



EARTHQUAKE PROGRAMS STATUS SURVEY

Results of a Survey of NEHRP-Funded State
Earthquake Programs in the Western U.S.
(2020–2021)

Prepared by CREW | Cascadia Region Earthquake Workgroup
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Overview

One of the core reasons that CREW undertook this inquiry was to help facilitate and inform our transition from an organization that had historically focused on supporting the constituents of the Cascadia region, to serving as the consortium supporting all of the states and territories of the western United States.

Interviewing the earthquake program managers of the NEHRP-funded western states and territories, as well as the team of federal earthquake program managers that support the Western Multi-state Assistance Region, provided CREW with a solid starting point for this new, wider collaboration. In addition to giving us the opportunity to learn more about our partners and the contexts in which they operate, the interviews helped introduce CREW, its team, and our objectives to states and regions that we have not worked with in the past. This process has already proven valuable and has spawned many fruitful discussions, ideas, and opportunities.

CREW hopes that the observations and discussions that emerged in the course of this inquiry will help set the stage for ongoing, open communication between all of the partners that participated in this project. CREW also views the insights that emerged as a starting point, leading to further exploration of common interests across the region and shaping, where appropriate, unified objectives and shared strategies.

CREW will continue to assess this information, and we look forward to collaborating on projects and programs that will increase seismic awareness and mitigation activities throughout the western region. We are excited to be working with such a great team.

Pascal Schuback
Executive Director, CREW

The [Cascadia Region Earthquake Workgroup \(CREW\)](#) is a 501(c)(3) nonprofit coalition of private, public, and academic partners working together to improve the ability of communities, businesses, and households to reduce the effects of earthquakes and related hazards.

EARTHQUAKE PROGRAMS STATUS SURVEY

Western Region, 2020–2021

Objectives

Beginning in the winter of 2020, CREW undertook to develop a “baseline” comparison of the earthquake programs of the states and territories that comprise the Western Multi-State Assistance Region of the National Earthquake Hazards Reduction Program (NEHRP). A principal objective of this survey was to identify the current needs, objectives, projects, and priorities of these programs, as well as their ideas for achieving their individual and regional goals.

CREW also sought to understand existing relationships between programs in the various geographical regions of the western U.S., with a view both to facilitating existing coordination and to exploring additional or wider opportunities for multi-state strategies and projects. Earthquake program managers were also asked about the challenges and obstacles that their programs face and the resources that they need to accomplish their work and achieve their full potential.

It is hoped that the results of this survey will provide useful insights and aid CREW and our partners in further developing productive relationships, new opportunities for information and resource sharing, and coordination that can unify efforts (when possible) in order to reduce duplications and costs across the region.

Interviews

A principal means of gathering information for this survey was a 90-minute interview with each earthquake program manager of the states and territories that participated (at the time of the interview) in the NEHRP State Assistance Grant Program. In some instances, the earthquake program manager was joined in the interview by colleagues associated with the state’s earthquake program.

To ensure a well-rounded perspective, CREW also interviewed the federal earthquake program managers of FEMA Regions VIII, IX, and X, as well as the two earthquake program managers of FEMA’s Federal Insurance and Mitigation Administration (FIMA) Resilience Office, who administer the State Assistance Grant Program for FEMA’s National Earthquake Hazards Reduction Program (NEHRP).

