

2018 National Earthquake Program Managers Meeting
Seattle, WA | May 1 – May 3, 2018
Meeting Notes

Meeting Participants:

Mulivanu Aiumu, American Samoa
Ryan Arba, CalOES
Cindi Barker, City of Seattle
Dan Belanger, Alaska
Hilda Booth, Arkansas
Jeff Briggs, Missouri
Steve Brukwicki, Kentucky
Robert Burton, South Carolina
Bob Carey, Utah
Mike Conway, Arizona
Tim Cook, Washington
John Crofts, Utah
Allison Curry, Indiana
Maximilian Dixon, Washington
Michael Dossett, Kentucky
Leo Rustum Espia, Guam
Robert Ezelle, Washington
Emily Fish, Georgia
Marjorie Gale, Vermont
Melinda Gibson, Wyoming
Joan Gomberg, USGS
Barb Graff, City of Seattle
Susan Hardy, Mississippi
Derrick Hiebert, Washington
Jamie Hill, American Red Cross
Eric Holdeman, Center for Regional
Disaster Resilience
Andy Jochems, New Mexico
Katherine Johnson, NIST
Stacie Louviere, University of Washington
John Metesh, Montana
James Mullen, Oklahoma
Dave Perry, South Carolina
Evan Reis, U.S. Resiliency Council
Kevin Richards, Hawaii
Jesus Poupart Rivera, Puerto Rico
Althea Rizzo, Oregon
Michael Ruple, Georgia
Brian Sherrod, USGS
Jon Siu, WAsafe
Bill Steele, Pacific Northwest Seismic
Network
Kimberly Stuart, Alaska
Brian Terbush, Washington
Matthew Wall, Virginia
Timothy Walsh, Washington

Cecil Whaley, Tennessee
Robert White, British Columbia
Jason Williams, Illinois
Veronica Cedillos, ATC
Pascal Schuback, CREW
Ines Pearce, CREW
Jim Wilkinson, CUSEC
Brian Blake, CUSEC
Heidi Tremayne, EERI
Zoe Yin, EERI
Leslie Chapman-Henderson, FLASH
Ed Fratto, NESEC
Mark Benthien, SCEC
Patti Sutch, WSSPC
Erin Mommsen, WSSPC
Nick Shufro, FEMA HQ, Asst. Admin. FIMA
Ed Laatsch, FEMA HQ
David Javier, FEMA HQ
Mike Mahoney, FEMA HQ
Jon Foster, FEMA HQ
Andrew Herseth, FEMA HQ
Jesse Rozelle, FEMA HQ
Casey Zuzak, FEMA HQ
Molly Kaput, FEMA Region I
Clark Brewer, FEMA Region II
Noriko Kibble, FEMA Region IV
Lora Goza, FEMA Region IV
Scott Bailey, FEMA Region V
Bart Moore, FEMA Region VI
Cheickh Koma, FEMA Region VII
Ryan Pietramali, FEMA Region VIII
Forrest Lanning, FEMA Region IX
Tamra Biasco, FEMA Region X
Amanda Siok, FEMA Region X
Lee Mueller, OPP
Shawn Preston, OPP
Lori Peek, University of Colorado Boulder

NEPM Day 1 – Tuesday, May 1, 2018

- I. **Welcome and Introductions – Matthew Wall, Virginia Earthquake Program Manager/NEPM Chairman; Barb Graff, Seattle Office of Emergency Management Director; Robert Ezelle, Washington Emergency Management Division Director; Mike O’Hare, FEMA Region X Administrator; Ed Laatsch, FIMA Director, Safety, Planning, & Building Science Division; Nick Shufro, FEMA Assistant Administrator for the Risk Management Directorate; Katherine Johnson, NIST Social Scientist**

Matthew Wall opened the meeting and thanked Seattle for hosting. He provided brief remarks and welcomed the morning’s speakers.

Barb Graff, Seattle Office of Emergency Management Director, thanked everyone for gathering in Seattle and discussed unreinforced masonry buildings and the risk they pose in Seattle. Unreinforced masonry buildings occupy more than 25 million square feet of Seattle, with more than 33,000 people exposed to the hazard. The hazard in Seattle isn’t as great as in California, resulting in less legislation.

Affordable housing units are a problem in Seattle, as many are unreinforced masonry and are located in areas of high seismic risk. Seattle came up with a phased approach to address retrofitting of unreinforced masonry buildings.

- Critical risk (77 affected structures, predominately schools): Building owner is given notice, then they have one year to apply and one more year to get a permit. After a permit is obtained, construction must be completed in five years. A seven year process overall.
- High risk (183 affected structures): These buildings are affiliated with poor soil conditions, or are three stories or higher, or have a room that can accommodate more than 100 people. Retrofit is a 10-year process.
- Medium risk buildings have a slightly longer time frame, covering 13 years.

Robert Ezelle, Washington Emergency Management Division Director, thanked the hosts and spoke on efforts to address earthquake risk. Washington is investing in an unreinforced masonry study and Washington DNR is pushing a project to assess earthquake risk in schools.

Washington ran an exercise looking at the Cascadia subduction zone. The exercise generated a lot of attention and the media has helped to carry the message of earthquake risk and preparedness forward. Political dialogue on earthquake risk is beginning as politicians realize that the risk is very real.

Early Earthquake Warning is another project expanding up and down the coast, with the majority of the funding and work being done in California. He posed questions for consideration and feedback: How do you educate the public? What do you do when the warning comes and how do you communicate that message?

Region X Administrator, Mike O’Hare spoke on Kodiak, Alaska’s 8.0 earthquake, noting it was a wake-up call to the region and linked this experience to building earthquake preparedness in Region X and the Nation. O’Hare touched on FEMA Administrator Long’s three goals he has established for FEMA - Build a culture of preparedness, Ready the nation for catastrophic disasters, and Reduce the complexity of FEMA. He noted that state earthquake program managers are essential parts of the program and must communicate their needs to their FEMA partners.

Ed Laatsch, Director of the FEMA Safety, Planning & Building Science Division, spoke on NEHRP reauthorization, noting a generally optimistic feeling. NEHRP is approaching 40 years, making it one of the older interagency organizations in the government. FEMA relies on information from the states for annual reporting to Congress. He noted there are efforts to aligning FEMA NEHRP activities with FEMA strategic priorities and other strategic initiatives to demonstrate program effectiveness.

Nick Shufro, FEMA Assistant Administrator, spoke on mitigation in a changing environment and the importance of investing in mitigation for a more resilient United States. He noted FEMA's moonshot initiatives which include doubling flood insurance policies by 2023 and increasing the mitigation investment rate to four times the current level. A national level exercise is taking place in Hampton Roads, Virginia, and FEMA is using it as a means to increase the number of insurance policies bought as a result of the exercise. Shufro also noted the Mitigation Saves interim report that has recently been published. The mitigation return on investment now averages 6:1 across the different perils. The ability to show a positive benefit-cost ratio to a developer helps make the business case for mitigation investment. The study is included in the omnibus bill as a rationale for increasing investments.

Katherine Johnson, NIST Social Scientist, talked about the organization of NEHRP and how NIST fits in. NIST is working on studies based on certainty of design and technologies to improve earthquake design performance. NIST has also just completed a study addressing design issues along with community and adoption considerations for buildings intended to be "immediate occupancy" after an event. The report should be released to Congress in the coming months. She noted that NEHRP reauthorization would update the program language and realign activities.

II. Earthquake Program Manager (EPM) 101: Responsibilities

Jeff Briggs, Missouri Emergency Management Agency, introduced the "Earthquake Program Manager 101" presentations. He noted many earthquake program managers begin the job not being earthquake experts. He continued that earthquake program managers don't need to be the experts, but should know where the experts are. Networking and understanding resources is important, as is positioning the earthquake program manager role to serve as a valued resource in the community. He talked about the importance of being able to leverage existing resources, especially state geologic surveys, FEMA, USGS, partners/consortia, universities, professional groups, and emergency managers.

He pointed out that different states have different duties for the same position, and different states have different needs. The most important part is that those needs are being met. Regardless of the differences between states, each shares the responsibility of trying to secure federal funding and increasing earthquake risk awareness. He emphasized leveraging projects other states are doing and sharing knowledge. Also, state earthquake PMs should develop a presentation that is suitable for all audiences and use it to develop consistent messaging in your state.

