users had the ability to assist in app development to further advance the alert and warning system.
 - Director Ghilarducci indicated that additional work needs to occur in public education and is a priority for Cal OES. Cal OES informed the board that public education and outreach is a priority and will continue to increase education efforts at the community level.
 - Deputy Director Nezhura added that the next presentation will indicate the education efforts being done at the community level.
 - Ms. Alicia Jensen, Office of Emergency Management, designee of the President of the University of California expressed her appreciation of the campaign and added that the composition of the Advisory Board provides an opportunity to share information about EEW with their respective staff and programs. She has the ability to reach out to the University of California communications team and would follow-up on this effort.
- Pulsar Advertising encourages agencies to visit the website, which provides a robust number of materials to distribute for various sectors and industries.
 - Ms. Jensen added that if the materials come from a trusted source, individuals may be more receptive to the messaging.
 - Director Ghilarducci agreed and indicated that the department will send correspondence to cabinet secretaries, partner agencies, California State University, University of California, and California Community Colleges about the Earthquake Warning California campaign. He also expressed that for those representing departments or the private sectors, he is not comfortable with where the system is currently. And, highlighted



that it is important to accelerate the pace of system development so that we can engage private entities and corporations to integrate EEW into safety and security protocols.

- Advisory Board Executive Officer Ortiz presented on behalf of United Way and provided updates regarding four (4) Earthquake Warning California grants given to target underserved communities. In addition, Cal OES is working with the Imprinta Communications Group to augment outreach towards underserved communities. In addition, he provided information regarding the 2021 Great ShakeOut event.

VIII. Next Steps

- Advisory Board Executive Officer Ortiz discussed integrating EEW systems into various industries and sectors, buildings, and infrastructure. Cal OES will also follow-up by sending letters to engage partners and industries. He inquired how the Advisory Board plans to implement and integrate these systems into their respective areas; and to determine next steps and recommend an approach.
 - Comments: Ms. Lupita Sanchez-Cornejo, Corporate External Affairs, AT&T, stated that a good component of her industry is the ability to connect with business organizations and chambers of commerce. which will allow them to reach a wide range of industry, a cross section of representatives, and their workforce.
 - Undersecretary Grant echoed Ms. Sanchez-Cornejo's suggestions around outreach because within her agency on the consumer side, flyers can go out with business license renewals and other regular mailings. That is a way to expand reach, not just to state workers but also to use procedures already in place.
- Advisory Board Executive Officer Ortiz offered assistance regarding any public relations materials needed, such as flyers, that can be developed by Cal OES.
 - Comments: Vice President Zago indicated that his organization works with 39 chambers of commerce that would assist with extended outreach to companies like Chevron, Panda Express, Raley's, Gap, HP, John Muir Health, and more.
 - Director Ghilarducci expressed his appreciation for all the recommendations and will work with Pulsar Advertising to create packages in order to engage with the various audiences



mentioned. In addition to downloading MyShake, he mentioned that it is important to let businesses know what they can get out of the EEW system. Implementing the system can potentially reduce employee injuries and workers' compensation costs. For example, during the recent earthquake in Southern California, several refineries flared operations, which is how refineries respond to these events and they coordinate with utilities to do this. There is an area of focus and priority, and the department will continue to accelerate and engage this part of the EEW system with partners for implementation.

- Advisory Board Executive Officer Ortiz announced that there will be presentations on system operations at the next meeting.

IX. Closing Statements and Public Comment

- Advisory Board Executive Officer Ortiz discussed the next steps which includes a focus on increasing EEW implementation among the public at all levels as, well as moving forward with automatic actions triggered by EEW notifications. Resources for board members include earthquake.ca.gov (toolkits, videos, FAQs), ListosCalifornia.org (Disaster Ready Guide, other resources), and Caloes.ca.gov (Preparedness Ambassadors curriculum).
 - Comments: Deputy Director Nezhura mentioned that although the resources mentioned do not focus on MyShake primarily, they provide case studies of actual disasters in the state, as well as resources for students. These resources include a family guide that children can take home to complete with their families and create an earthquake preparedness plan. She also indicated that Cal OES is looking to integrate EEW in future revisions and that these resources have been a focus in magazine articles for teacher associations.

X. Adjournment

- Director Ghilarducci provided closing remarks.
- Ms. Sanchez-Cornejo motioned to adjourn.
- Ms. Jensen seconded the motion.