| STATE/TERRITORY | INTERVIEWED | ROLE(S) —SPRING 2021 | PROGRAM LOCATION |
|--|--------------------------|---|--|
| Arizona | Michael Conway | Senior Research Scientist; EQPM | Arizona Geological Survey (AZGS) |
| California | Sheri Blankenheim | Senior Emergency Services Coordinator | California Governor's Office of Emergency Services (Cal OES) |
| California | Todd Becker | Earthquake and Tsunami Program Specialist | Cal OES |
| California | Yvette LaDuke* | Tsunami Planning Coordinator | Cal OES |
| California | Rachel Sierer Wooden* | Earthquake Early Warning Program Manager; EQPM | Cal OES |
| Guam | Leo Rustum J. Espia | Deputy Administrator of Homeland Security; EQPM | Guam Homeland Security, Office of Civil Defense |
| Hawaii | Kevin Richards | Natural Hazards Officer; Earthquake and Tsunami Program Manager | Hawaii Emergency Management Agency |
| Idaho | Susan Cleverly | Mitigation Section Chief; EQPM | Idaho Office of Emergency Management |
| Montana | Mike Stickney | Director of the Earthquake Studies Office; EQPM | Earthquake Studies Office, Montana Bureau of Mines and Geology |
| Nevada | Sue Coyote | Grants & Projects Analyst | Emergency Management & Homeland Security Division, Nevada Dept. of Public Safety |
| Nevada | Janell Woodward | State Hazard Mitigation Officer; EQPM | Emergency Management & Homeland Security Division, Nevada Dept. of Public Safety |
| Oregon | Althea Rizzo | Geological Hazards Program Coordinator; EQPM | Office of Emergency Management, Oregon Military Dept. |
| Utah | John Crofts | Earthquake Program Manager | Utah Division of Emergency Management, Dept. of Public Safety |
| Washington | Maximilian Dixon | Hazards and Outreach Program Supervisor; EQPM | Emergency Management Division, Washington Military Dept. |
| Wyoming | Seth Wittke** | Geologist, Groundwater and Hazards section; EQPM | Wyoming State Geological Survey |
| FEMA Region VIII (CO, MT, ND, SD, UT, WY) | Sean McGowan | Earthquake Program Manager | Risk Analysis Branch, Mitigation Division, FEMA VIII |
| FEMA Region IX (AS, AZ, CA, FM, GU, HI, MH, MP, NV) | Anne Rosinski | Earthquake Program Manager | Risk Analysis Branch, Mitigation Division, FEMA IX |
| FEMA Region X (AK, ID, OR, WA) | Amanda Siok | Earthquake, Tsunami, and Volcano Program Manager | Risk Analysis Branch, Mitigation Division, FEMA X |
| FEMA HQ | Jon Foster | Earthquake Program Manager | FIMA Resilience Office |
| FEMA HQ | G. David Javier | Earthquake Program Manager | FIMA Resilience Office |

EQPM = earthquake program manager; FIMA = Federal Insurance and Mitigation Administration

*California: Subsequent to the interview, **Yvette LaDuke** became the state earthquake program manager.

Wyoming: Subsequent to the interview, the earthquake program moved to the Wyoming Office of Homeland Security and **Shamika McDonald (State Hazard Mitigation Officer) became the EQPM.

Interview Data

The interview questions and the information that CREW collected from state earthquake program managers can be viewed online at CREW's *Western States EQPM Survey* site. To request access to the site, please contact CREW at info@crew.org.

The FEMA-NEHRP grant activities of each state and territory are summarized on FEMA's [NEHRP Grants Dashboard](#), which provides information on projects from 2016 onward.

Findings and Observations

Earthquake Program Size and Location

While the survey did reveal instructive patterns and similarities among earthquake programs, it also demonstrated significant differences between them. Factors including size and location (both geographical and institutional), while obvious, are worth noting because of the extent to which they appear to influence the priorities, relationships, and capacity of each earthquake program.

INSTITUTIONAL LOCATION

At the time of the interviews, three of the eleven earthquake programs were housed in a state geological survey. The remaining eight programs are situated within the state/territory's emergency management agency. Subsequent to the interview, one of the programs that had been part of a geological survey (Wyoming) moved to the hazard mitigation program of the state's emergency management agency.

The institutional location of the earthquake program, its corresponding authority and sphere of responsibility, and the expertise of earthquake program staff were noted as determining factors when program managers decide which of the NEHRP allowable activities they are capable of addressing when applying for a FEMA-NEHRP grant. The goals and objectives of earthquake programs housed in geological surveys, for example, tend to differ from most of those of their counterparts in emergency management in that they prioritize development of seismic networks, seismic hazard assessment, and earthquake fault data. In cases where the earthquake program manager is also the state hazard mitigation officer, mitigation-related projects, such as development of mitigation plans, are more in evidence. Among the allowable activities specified in the grant, *outreach and education* was identified as within the scope of all programs and was considered by the majority as a priority.

As the circumstances of the COVID-19 pandemic have made abundantly clear, earthquake programs located within state emergency management agencies are directly affected by non-seismic emergencies and disasters: these EQPMs are often required to staff emergency command centers during emergency response, which interrupts and curtails their time to administer the earthquake program and work on its grant-funded projects.

GEOGRAPHICAL LOCATION (REGIONAL RELATIONSHIPS)

A number of cooperative relationships already exist between neighboring states and territories. In a few cases, these involve ongoing interaction and exchange.

Arizona, Nevada, and Utah. Frequent interchange and collaboration take place between the earthquake programs of Arizona and Utah, and between Nevada and Utah. The Arizona Council on Earthquake Safety (ACES) and the Utah Seismic Safety Commission also have a close working relationship: the Utah commission has been providing mentoring and guidance to ACES. The three states together have shared National Earthquake Technical Assistance Program (NETAP) classes, and Nevada has in the past invited the neighboring states to participate in workshops. They have jointly created outreach materials, such as an [earthquake handbook](#) for small rural communities.