Maximilian Dixon and Tim Cook, Washington Emergency Management Division, spoke about the importance of leveraging a public information office or communication team, if available. They spoke on preparedness and outreach, working with others who have similar missions and building on overlapping plans and assisting one another. Other resources worth leveraging include exercise and training personnel, planners, the SHMO and mitigation team, and alert and warning centers, if applicable. Maximilian closed by soliciting feedback on how processes can

be improved.

III. Panel Session: External Partner Roles and Relationships – Brian Sherrod, USGS Research Geologist; Tim Walsh, Washington DNR Assistant State Geologist; Heidi Tremayne, EERI Executive Director; Mark Benthien, SCEC Director for Communication, Education and Outreach; Veronica Cedillos, ATC Director of Projects; Leslie Chapman-Henderson, FLASH President and CEO; Lee Mueller, OPP Outreach Director

Brian Sherrod presented on behalf of the U.S. Geological Survey (USGS). USGS maps geologic structures and assesses earthquake hazard, and conducts research to enhance understanding of the hazard and to synthesize, integrate and rapidly distribute information on an earthquake event. Sherrod presented the National Seismic Hazard Map and noted it is currently updated every six years on a rotating cycle based on data points.

Sherrod spoke about the earthquake early warning system (EEW), ShakeAlert, noting a public pilot later in 2018. The system can provide seconds to minutes of warning in the event of an earthquake. After an event, the USGS will publish an event webpage with relevant information, such as an interactive map, a ShakeMap, a “Did you feel it?” map, and a pager alert. Also during an event, USGS has a field response, which results in more than 200 scientists and support staff as resources available to states.

Tim Walsh, Washington DNR Assistant State Geologist, presented on State/Territory Geological Survey resources. He pointed out that almost all states have a geological survey; the American Association of State Geologists (AASG) has a live map for each state’s geological survey web page. AASG also provides a national geologic map database.

Heidi Tremayne, Executive Director of the Earthquake Engineering Research Institute (EERI), presented on capabilities of the organization. EERI is a non-profit technical membership society with about 3,000 international members. EERI focuses on advancing earthquake engineering science but also understanding realistic risks. Key programs include: learning from earthquakes, school earthquake safety initiative, world housing encyclopedia, confined masonry network, concrete coalition, and the *Earthquake Spectra* Journal. She noted there are 14 Regional Chapters in North America (one in British Columbia), and talked about EERI efforts in mitigation planning, property inventory and seismic inspection of critical infrastructure, and earthquake awareness and education. In closing, she noted the dates of their next annual meeting, March 5–8, 2019, and the launch of a National Conference on Earthquake Engineering, to be held in Los Angeles from June 25–29.

Mark Benthien provided information on the Southern California Earthquake Center (SCEC). SCEC is an earthquake science research center supported with funding from USGS and the National Science Foundation (NSF). SCEC offers earth science and computer science internships and founded and administers the Earthquake Country Alliance (ECA). SCEC also manages the Great ShakeOut, which last year had about 50 million participants in the world. This year the Great ShakeOut will be held October 18 at 10:18. Mark noted new SCEC initiatives for 2018: 10th anniversary programming; streamlining all ShakeOut websites; expanded inclusion of mitigation messaging; developing guidelines for how participation can meet new Centers for Medicare and Medicaid Services drill requirements; incorporation of “public rollout” of EEW; Spirit of ShakeOut awards; and a new ShakeOut Coordinator Portal.

Veronica Cedillos, Director of Projects at Applied Technology Council (ATC), spoke about ATC

resources and capabilities. She talked about the mission, process, and technical resources, and presented on ATC technical resources: guidelines, technical reports, program plans, technical briefs, and national and international workshops. A main goal of ATC is understanding who is doing what in the field. She also presented on examples of specific ATC products, and closed by mentioning in-person trainings and free webinars on FEMA products via the National Earthquake Technical Assistance Program (NETAP).

Leslie Chapman-Henderson presented on the Federal Alliance for Safe Homes (FLASH). FLASH has resources of more than 100 diverse partners, with a focus and direct connection to the earthquake programming. This includes work for FEMA's Building Science Branch (BSB) such as administering QuakeSmart; creative services; design outreach initiatives; building code commentaries; building code education; develop public/private partnerships; and state support projects.

Lee Mueller spoke on capabilities of Outreach Process Partners (OPP). Partnership opportunities exist for state support projects, with past projects including preparedness playing cards, a Kentucky preparedness checklist, and an earthquake hazard public service announcement for the U.S. Virgin Islands. Additional services include audience research using Meltwater, data visualization dashboards, and other strategic capabilities.

Pascal Schuback presented an overview of consortia, beginning with the Northeast States Emergency Consortium (NESEC). With Ed Fratto as Executive Director, NESEC serves a population of around 43 million, consists of 501c3 non-profits, and releases products including HAZUS and the Map Your Risk program.

Jim Wilkinson is the Executive Director of the Central United States Earthquake Consortium (CUSEC). Goals of CUSEC are to reduce death, injury, property, and economic losses, raise public awareness and education, and application of research and lessons learned. Key partnerships of CUSEC are with FEMA, USGS, NEMA, DOT, USACE.

Patti Sutch is Executive Director of the Western States Seismic Policy Council (WSSPC). Their focus is on policy, especially working with lawyers, emergency managers, geological surveys, and seismic commissions. Their focus is on policy, working with emergency managers, geological surveys, and seismic commissions.

Pascal Schuback represents the Cascadia Region Earthquake Workgroup (CREW) as Executive Director. CREW focuses on building stronger relationships with public, private, academic, and other non-profit organizations. CREW goals include designing and promoting efforts to reduce loss of life and property damage; educating and motivating decision makers, managers, and the public; and fostering productive partnerships between stakeholders.

IV. Lunch Guest Speaker: WAsafe Safety and Building Safety Assessment – Jon Siu, City of Seattle Principal Engineer/Building Official

WAsafe is a coalition formed in 2015 between AIA Washington, ASCE, Structural Engineers Association of Washington (SEAW), WA Association of Building Officials (WABO), and WA State Department of Health (DOH). It is similar to the Missouri SAVE coalition.

The main objective of WAsafe is to assist building officials with building safety assessments following a disaster by developing a group of qualified volunteers. The program provides WAsafe evaluator training; maintains an evaluator roll; and assists WA State EMD in calling up

and dispatching volunteers and sharing resources. The program focuses on allowing people to reoccupy safe buildings in a timely fashion, and leveraging state and local resources to do so. The main value added by WAsafe is assisting with post-event inspections as a force multiplier, sometimes by as many as thousands.

The WA EMD Report is a post-disaster safety assessment program (SAP) developed for the State of Washington and helped lead to the standing up of WAsafe. ATC-20 and ATC-45 are guidance documents focusing on flooding, wind, and earthquake with emphasis on earthquake in WA. Capabilities include volunteer enrollment managed by WAsafe member organizations, response managed by WA EMD, etc.

WAsafe resources include inspectors of all types and qualifications, including for structural evaluations and non-structural evaluations. Volunteers include certified building plan examiners, commercial building inspectors, building inspectors, architects registered in WA, and certified building officials.

The Washington State military department, AIA-Washington, SEAW, and WABO signed an MOU in April 2018 to recognize WAsafe's role in establishing a mobilization process for emergency workers to evaluate buildings. The role of the local government is to provide jurisdictional contact, provide orientation training, issue local placards, deputize WAsafe volunteers, and coordinate WAsafe volunteer activities.

WAsafe engages in pre-event activities to train volunteers and maintain volunteer enrollment. Activities can include training on evaluation procedures, WAsafe process, WA emergency worker laws, and NIMS information. WAsafe also maintains a to-do list of continuing priorities. Currently, this list includes increasing awareness of the WAsafe program to local emergency management organizations, building officials, and volunteers.

V. EPM 101: Resources

Veronica Cedillos, ATC, discussed training resources available to earthquake PMs. NETAP is a training program ATC manages on behalf of FEMA and is designed to help local, state and tribal governments obtain knowledge, tools, and support needed to plan and implement effective mitigation strategies. Types of training include instructor-led, training development or update, and technical assistance or special project support.

The NETAP process begins by developing a NETAP resource guide. This includes basic information on NETAP, the process, and how to request a course, as well as basic information and a brief description of the course. This is sent to the FEMA Regions and state earthquake PMs. States submit training requests. Upon FEMA HQ approval, ATC will try to leverage other events, make a plan of which can be conducted, and coordinate with training recipient.

Planning and conducting for NETAP training takes place at the local level. The local POC is responsible for advertisement, registration, venue reservation, and securing audio and visual equipment. ATC provides template flyers for advertising, experienced instructors, training materials, certificates, and offers performance reporting to help develop future trainings.

Examples of NETAP courses include FEMA P-154: *Rapid Visual Screening of Buildings for Potential Seismic Hazards*, ATC-20: *Procedures for Postearthquake Safety Evaluation of Buildings*, and a class exercise where participants are taken to do a FEMA P-154 evaluation nearby. ATC also publishes guidelines for evaluation and retrofit by type of building and

guidelines for risk reduction by building use or building component.

There are multiple training courses in development including a recently-developed course on *Building Codes and Why They Matter* and FEMA P-1000: *Safer, Stronger, Smarter: A Guide to Improving School Natural Hazard Safety*. As of April 26, ATC has reached 2,569 people in multiple states through several courses.

Maximilian Dixon and Tim Cook, WA EMD, discussed grant funding opportunities available to earthquake PMs. Hazard Mitigation Assistance (HMA) grants fund seismic retrofits. FEMA's Hazard Mitigation Grant Program (HMGP) consists of cost-share grants, usually at a rate of 75/25% with a 3-year period of performance (POP). These are reimbursement-based, available to eligible entities only, and competitive. HMA is geared toward funding projects and not programs.

For HMGP grants, the cost-share is 75/25%, the application period is usually 9–12 months, and the POP is 3 years. These are competitive statewide and frequently only available after a Presidential Declaration in the state. Eligibility is restricted to governments, special purpose districts, and qualifying non-profits organizations that have a FEMA-approved Hazard Mitigation Plan. The funding level is fixed to 20% of overall FEMA relief funds given to the state for the Disaster Declaration.

The Pre-Disaster Mitigation Grants (PDM) program is an annual program, per Congressional appropriation. In 2018, the PDM program was appropriated for \$250 million. Seismic retrofits are eligible for these grants under three categories: structural retrofitting of existing buildings, non-structural retrofitting, and infrastructure retrofitting. Other seismic retrofit projects include retrofitting water tanks and critical facilities, EEW, and ShakeAlert components. Safe room construction is an eligible category that provided an opportunity to build evacuation structures above ground.

Tim Walsh, WA DNR, discussed key products earthquake PMs should be aware of. LiDAR applications are useful to the industry because it does a virtual deforestation, removing surface structures to examine the ground underneath. Types of elevation data vary, including surveying, photogrammetry, and LiDAR-derived highly detailed Digital Elevation Models (DEMs).

Washington, Oregon, and USGS all have LiDAR portals. All the data goes into making a probabilistic map of earthquake hazard in the United States. This information is also important to the HAZUS loss estimation tool. Nick Shufro, FEMA HQ added that Congress recognizes the value of LiDAR and has authorized another \$85 million for LiDAR acquisition, to be shared across federal agencies, for a combined \$121 million investment this year. FEMA primarily uses LiDAR to map floodplains, but Shufro noted there is also application for earthquake risk mapping.

VI. EPM 101: Grants Management – Noriko Kibble (FEMA), Ryan Arba (CalOES)

Noriko Kibble provided an overview of grants management from the FEMA perspective, noting that she has the most direct state assistance grants. States that are doing direct state assistance are encouraged to work with each other and share best practices. States should also work with their financial staff to ensure they don't misappropriate funds. Tips presented included a comprehensive work plan to show funds are being used properly; developing progress reports with a narrative and budget; being prepared for financial reviews; and talking to Regional representatives.

Jim Wilkinson asked for clarification of direct state assistance funds. Ed Laatsch provided an overview of funding stream and allocation of funds.

Ryan Arba presented on the processes for pre-award, when the award is received, and after closeout. Pre-award work should be done with grants personnel to get the sub-award process figured out. Due to the cooperative nature of the grant, states can work with partners prior to the award of the grant. During the award process, states should set up regular check-ins and build in buffers for reports. After closeout, ensure work is done with FEMA to make adjustments and make the process more efficient.

VII. EPM 101: Successful Projects

Veronica Cedillos, ATC and Mike Mahoney, FEMA presented an example of a successful earthquake program project. Following the South Napa earthquake, FEMA published P-1024: *Performance of Buildings and Nonstructural Components in the 2014 South Napa Earthquake*. The study was important because there was no declared presidential disaster. Being funded under NETAP included the capability of funding a special project component, which was the base funding for FEMA P-1024.

After the South Napa earthquake was eventually declared, a new task order was created with ATC to develop two Recovery Advisories (RAs). FEMA funded the data collection on retrofitted URM buildings following a 1986 California law requiring compliance with retrofitting. The study results prompted the first RA to focus on masonry chimneys, recommending replacement with light weight metal or capping chimneys not in use. The second RA dealt with cripple walls and provided plans to retrofit those up to seven feet high, which were initially elevated due to a structure being located in a floodplain. All of these publications are available on the FEMA BSB flash drives.

Robert White, Emergency Management British Columbia, presented on a Seismic Microzonation project underway within the Metropolitan Vancouver area. Seismic microzonation is used to understand variations in seismic hazard, involving the assessment of the hazards of liquefaction, slope instability, and ground shaking. Emergency Management British Columbia (EMBC) Seismic Microzonation Project is a \$3.7M project in partnership with the Institute for Catastrophic Loss Reduction and Western University. The outcomes are neighborhood scale maps and digital data as GIS layers. The anticipated completion of the project is in March 2023.

To date, progress has included engaging with project partners to raise project awareness, identifying sources of geotechnical datasets and collecting those datasets. Next steps will include field work, further geotechnical dataset collection, engaging with First Nations, and engaging with the Engineers and Geoscientists of British Columbia.

One of the major successes has been addressing a seismic hazard knowledge gap. Other successes are the multitude of available resources and securing buy-in from federal and local government and other partners.

Brian Blake, CUSEC briefed on leveraging NETAP to engage stakeholders. CUSEC works with a wide variety of partners—mostly through NEHRP—to reduce deaths, injuries and economic losses from earthquakes. The program is outcomes oriented, and succeeds by increasing knowledge of earthquake hazard, risks, and mitigation actions and increasing the number of actions taken by those at risk. Because of this, the Nation is more resilient against earthquakes.

One state success story is the HOPE Hospital Coalition in Illinois. The IL Department of Public Health Summit held breakout sessions on hospital mitigation from a high-level, non-technical perspective. The Chair of the Coalition requested a full training, which has resulted in the approval to begin ATC-20 and FEMA P-154. The success is partly attributed to HOPE Coalition viewing the project as a long-term mitigation activity, which helps justify the cost to hospital administrators.

Another success story is “When Wynne Shakes” in Arkansas. Through the QuakeCatcher network, CUSEC provided messaging to students at schools across the state. The Environmental and Accessible Science and Technology (EAST) project had students creating videos, animations, presentations, first aid trainings, and encouraged the entire county to participate in ShakeOut. Next steps for the project are to go to other counties that participate in the EAST program.

VIII. EPM 101: Outreach

Cecil Whaley, TN EMA, provided an overview of best practices on how to successfully brief state legislators. Before approaching any legislators, Cecil Whaley emphasized that it is important to identify champions of your program. There is a trend of candidates for office being less frequently trained in law—and are therefore less familiar with policy—so find the passion of the legislature to be successful. One way to increase visibility on preparedness legislation is to begin with networking, get the message out, and eventually the citizens will begin to push for it from the legislature. A key to success is building relationships with the community. State earthquake PMs should work to become the primary resource following an event.

Steven Friederich, WA MIL, and Maximillian Dixon, WA EMD, provided an overview on how to successfully engage the media. The key to interacting with the media is building relationships; know the media and be in contact with them on a regular basis. The first interaction with reporters should be prior to a live broadcast. Build rapport and trust and eventually you will be the primary resource. Tips for success while speaking on-camera include: don't rush; don't look at the camera; don't lie; use the phrase “I'll get back to you on that” and mean it; practice ahead of time; don't fill silence, allow “awkward silence”; and always follow up.