California, Oregon, and Washington. The earthquake programs in these three states have coordinated in the development of specific project areas, such as the creation of the [Be 2 Weeks Ready](#) program. They also engage with one another in the region-wide Cascadia Rising Exercise, and they cooperated for the release of ShakeAlert.

Hawaii, Guam, and the Commonwealth of the Northern Mariana Islands (CNMI)*. Certain of the Pacific islands (e.g., Hawaii, Guam, and Samoa) have in the past formed an island caucus within the National Tsunami Hazards Mitigation Program. Guam and CNMI are now part of the Emergency Management Assistance Compact; they plan and exercise together. (*CNMI was not a participating NEHRP territory at the time of CREW's interviews but has since become one.)

Idaho, Montana, and Wyoming (also, Montana and Utah). The cooperation described between these states revolved chiefly around the quantification and monitoring of seismic hazards. Idaho's earthquake program is also engaged in the further development of a regional virtual earthquake clearinghouse plan, with multistate engagement and applicability.

PROGRAM SIZE

A number of the earthquake programs depend on a single person—the earthquake program manager (EQPM)—with no or limited staff support. In most cases, the EQPM's

management of the earthquake program constitutes only one component of the person's total job responsibilities. While many of the EQPMs articulated a desire for more staff, the "single-person shops" emphasized this as a need.

The size and funding sources of the earthquake programs vary, and managers of some of the smaller programs in particular indicated that they struggle to come up with the state's 25-percent match in order to qualify for a NEHRP grant.

Pacific Earthquake Programs and the Tsunami Hazard

In tandem with their focus on earthquakes, the earthquake program managers of Pacific states and territories indicated that the tsunami hazard is a significant concern and priority. Examples of their tsunami-related activities include conducting outreach and education to raise awareness, supporting and promoting tsunami evacuation zone drills (for example, Washington's program emphasized the successful institution of mandatory earthquake/tsunami/lahar evacuation drills in schools), funding and overseeing the creation of guidance documents and manuals, and providing technical expertise and guidance to help communities obtain funding for mitigation projects.

Earthquake Programs & Seismic Safety Commissions

Six of the states surveyed currently have seismic safety commissions:

1. Arizona (Arizona Council on Earthquake Safety – ACES)
2. California (California Seismic Safety Commission)
3. Idaho (Seismic/Avalanche Technical Working Group)
4. Oregon (Oregon Seismic Safety Policy Advisory Commission – OSSPAC)
5. Utah (Utah Seismic Safety Commission)
6. Washington (Washington Seismic Safety Committee)

The EQPMs of Arizona, California, Idaho, and Utah indicated that they have an active working relationship with their respective commissions. Arizona's council also has a mentoring relationship with the more-established Utah Seismic Safety Commission.

Nevada once had a seismic committee, but this was sunsetted. The state now has a state resilience committee.

The federal earthquake program manager of FEMA Region VIII expressed strong interest in seeing viable state seismic commissions develop in each state of the region and favors the growth of mutual aid and guidance between established and fledgling seismic commissions.

Common Activities and Priorities

As noted above, the institutional location and particular role and expertise of the earthquake program manager play a significant part in shaping the focus and priorities of the program. In consequence of this and differences in the size, earthquake risk, and preparedness history of each state, the interviews revealed considerable diversity among the foci, goals, priorities, and projects that earthquake program managers articulated. Nevertheless, some common interests did emerge. The following table presents a short list of activities that were identified by multiple earthquake program managers as priorities or as significant current or future undertakings.

| * | EARTHQUAKE PROGRAM ACTIVITIES IN COMMON | MENTIONED AS A PRIORITY OR SIGNIFICANT UNDERTAKING BY: |
|----|---|--|
| 1 | Public education & outreach, including for policy- and decision-makers: maintain, expand, improve outreach communications; produce public guidance documents and products | AZ, CA, Guam, HI, MT, NV, OR, UT, WA, WY |
| 2 | Address URMS; inventory building stock | AZ, CA, Guam, MT, NV, OR, UT, WA, WY |
| 3 | Conduct/update/deploy exercises & training (including virtually) | AZ, CA, Guam, ID, NV, OR, WY |
| 4 | Cultivate/maintain public-private partnerships and engagement; engage with and support local emergency management partners | AZ, ID, OR, UT, WA |
| 5 | Hazard modeling/mapping; update/expand seismic networks; improve fault databases | AZ, Guam, ID, MT, WY |
| 6 | School seismic safety (especially buildings) | AZ, Guam, NV, UT, WA |
| 7 | Preparedness planning/response planning (earthquakes & related secondary hazards) | CA, Guam, HI, OR |
| 8 | Facilitate/support public drills (e.g., ShakeOut, tsunami evacuation) | AZ, WA, WY |
| 9 | Promote mitigation; provide guidance/technical assistance to support local mitigation efforts | AZ, ID, WA |
| 10 | Develop/expand earthquake clearinghouse | AZ, CA, ID |
| 11 | Create/further develop a mitigation plan | Guam, ID |