Writing is integral to the success of a program, as is social media. Social media should be part of any successful toolkit. Collaborate on social media messaging for standardization and take advantage of “theme days” such as anniversaries, ShakeOut, or World Tsunami Day. Use quality images to promote events and take advantage of non-standard social media resources, such as a Reddit Ask Me Anything (AMA). The Reddit AMA is valuable since it involved key partners with varied knowledge and relevant stakeholders and was a direct line to users.

Dan Belanger, AK EMD, provided best practices on community outreach and overcoming obstacles to stakeholder engagement. Dan noted that the challenges of outreach and education in Alaska are varied and many. Only 2% of Alaska is accessible by road as the geography varies greatly within the State. Funding is a concern since travel is expensive. Many parts of the state are low-tech, with poor IT access and low bandwidth. Also, there are 62 languages in the State. These are just some of the challenges.

Outreach is done via community events, such as traveling with an earthquake simulator, and community resources, especially schools, emergency responders, city managers, and others. A key element to a successful outreach campaign is teaching the audience how to create or procure the resources themselves, not just providing the resources. Types of outreach

communication are sorted into three groups: informal education (workshops, town halls, focus groups), formal Education (K-12 school disaster preparedness curriculum), and outreach education (e.g., engage the business community).

Leslie Chapman-Henderson, FLASH, also presented on successful ways to engage stakeholders. FLASH is focused on finding a champion in the business community and getting people engaged. Benefits to doing so include creating a resilient business, a resilient workforce, and leveraging resources and funding from new partners. QuakeSmart is a program for businesses; a toolkit and questionnaire, but also a workshop where the toolkit is used and the process is reviewed with the business. Areas of focus are staff, space, systems, structure, and service. QuakeSmart is comprised of three steps: 1) Identify risk, 2) Develop a Plan, and 3) Take Action. The Ready Business Program includes hurricane, inland flooding, power outage, QuakeSmart, and severe wind. A video of the Ready Business Program Toolkit was played and directed viewers to ready.gov/business.

FLASH has created several outreach tools and state support project options including QuakeSmart Workshops, Great ShakeOut billboard campaigns, preparedness flash cards, development of activities for kids, and a puppet/doll for education in the schools created by Disney. *If Disaster Strikes Will You Be Covered?* is the most frequently downloaded asset and it pairs insurance with mitigation options. It is available in both English and Spanish. The National Earthquake Conference occurs every four years and the National Earthquake Resilience Coalition has been formed out of that event. The Coalition publishes a quarterly newsletter on topics such as science and policy, upcoming events and conferences, and featured interviews with earthquake partners and experts.

Maximilian Dixon formally closed out the EPM 101 portion of the NEPM, noting that it is a new program and feedback to improve the content and structure is welcome.

IX. Earthquake Early Warning – Maximilian Dixon (WA EMD) and Althea Rizzo (OR EMD)

ShakeAlert strategy development was led by CREW, funded by FEMA, and included more than 100 collaborators. ShakeAlert is a system that detects an earthquake and rapidly disseminates warnings to end users in potentially affected areas. The system currently operates as a production prototype in CA, OR, and WA. ShakeAlert does not yet support public warnings.

EEW is a combination of the ShakeAlert system technology, recommended protective messages communicated to end users, and the outreach, education, training and other emergency preparedness and mitigation activities required to fully implement EEW. A successful EEW would occur when the ShakeAlert system adequately detects an earthquake, rapidly disseminates warnings to end users in potentially affected areas, the end users receive the warning and take recommended protective measures, and there is receipt of action taken.

The full-scale alert is limited by a lack of funding to complete and operate the system. The sensor network remains incomplete, current mass notification technologies are too slow, and potential end users aren't educated enough. ShakeAlert will begin in limited operation in 2018 with several pilot deliveries.

The purpose of a Pacific Northwest strategy is to define a path forward for state, tribal, and local governments in OR and WA to contribute to the successful development, implementation, and preparedness associated with EEW. Outreach, education, and training strategy goals are to

2018 National Earthquake Program Managers Meeting
Seattle, WA | May 1 – May 3, 2018
Meeting Notes

facilitate OR and WA involvement in ShakeAlert and EEW; engage and provide information to decision makers, stakeholders, and the public with relevant and pertinent information; promote opportunities for users to integrate EEW into systems and operations; support the education and training of end users; and assess EEW's ability to reduce injury and loss to life and property.

The OR and WA Committees for Communications, Education, and Outreach (ORCCEO and WACCEO) are actively engaging with and gathering feedback from tribal, state, and local stakeholders to collectively support EEW and ShakeAlert implementation activities and other priorities. Dixon highlighted recommended activities, sample activities, the role of stakeholder champions in the success of EEW, as well as tips on how to get involved. He noted the latest technology is Wireless Emergency Alerts (WEA), but there are some challenges related to cellphone carriers.

Matthew Wall provided closing remarks. He reminded the group that notes will be available on the CUSEC website and the next day will begin at 8 am. He adjourned Day 1 at 4:50 pm.

NEPM Day 2 – Wednesday, May 2, 2018

I. Welcome and Overview of the Day

Matt Wall opened the meeting at 8 am. He reminded the group to use #NEPM2018 on social media and reviewed the previous day's speakers and the topics discussed.

II. FEMA NEHRP Update – David Javier, Mike Mahoney, Andrew Herseth, Jonathon Foster

David Javier opened and facilitated FEMA's NEHRP Update. FEMA will be releasing the results of the Earthquake Consortium and State Support (ECSS) national level review prior to grant awards so states can have more time to plan. The success of this year's review is a result of direct interaction between States, Regions, Consortia and Partners. FEMA Regional staff serve as the primary POC for states and are responsible for fulfilling FEMA responsibilities throughout the Region. Many of the Regional program managers fulfill many positions, so earthquake work constitutes a fraction of full-time duties. Javier reviewed the ECSS timeline, from the Comprehensive Cooperative Agreement meeting in February through the publication of the Nationwide State Support Plan at the end of July.

Mike Mahoney presented on the application of new knowledge and research. New publications are available on both the technical side and state support/outreach side. FEMA's technical team is responsible for turning research results into practice, which is done by developing and disseminating guidance and maintaining consensus seismic resource documents, such as the Recommended Seismic Provisions. The Recommended Provisions were most recently published in 2015 and a 2020 update is currently underway. Mahoney also covered various projects the Branch has undertaken, such as Project 17, FEMA P-749: *Earthquake-Resistant Design Concepts*, a nonstructural mitigation guide, seismic performance goals of IBC, existing buildings guidance, a school safety guide, and a homeowner outreach guide.

Drew Herseth spoke on building code adoption at the state and local level, how FEMA fits into that process, and what that means for state earthquake PMs. The first priority of the FEMA strategic plan is to build a culture of preparedness. FEMA is involved with building codes through NEHRP authorization and helps to build a culture of preparedness by requiring grant recipients to adhere to the most recent building codes; promoting code support activities, especially the recommended seismic provisions; and championing the adoption of the codes at the state and local level. One challenge here is that many states amend the building codes, some weakening them.

Jon Foster presented on efforts to reduce the complexity of FEMA. Strategic Goal 3, Objective 3.3 of the FEMA Strategic Plan is to develop innovative systems and business processes that enable FEMA employees to rapidly and effectively deliver the agency's mission—before, during, and after disasters. One area to reduce complexity is the national level review of the NEHRP ECSS requests. Foster covered the review process and noted there was attendance from FEMA Regions, HQ, and contract support. The 2017 workgroup guidance was reviewed for accuracy and efficiency, and updated to maintain its status as a living document. The 2018 national level review received 54 applications and approved 42 projects. As appropriate, the workgroup guidance will be updated based on lessons learned and best practices. Jon noted that another area for potential efficiency improvements is the Comprehensive Cooperative Agreement (CCA) state and territory call. While everything went smoothly this year, FEMA HQ is considering a webinar next year and including an example request.

Maximilian Dixon offered the recommendation to include in the ECSS example what kinds of information the review group is looking for, any words to avoid, and examples of information that will help be viewed favorable and examples to avoid being received negatively. Jon Foster noted the recommendation and noted the guidance for 2019 should be released in February for next year's review.

Jim Wilkinson, CUSEC asked if FEMA would share a list of Consortia capabilities in advance of next year's ECSS. David Javier replied that they would.

Cheickh Koma, Region VII, suggested providing an opportunity for Regions to do preparation work with states to review ECSS projects that have worked, why they worked, and pitfalls. He suggested an formal process for Regions to follow to support the states, including follow up on grant approval.

Leslie Henderson-Chapman, FLASH, suggested creating a catalog of projects that have been approved as a list of recurring options and include information on projects that have been successful and specifics of how the projects work.

Jim Wilkinson, CUSEC, noted to be cautious as projects are put together and the avenues used to fund the programs. Ensure the information in your program fits within the science and engineering community. Sometimes there are reductions in building code requirements brought about by companies manipulating legitimate information in ways to justify those reductions.

Jeff Briggs, MO, expressed some confusion regarding the two avenues of assistance. David Javier talked about the differences between Direct State Assistance and Consortia and Partner Support. Consortia and Partner can be used by States that cannot or choose not to meet the 50% cost match. For states who cannot make the match, there will be a NOFO released. It was suggested that in the future a clear delineation is made of which process should be pursued based on the ability of the state to make the match. Ed Laatsch discussed changes in state support and direct state assistance throughout the years and used it to make the point that the process could change yet again.

Mike Mahoney finished by noting any FEMA publications can be obtained via the publications 1-800 number; anybody within the U.S. can call and get any pub they want, free of charge.

III. Consortia/FEMA Region Updates – Ed Fratto, Jim Wilkinson, Brian Blake, Patti Sutch, Pascal Schuback, Noriko Kibble, Forrest Lanning

Ed Fratto provided an overview of NESEC capacity and capabilities, and an update on NESEC activities and state support projects. He noted that due to the geography of NESEC states, a regional approach is truly needed. Small events can cause large damage, and many people in the Northeast don't realize the risk. He discussed a public awareness campaign, making a point to note that earthquakes don't only affect California.

Fratto discussed NESEC usage of HAZUS, GIS, and ROVER. The process is complemented using Google Maps and Pictometry; not all surveys can be conducted in-person, so some are done virtually. This process allows more work to get done and it can be done remotely. Incorrect information can be corrected by facilities personnel for that building.

Unreinforced Masonry (URM) buildings in the U.S. are estimated to number more than 17 million. The Northeast uses GIS overlays and pictometry to obtain measurements and street

view to get a visual of buildings, since building type is needed for HAZUS. The ROVER/HAZUS report process was used and validated through the national guard and state emergency management office. NESEC provides support to two states, Vermont and Maine, for ECSS. Maine is supported by HAZUS state-wide; enhanced HAZUS report makes the information easier to read and is supplemented with figures and tables. Any partnering jurisdiction is supplied with a map of URM buildings, including potential number and locations.

Jim Wilkinson spoke about CUSEC goals and program areas. CUSEC goals and program areas reflect state plans initiates and resources overlap and can be leveraged. Workgroups are primarily driven by state, but the federal counterpart is on the committee. CUSEC has evolved to have an approach that allows all participants to have a voice.

Brian Blake presented the four goal areas of CUSEC. He talked about support to the states, which has included two regional shakeout campaigns—Central U.S. and Southeast ShakeOut, several PSAs in Tennessee and Illinois, billboard campaigns, and messaging and guidance for participating states.

A GIS tool was developed last year after reviewing participation in preparedness activities in relation to specific hazards. The developed GIS tool discovered that areas of moderate risk for a hazard had a relatively low 28% of students participating. This resulted in the formation of a goal to increase preparedness activity participation numbers in higher risk areas.

Kentucky has a community resilience pilot project called CHAMPS. The program uses GIS and other tools to analyze data around the state to drive planning. The pilot is being used in three states—Kentucky, Tennessee, and South Carolina. The results will include information about community infrastructure and various dashboards to help drive mitigation planning processes.

CUSEC supports multi-state planning via mission-ready package development for EMAC. Support exists primarily for post-disaster assessment and to date has seen the development of 75+ mission-ready packages. Dashboards take incident-specific GIS information and customize with data points and links to the USGS website and applicable maps.

Patti Sutch noted that WSSPC is an earthquake consortium consisting of 13 western state members plus British Columbia, Yukon Territory, and Pacific territories. Core capabilities include policy recommendations; conferences, workshops, and trainings; outreach; and state support projects.

Pascal Schuback presented on the capabilities of CREW, noting its scientific focus. One major priority at CREW is the “Two Weeks Ready” campaign. Other efforts include digital functionality, such as creating videos for social media posting. Digital outreach has so far reached 45,000 people and allows targeted ads to increase efficiency. Schuback spoke on other CREW initiatives, such as earthquake scenarios, sector specific factsheets, and EEW. He finished by mentioning the Maritime Symposium, taking place June 20, 2018, in Seattle. He stressed the importance of leveraging opportunities to partner, the use of social media, and building partnerships between public, private, academic, technical, and others.

Noriko Kibble focused on the New Madrid Seismic Zone (NMSZ) and Shaken Fury Exercises. She said the NMSZ exercise impacted Regions IV, V, VI, and VII, but most notably in Region IV. It includes more than 400,000 square miles, eight states, and highly populated areas. Region IV pushed for the exercise to include recovery and mitigation core capabilities, which was expanded from a response-only exercise. She noted the final plan should be out in July.

The Shaken Fury exercise includes mass evacuation plans underway in Kentucky, Tennessee, and Mississippi. The exercise is headed by FEMA HQ exercise division in coordination with the FEMA Regions. The purpose is to evaluate and improve the whole community ability and includes nine overarching objectives. The scenario epicenter is based on the Marked Tree Fault, about 40 miles outside Memphis, and incorporates private sector engagement from varied participants.

Forrest Lanning presented on the EEW system in Mexico City. After an earthquake affecting Mexico City in September 2017, EEW became a hot topic with partners, especially in CA. Mexico has had an EEW system running since the 1990s. A video was shown of the EEW alarm as it occurred during the event. Lanning discussed the background of the project and the infrastructure in place in Mexico City. He noted there are many players in the project and there are still concerns to be addressed, such as the value given the relatively short warning time in some instances. He finished by noting key takeaways: EERI is planning to do a webinar to expand on findings; there are some private systems in place to pay to get an alert by phone; and some earthquakes are missed by the system completely. A key takeaway for the United States is that the public and politicians should know EEW can work.

X. State/Territory Updates

Several states provided updates on their earthquake-related activities.

- **Washington, Maximilian Dixon**

Washington had 1.26 million participants in ShakeOut, which is the best yet. More than 800,000 people participated from schools. Outreach and collaboration grows every year and the state strengthened outreach to Limited English Proficiency communities, schools/youth, and coastal communities.

Washington produced earthquake, tsunami, volcano, and all-hazards playing cards. With the anticipation of EEW, efforts have been taken for implementation into WA EMD and to perform education, training, and outreach. After Cascadia Rising, the State learned situational awareness needed improving. One solution is to provide briefing sheets, one or two pages of the biggest things decision-makers need to know immediately, for any hazard. They also promoted the idea of leveraging ideas from other states for successful state support projects.

- **Oregon, Althea Rizzo**

Althea Rizzo discussed an average day's activities as the Oregon earthquake PM. A day includes planning for a series of seismic retrofit workshops, which involves finding venues and caterers, creating promotional materials, and reaching out to building officials to push out information that workshops are upcoming.

Other daily activities are varied and can include overseeing publication updates; adapting a Washington project called "map your neighborhood"; reaching out to academic groups; developing guidelines and a statement of work; and drafting messaging for creating resilient neighborhoods and a 2 Weeks Ready campaign. Oregon continues to participate in a ShakeOut workgroup and is in the process of establishing a schedule.

Rizzo discussed various outreach projects and initiatives, closing by noting that each

program manager brings their unique passion to the job, which will help guide the program.

- **Alaska, Dan Belanger**

Alaska is faced with both earthquake and tsunami hazards. Alaska's program successes include a Quake Cottage; rapid visual screening; a preparedness flipbook; an earthquake and tsunami workshop in Anchorage; and preparedness playing cards.

The Quake Cottage uses a simulator as an outreach tool. It toured Southeast Alaska, reaching 12 communities in 30 days, with more than 10k attendees. The Tsunami Operations workshop was a regional program for emergency managers, first responders, and more to discuss local earthquake and tsunami threat and planning. Training activities included FEMA P-807, ATC-20, FEMA 395, Earthquake Safety and Mitigation for Schools.