**The order in which activities are listed reflects their prevalence among programs at the time of the interviews (as shown in the right-hand column).*

Priorities & Concerns Related to NEHRP & NEHRP Funding

TRANSPARENCY & ENGAGEMENT WITH STATE EARTHQUAKE PROGRAMS

While several earthquake program managers remarked on recent improvements that they have observed in FEMA-NEHRP's interactions with state earthquake programs, this progress toward greater transparency was generally viewed as a step in the right direction rather than transformative. Earthquake program managers emphasized that they would like to see FEMA-NEHRP:

- Adopt a more collaborative approach and engage with earthquake program managers as partners, especially when contemplating changes that impact the programs of the states and territories. (EQPMs objected strongly to what they perceived as top-down, closed-door decision making and surprise changes.)
- Increase transparency and maintain open communication with earthquake program managers.
- Be mindful of the EQPMs' circumstances, resources, and program objectives when shaping FEMA-NEHRP's objectives, goals, expectations, requirements, and processes. In particular, be aware of the expertise and capacity differences between programs of different size and staffing, and broaden NEHRP goals so that they are more inclusive of the diverse needs of states and territories.
- Communicate and explain FEMA/NEHRP's objectives, goals, and expectations more clearly and accessibly.

Relationships with Regional EQPMs. It was evident from the interviews that engagement between FEMA's regional earthquake program managers (Regions VIII, IX, and X) and the earthquake program managers of the states and territories is very productive, and a number of the state/territorial EQPMs spoke highly of their respective regional earthquake program managers and the support that they provide.

FEMA-NEHRP GRANT ALLOWABLE ACTIVITIES¹

When discussing the allowable activities, earthquake program managers expressed concern over what seemed to them to be a misalignment between the kinds of projects now expected by FEMA and the available funds and timelines of the grants. Mitigation projects drew the most attention in this context: Some earthquake program managers feel pressured by FEMA-NEHRP to direct their NEHRP grant funds away from education and outreach and toward mitigation projects.² They point out that most mitigation

¹ [NEHRP state assistance grant program](#)

² See below for more discussion of this issue.

projects are not feasible with NEHRP funding because such projects typically take longer than 12 months (the grant performance period) to initiate and complete, particularly if the project requires an environmental planning and historic preservation (EHP) review.

In addition, it was remarked that mitigation projects, and projects such as school assessments, building inventories, and URM databases, typically cost considerably more money than a NEHRP grant provides. Earthquake program managers, while acknowledging the importance of and need for mitigation, observed that other, larger grants, such as BRIC, are better suited than the NEHRP grant to fund mitigation projects.

The earthquake program managers prefer to have the flexibility to apply the smaller NEHRP grants to projects that in their view align more closely with the specific needs and circumstances of their respective states/territories, as well as the particular objectives, capacity, and skill sets of their respective earthquake programs.

FEMA-NEHRP GRANT APPLICATION PROCESS AND PERFORMANCE PERIOD

Many of the earthquake program managers had concerns about the application process. In particular, they would like to see the process streamlined so that it respects and realistically reflects the limited time, staff, and capacity of state earthquake program managers. The time allowed by FEMA for preparation of an application was also reckoned too short, and it was noted that the complexity of the application and the staff time required to apply for the grant is not proportionate to the relatively modest size of the grant funds.

For several earthquake program managers, the grant's 12-month performance period³ was reckoned simply too short, because the time required for a state/territory's scoping, contracting, and subaward process begins only after FEMA awards the grant and releases the funds. By the time contracts were in place and the work began, the actual timeline for completing the projects was reduced to nine or ten months. This condensing of the timeline is further exacerbated when FEMA-NEHRP delays issuing the funds, and when, as frequently happens, project managers are diverted during the grant performance period by incidents and emergencies. While FEMA-NEHRP has been good about granting extensions, this was not thought to be an ideal solution, as submitting requests for an extension absorbs yet more of earthquake program managers' time and resources.