- **Hawaii, Kevin Richards**

Hawaii worked with WSSPC on a two-day workshop in February; HETAC hosted and the event was supported by WSSPC. The focus was on power, utilities, and systems and how they should be backed up for resilience. It includes opportunities for strategic plans and projects and tips for increasing resilience. The event was popular with the public.

- **Guam, Leo Rustum J. Espia**

Guam noted catastrophic planning for typhoons, connecting the hazard with earthquake. Guam only has one airport, and with it being a supply center, any significant disruption could impact much of the Pacific and U.S. The catastrophic plan accounts for power, water, waste water, fuel, and port recovery.

FLASH has been supporting Guam for direct state support. Earthquake preparedness week is held in Guam in August. Public outreach and community education program includes school outreach, forums, town hall meetings, and social media.

Last year Guam saw its largest ShakeOut participation. Train the trainer continues to be an important service. Guam's hazard mitigation plan is being reviewed for necessary revisions and efforts are ongoing to adopt the latest building codes.

- **California, Ryan Arba**

CalOES has invested in an EEW network and has set aside funding for a media campaign. Another proposal would complete the seismic instrument build-out. EEW is a top priority. The system needs to be monitored after rollout to ensure success. CalOES is responsible for implementing EEW.

ShakeAlert signal is important to the State, with State money and lots of legislative support to invest in seismic instruments. A concern is having a stable, ongoing source of funding. It was noted that there's no one solution for EEW, there must be many ways to get the message out. Some research gaps exist, particularly with the extent of EEW awareness among the public and relatively low warning response times.

Additional topics covered included a study to determine tone, message, and branding for EEW; earthquake/tsunami preparedness playing cards; aftershock messaging; and

tsunami walks.

XI. FEMA, Consortia and Partners/ State Earthquake PMs Breakout Session

Separate breakout sessions were held and reported out on – see notes in following section.

XII. Breakout Reports and Discussion

Ed Laatsch, FEMA HQ, provided the report out for the FEMA, Consortia, and Partners break out. The “Story of Us” hasn’t made much progress since last year. The goal is to demonstrate the value of NEHRP and the wider impacts of earthquake programs. Team members have been identified to lead the effort and they are looking for states willing to join the conversation about NEHRP and what it does. The identified team members are: Pascal Schuback, Leslie Chapman-Henderson, Mark Benthien, Mike Mahoney, Lee Mueller, Patti Sutch, Ed Fratto, Jon Foster, Forrest Lanning, Cheickh Koma, Noriko Kibble, and Scott Bailey.

There was an effort last year to streamline communications and move forward with Basecamp. Full participation was never realized so there will be an effort this year to revive Basecamp to enhance collaboration.

There has been discussion on the development and use of infographics to help explain the ECSS process and show how the two paths for grants is laid out. Other topics of discussion included refining the process to educate new earthquake PMs, how to handle more direct contacts, and how to align FEMA/NEHRP/other priorities. FEMA will be more aware of ways to reduce complexity and to understand how different groups and audiences may have different priorities and goals. An email will be sent out to solicit input on lessons learned and suggestions on how to address challenges, particularly with the grants programs.

Matt Wall, VA, provided the report out for the State and Territories breakout discussion. Regarding the story of who we were and where we’re going, creating a culture of preparedness, and how NEHRP can be made stronger, one suggestion the state have is to take NEHRP out of Mitigation and put it in Preparedness. Being in Mitigation puts a chokehold on communications, particularly with Preparedness and Recovery. Moving the program to Preparedness also provides an opportunity to support training and planning exercises.

A recommendation to reduce complexity is to have two grants calls: one for direct state assistance and one for Consortia and Partner Support. FEMA should include infographics and target information to that audience. Further, it was noted that there is an apparent or perceived lack of transparency in the grants process. A peer-review process is recommended with the following criteria:

- A pre-application phase: does the project meet criteria?
- A standardized application with required components: add specifics for required information; makes the review process faster and cleaner; makes oversight process easier.
- Create a formal process for rejecting projects and notifying the affected parties. Without the ability to understand the problems, there is no ability to adjust for future years.
- Create a database of funded products, which also creates a best practice community. Develop grants management training and reach out to relevant end users.

In response to the recommendation that NEHRP be moved to Preparedness, Jim Wilkinson, CUSEC, noted it shouldn’t matter where the program resides, but it more matters about how the program is guided and managed. Matt agreed, but said another consideration was to take

advantage of additional funding streams. Kevin, Hawaii, noted Preparedness has more opportunity, and more closely aligns with actual EPM duties. Jim went on to say there's a disconnect between different funding streams, but guidance could dictate how different processes are handled, and would be more effective than moving it to a different component.

It was recommended that if a full match can't be made, a State could make a match for what they are able in order to keep the program moving forward. Ed noted this was attempted several years ago and ended up requiring an FTE to manage all the different ways funding was handled. It was suggested to simplify the minor grants and make them a different category and easier to manage. Maximilian suggested having clear leadership and guidance from HQ on where NEHRP is headed.

XIII. State Updates, Part II

- **Utah, Bob Carey**

The Seismic Safety Commission is fully funded by DEM and serves as guidance to legislature and the governor's office, as well as local governments. This year the legislature did a review and the program gave a presentation to show value added. Overall, the project was a success and is a recommended exercise for all states.

Additional topics touched on were the safety assessment program, which looks to standardize placarding throughout the state; the Utah State Hazard Mitigation team; conference support activities; and successes through leveraging other programs.

- **Missouri, Jeff Briggs**

The Missouri SAVE coalition is the seismic safety commission for the state. Overall, the state suffers from limited resources, which focuses priorities on highlighting a few projects to get people excited and relying heavily on consortia and partners, such as a billboard campaign using NEHRP funding and FLASH to administer.

Other efforts include determining which counties have the highest and lowest ShakeOut participation, and Missouri is relying on CUSEC and their ShakeOut tool to figure out how to grow numbers. Additionally, Missouri has recently allowed their building assessment volunteers to travel to other states. The Seismic Safety commission taps into NETAP and structural assessments, deploying volunteers beforehand to schools to assess the seismic vulnerability in older school districts in high-risk areas of NMSZ. This year, the next step will measure the success of the program and ask managers to follow up. NEHRP money was used to fund some follow-up kits for schools.

- **Oklahoma, Jim Mullen**

The Governor of Oklahoma ordered an improvement to the state's ability to respond to earthquake disasters. A survey of emergency support functions led to a list of concerns, with COOP issues being of concern. Other efforts included surveying ESFs and asking if the problems continue to exist, bringing in key players, and finding a system to leverage resources.

Jim Mullen noted it is important to memorialize processes in areas where there aren't already SOPs or standardization. The program drafted an earthquake annex as part of

their operations plan, which included suggestions for critical facilities to get a review; annual non-structural hazard assessments; conducting an annual meeting to talk about earthquakes; and individual family preparedness plans to be communicated with employees.

- **New Mexico, Andy Jochems**

New Mexico's population is centered around seismic hazard and transportation corridors. Twenty faults in the state meet the definition of active, with historical seismicity, largely resulting with the faults. New Mexico has moderate seismic risk, but it is concentrated along urban corridors, resulting in infrequent, high-consequence events. Because of this, public awareness and attitudes vary, and building codes take into account infrequent events.

The State Hazard Mitigation plan will be updated this year, after participation in the Vigilant Guard exercise in August 2017. The exercise saw a decent level of cooperation and communication, at least at the practice level.

Another effort is Rockin' Around New Mexico, a geoscience workshop for K-12 teachers, funded through a DHSEM sub-grant via FEMA. The program utilizes partnerships with local organizations and is held throughout the state. It generates media coverage. ShakeOut participation in 2017 was down from recent years, largely because the Albuquerque public school system no longer requires participation. Upcoming efforts include mapping using LiDAR; revamping information websites and applications; and creating a disaster clearinghouse to clarify roles and communication channels.

- **South Carolina, David Perry**

One of many efforts underway in South Carolina is a tsunami response plan re-write, which was published in April 2018. The Earthquake Plan is also being rewritten with an anticipated publish date in September 2018. The State is also making modifications to NEHRP grant, to rotate some money to more promote ShakeOut activities.

Other topics covered included the HAZUS conference, which will be held in Charleston this year; an enhanced SCEMD in-house training program; ROC Drill modules; NEHRP Proposal; and participation in the Shaken Fury and ShakeOut exercises.

- **Mississippi, Susan Hardy**

Fiscal year 2017 NEHRP projects included participation in the Great Shakeout, with 54.3% student participation in critical counties; distribution of totes with an earthquake guide; flashlight on a rope; and student disaster preparedness activity book. A facility inventory will be performed in June 2018 with a nonstructural mitigation workshop scheduled for August 2018.

- **Vermont, Marjorie Gale**

In Vermont, hazard programming is based on hazard mapping, which is leveraged through partnerships with consortia and partners. Vermont partners with NESEC to provide products for regional planning commissions. The State also works with universities on detailed studies.

The State is working on a multi-hazard approach to leverage opportunities for landslide and earthquake analyses. The State is conducting a landslide inventory and landslide analysis with modeling. This information will also be used to evaluate risk by adding sites such as dams and hazardous waste sites, and adding data layers to share with NESEC. The northwest portion of Vermont is at moderate risk for earthquakes. A small earthquake in December saw media outlets reaching out, so the opportunity was leveraged to push messaging, especially Drop, Cover, Hold On. NESEC will run HAZUS for flood and earthquakes and layer them to provide an all-hazards look. There are four resulting analysis categories: none, flood, earthquake, or both. Data is delivered to hazard planning commissions.

- **British Columbia, Robert White**

British Columbia (BC) has some of the highest earthquake hazard in Canada. Seismic project initiatives in BC include the BC integrated earthquake risk assessment; Seismic Microzonation; prioritized post-earthquake response; Ocean Networks Canada EEW system; and EEW Response actions. Educational initiatives in BC are centered around PreparedBC; including a new earthquake and tsunami guide. Other educational initiatives include Tsunami Preparedness Week; and the Great British Columbia ShakeOut.

BC is coordinating with CREW on the Pacific Northwest strategy for EEW, with input developed for EEW outreach, education, and training. Future steps for British Columbia entail a Provincial Tsunami Response Plan and exploring Provincial Seismic Monitoring. There are currently a variety of systems in place, including EEW, that serve different purposes and don't all communicate with each other. Efforts are looking into bringing the systems together, so they complement and don't compete.

- **Kentucky, Steve Brukwicki**

Earthquake activities in Kentucky include participation in ShakeOut and Steve is working with the PIO to advertise and travel to schools to increase awareness. Other activities include attendance and participation at NEPM; judging earthquake posters from elementary students; serving as the lead state for the CUSEC Shaken Fury exercise; working with CUSEC trying to link utility services with other states; and re-writing the incident support plan.

XIV. USRC Building Rating System, Evan Reis (U.S. Resiliency Council)

Evan Reis spoke on moving Emergency Management toward Resilience Management. He noted that green and resilient design are two sides of sustainability, but coupling them gives a bigger picture of sustainability. Building codes are designed for life safety, but modern building codes have only become truly modern since 1995. Buildings in earthquake country probably aren't built to the code, and that's only a life safety document anyway.

Using the USRC Rating System, most buildings are focused on safety. When resilience-based design is used to create a building better than code, costs are generally around 0–5% of the cost of the building. This results in a structure that is more usable after an event, making it more cost-effective in the long run.

From a planning perspective, begin by being able to rate existing buildings or enforce higher

ratings for new builds. In Seattle, there is a pilot program underway to estimate the benefit of retrofit ordinances. The program can estimate the amount of damage, injury, and recovery time based on current standards, and then model implementing ordinances and how much it reduces risk. Next steps are turning aerial images into models and estimating the size and structural type of buildings for use in modeling. Wind, flood, and earthquake information can be laid over the 3-D model of the city for a holistic hazard view. After an earthquake, damaged buildings can be put into the model to see how aftershocks will affect initially-damaged buildings. The program uses well-established science from FEMA, ATC, and USGS ShakeMaps, among others.

xv. 2019 NEPM Meeting – Matthew Wall and Bob Carey

Matthew transitioned NEPM responsibility to Bob Carey, the new NEPM Chair, to move forward with planning for the 2019 NEPM. Bob opened nominations for the NEPM Vice Chair. Maximilian Dixon was nominated for vice chair by Jeff Briggs. Maximilian accepted and approved. In addition, members of the 2019 NEPM Planning Committee were selected, including Brian Blake, Pascal Schuback, Jeff Briggs, Susan Hardy, Dave Perry, and Mike Conway.

The group discussed locations for the 2019 NEPM with consideration to Salt Lake City and location of the 2020 NEC. Maximilian suggested having a backup city in case NEC chooses Salt Lake City. Matt suggested creating a survey, which also allows those not present to have a say. Brian will send the survey out to the group.

NEPM Day 3 – Thursday, May 3, 2018

I. Reducing Risk Where Tectonic Plates Collide: A Plan to Advance Subduction Zone Science – Joan Gomberg, USGS

Joan Gomberg introduced the topic of subduction zones and supplied a definition, noting that tools studied at subduction zones can be applied in other seismic areas. The plan's goal is to reduce the risk from earthquakes and the motivation for studying subduction zones is to heighten public awareness. The more that is understood about earthquakes, the better products that can be produced. Efforts such as these also save money and lives. Lidar has been an important tool in mapping the landscape, which proves essential in estimating hazards.

The Cascadia Recurrence Project aims to study evidence of past earthquakes to get a better idea of how often they occur in the region; having this information can help to predict future events. However, there are different maps, and there isn't consensus on which is "more current", which could result in a big difference in building codes, along with other concerns. Gomberg noted that more details and related activities available on the USGS website.

II. Breakout Sessions

Developing a Robust URM and Soft Story Inventory: Training for Local Officials – Althea Rizzo, Oregon OEM

Althea Rizzo presented on URM buildings and common challenges dealing with retrofitting. URM buildings are a concern because poor building performance can cause business interruption, loss of use, and other undesirable effects, not to mention they are typically high occupancy.

A recurring challenge amongst communities is figuring out where to start. To assist with this challenge, Oregon held a URM workshop utilizing ECSS in partnership with EERI. The proposal was tied back to the state natural hazard mitigation plan, which correlates into an ECSS eligible activity, making the project eligible for NEHRP funding. Other common challenges were funding and garnering community buy-in. Successful programs had a long, sustained community conversation and finding a common way of moving forward. Lessons learned included the importance of proximity of deadlines and having an internal champion.

Althea Rizzo posed a question to the group, asking about first steps to implementing in the different states/territories. Matt Wall commented that a major concern is funding and providing economic incentives. Jim Wilkinson countered saying structural work doesn't usually result in increased home values, with Matt replying that retrofitting actually does increase the market value of a home. Drew noted there are academic studies on the topic, including studies that document tornado shelters or safe rooms adding value to homes. Jim added that what works in one region might not work in another and noted that he didn't think the value-added transfers over to market side. Kevin noted the issue is complex, but being able to secure engineering help and provide a financial incentive from the state level would likely be the best way to get consumer buy-in.

Ines recommended considering groups of people who can negatively affect a project. Barb suggested also bringing in developers and consider tweaking city/local rules to help. Barb also made a point to say States should avoid getting discouraged by programs that don't work in one area but work in another.

Althea asked about next steps after a workshop. Barb said to create an inventory and make the issue quantifiable; create a community of people with a passion to go out and do training; and encourage collaboration between communities in attendance.

ShakeOut – Mark Benthien, SCEC; Brian Blake, CUSEC; Maximilian Dixon, WA EMD

The ShakeOut breakout session focused on promoting ShakeOut in schools and best practices to be successful and monitor participation. Mark Benthien opened the session and discussed the social science behind ShakeOut and what motivates people to take preparedness action. The goal is to shift the culture around earthquake preparedness and increase readiness at all levels. They want to encourage multi-sector, multi-layer exercises and engagement.

Mark discussed the systems, process, and purpose of ShakeOut registration and why they pursue registration each year. Mark also highlighted the effort to update the ShakeOut graphics to better demonstrate the protective action people should take. There are several resources available to promote participation in the drills plus strategic messaging to promote ShakeOut as an earthquake PM. With FEMA NEHRP support, SCEC distributes regionally customized “ShakeOut Updates” and personalized emails to encourage registration. To increase participation, Mark recommends starting with schools and engaging with the state department of education. It can result in a significant number of registrations through one engagement. To support these school outreach efforts, ShakeOut has developed new materials for children age 5-9 that can be used nationally. This is a key age range.

The group discussed what the large impacts may be from participation in the ShakeOut drill and how this may translate into actual structural mitigation. They discussed the need for larger marketing to make an impact on the public and decision makers. The group also discussed engagement with meteorologists, universities, etc. There was also discussion about folding ShakeOut into a larger, full-scale exercise and how this is probably best achieved through individual state effort.

Brian Blake presented on improving ShakeOut participation in K-12 and tools to support understanding and measuring participation against areas of seismic hazard. He highlighted participation trends and how the ShakeOut drill does drive more preparedness activities. They are looking at ways to improve participation and are focused on assessing current participation data. Brian highlighted how they are tracking participation by location and factors that may be influencing these trends. This analysis has only been done on the central and southwest states, but the methodology can be shared with other ShakeOut regions. Jeff Briggs was interested in using this analysis in real time to drive outreach efforts within a state. This capability is not available now, but a good idea.

Maximilian Dixon presented on Washington’s effort to increase participation within the schools. One resource they developed are 20 second preparedness videos that discuss tsunami and earthquake, and encourage students to help one another. Washington also hosted a youth video contest which was successful. Maximilian has a champion that helps him secure school district participation – this is vital. The group discussed ways to increase school participation and the resources available through ShakeOut to help.

FEMA Hazus – Jesse Rozelle, Casey Zuzak, Jordan Burns

FEMA’s Natural Hazards Risk Assessment Program (NHRAP) was created in 2017 with the goal of providing risk assessment data, tools, analyses, and methodological guidance to support

all FEMA programs and partners in the development of risk communication for all phases of emergency management. The NHRAP has developed a strong partnership with the USGS National Earthquake Information Center (NEIC) through the development of Hazus and subsequent products, and serves as the primary liaison for coordinating ShakeMap scenario needs. The Hazus software is nested under the NHRAP and with the release of Hazus 4.2 SP1 (May 2018), users will have the ability to directly incorporate USGS Vs30 site soil characteristics where local data are not available. During an earthquake response event, the NHRAP team will deploy onsite with the USGS NEIC to develop the Hazus TwoPager and official Hazus runs, and distribute all products via web service and public data download. For more information please email FEMA-NHRAP@fema.dhs.gov.

III. Earthquake Engineering Performance Assessment Tool (EPAT) for Washington Schools – Cale Ash, Degenkolb Engineers (EERI)

Cale Ash presented on the Earthquake Engineering Performance Assessment Tool (EPAT), which was developed through EERI and FEMA funding for a Washington state assistance project. Work was completed over two years with the motivation for the project to have a way to prioritize reducing earthquake risk, balancing resources with the need.

Risk factors are dependent on multiple factors, such as soil class or type, structure type, the configuration of the building, and the history of the building code applicable to that building. Cale spoke on the difference between hazard and risk, noting that small level ground shaking can still cause damage to a URM building, thereby making it low hazard but high risk.

There are several existing risk assessment tools, including P-154: *FEMA Rapid Visual Screening*, ASCE 41 Tier 1, and HAZUS. EPAT was created to develop an excel-based methodology especially for schools in Washington State, but can be adapted to other regions and other types of buildings. The tool is pre-populated with some building code history and is meant to be a companion to RVS or ASCE 41 Tier 1, which it helps quantify results of those.

Overall, EPAT was meant to be a supplement to RVS or ASCE 41 Tier 1. It was designed to help decision-makers decide where to invest resources. While viewed as a valuable tool, it is but one step in mitigating the most dangerous buildings.

IV. FEMA P-1000 Presentation – Lori Peek, University of Colorado Boulder

Lori Peek presented on the new FEMA P-1000 publication, *Safer, Stronger, Smarter: A Guide to Improving School Natural Hazard Safety*, and how it can be used to improve safety in school buildings, enhance risk reduction activities, and encourage preparedness and recovery planning. The objective of the FEMA P-1000 guide is to help schools develop comprehensive strategies and help build resilient communities. The primary intended audience is school administrators, emergency managers, and school board members; secondary audiences include parents, students, teacher unions, and similar groups.

There are six big picture takeaways: children are vitally important, but often overlooked, in natural hazards preparedness and mitigation activities; natural hazards are inevitable, but disasters are not; there have been too many close call events in schools such as tornadoes and earthquakes that strike on weekends or during after school hours in the evenings; almost all people are living at risk, and nine out of ten children in the nation live in a community with at least one natural hazards threat; risk is amplified by poor infrastructure and unequal allocation of financial and social resources; and there are actions we can take before, during, and after

disaster to help reduce risk.

A comprehensive approach includes many actions and actors, organized by before, during, and after an event. This approach is important because events have consequences even if physical damage is limited. First steps can involve prioritizing the most vulnerable buildings and ensuring new buildings are built to the highest standards. In existing buildings, key steps are to determine existing vulnerabilities, identify mitigation options, and develop a plan to implement building mitigation actions over time. Capital improvement plans often dictate the pace of retrofitting, but even small incremental steps can make a big difference. School leaders and emergency managers can work together to apply for federal funding, namely by tying improvements into state hazard mitigation plans. State Hazard Mitigation Officers (SHMOs) are a great resource for information on federal funding. A funding plan matters because it involves key stakeholders in a way where they are engaged and learn about the hazards.

A response plan should consider all threats and hazards. The purpose of a school emergency operations plan is to delineate what actions should be taken before, during, and after, and the roles and responsibilities of each person.

Recovery is the least understood and planned phase, with four fundamental kinds of recovery: academic (students are in a facility where they can learn), physical, fiscal, and psychological. Planning ahead can help speed recovery efforts. After a disaster, the first step is to have an expert assessment. Donation management can be a large part of planning the recovery process, and having a communication plan will help dictate what donations are or are not needed.

The whole community approach considers that all members need a voice and to feel validated. This approach includes children/youth; design professionals; elected officials; emergency management officials; labor bargaining; local business/community orgs; hospitals; media; and parents/caregivers. Foundational principles are to understand and meet the needs of the whole community; engage/empower the whole community; and strengthening what works. All of these efforts help to build a culture of preparedness. The FEMA P-1000 course also covers communicating with the community. Key topics include notifications, awareness, explanation of protocols, tools and technology, and updates.

The P-1000 guidebook can be downloaded for free from the FEMA website. Hard copies were also distributed at the meeting. The session closed with a call to action and a request that the participants take the guidebook back to their states and communities to move forward with school mitigation activities.

This was the first delivery of the FEMA P-1000 training course. ATC passed around feedback forms to inform improvement of the training as it is delivered to wider audiences. Veronica Cedillos of ATC and Lori Peek of the University of Colorado Boulder welcome further feedback on the training session and the implementation of the guide.

XVI. Closing Comments

Bob facilitated the meeting's closing comments and discussions. All presentations from the NEPM will be posted on eqprogram.net. All presenters are requested to send any edits that they may have to their presentations within the next ten business days. Brian noted a link will be sent out with presentations and a survey for next year's meeting location. Maximilian Dixon requested input on ways to improve EPM 101, which can be sent to Maximilian and Bob.

xvii. Meeting Adjourned

Bob adjourned the 2017 NEPM.

2018 NEPM Action Items

- FIMA-Nick Shufro request for input from attendees when the NEMIS comes out in June.
- FIMA-Nick Shufro request for States to share lessons learned with FIMA for the Mitigation Best Practices Portfolio, as well as to share that information with fellow earthquakes PMs at the meeting.
- Identify the NEHRP story to build support for the program. Develop subcommittee of FEMA HQ and Regions, Consortia, Partners, and State representatives to determine what this national-level story is.
- Streamline communications between FEMA, States, Consortia, and Partners to support telling the NEHRP story.
- States and FEMA Regions to engage with one another to support successful execution of Direct State Assistance, and to share materials to support response to NOFO.
- Survey Monkey to determine next year's NEPM location.
- David Javier to send an email to solicit input regarding FEMA grants programs, especially lessons learned and suggestions on how to address challenges.