Another challenge is the requirement that the applicant come up with a 25-percent match in order to qualify for the grant. For some programs, this is a significant obstacle.

³ Subsequent to this survey, FEMA changed the period of performance for state grants to 18 months.

REQUIREMENT THAT RECIPIENTS MEASURE AND DOCUMENT EFFECTIVENESS

Another challenge identified in connection with the FEMA-NEHRP grant is the requirement⁴ that grant recipients be able to document "measurable improvement" to demonstrate the effectiveness of their NEHRP projects. It was noted that this is a problem especially for projects that involve multiple phases of implementation over the course of several years, since the impacts and results will not be evident within the performance period of an individual grant. Moreover, one of the principal uses of FEMA-NEHRP funding is public education and outreach, the impacts of which can be difficult to quantify and may not be evident within the short period of the grant.

PUBLIC EDUCATION AND OUTREACH AS A PRIORITY

Increasing earthquake awareness and education is an allowable activity for the NEHRP grant and may include developing outreach or marketing plans, educational or informational materials or online tools, staffing, workshops, and tasks that directly support the activity. As noted previously, the survey revealed both that outreach is a common facet of earthquake program work and that some tension now exists around the use of FEMA-NEHRP funds to support a state/territory's public education and outreach activities.

FEMA-NEHRP's Perspective. It was clear from responses to survey questions that FEMA-NEHRP, while recognizing the importance of outreach and education, would prefer to see a greater share of NEHRP grant funds spent on other allowable activities, such as seismic safety inspections, inventories, and mitigation planning. For instance, a NEHRP grant might be used as seed money to support the development of structural mitigation projects, including meeting prerequisites for other, larger grant funding sources. Outreach as an activity might in this context be undertaken as a phase or component of the inspection, inventory, or planning project; however, FEMA-NEHRP would like to see earthquake programs move away from regularly putting the majority of grant funds towards education and outreach. In connection with this, the outreach and education publications that FEMA has produced are expected to obviate the need for comparable state-produced materials. Also, FEMA, at the direction of the Office of Management and Budget, has introduced performance measures and logic models into the funding process; the effectiveness of outreach and educational materials is difficult to demonstrate by these means.

⁴ This requirement derives from the Financial Assistance Policy and Oversight (FAPO) division of the federal Department of Homeland Security (DHS). FAPO is within the DHS Office of the Chief Financial Officer, Undersecretary of Management.

The Perspective of States/Territories. The majority of earthquake program managers characterized outreach and education as a goal, priority, or significant component of their program’s work. For example, the NEHRP grant is an essential funding source for the successful annual role out and growth of ShakeOut. Other preparedness outreach and education campaigns are synchronized with and tied to ShakeOut, and for some, it plays an important part in stimulating other sources of funding.

For EQPMs, ongoing investment in outreach and education is necessary to:

- Increase public awareness of the seismic hazard.
- Convey information about and promote mitigation and preparedness.
- Encourage regular and increased public participation in drills.
- Improve the accessibility of seismic hazard and preparedness information to reach all audiences and communities.
- Convey to legislators and other decision makers the seismic risks faced by their communities.
- Provide tools to county and local emergency managers.
- Convey guidance regarding how communities can mitigate risk and increase resilience.
- Provide technical expertise and ensure that people know about resources for mitigation and how to obtain funding.

From a resource standpoint, the earthquake program managers also consider that outreach and education projects are well suited to the size of the grant.

BUILDING CODES

The survey suggests that the allowable activity that is undertaken least by earthquake program managers is updating building codes, zoning codes, and ordinances to enhance seismic safety.⁵ For the earthquake program manager of Guam, facilitating the rollout of newly adopted building codes, chiefly by means of distribution and education, was a significant priority in 2021. This was an exception, however: most earthquake program managers did not mention and appeared to have no direct engagement in this area of activity. To some extent, this may be because building codes lie outside of the prescribed sphere of most program managers’ professional activity and expertise. In addition, a few

⁵ This can include planning, developing, updating, adopting, and communicating local building codes, zoning codes and other community development ordinances to enhance seismic safety.

discussions suggested that, because building codes are seen as both political and, in some areas, highly contentious, such projects could be especially sensitive.

Opportunities for Sharing Knowledge and Products

As noted above, fairly regular coordination takes place between particular states based on existing geographical (and geological) relationships. In addition to these, some recent projects of note are the basis for wider information and experience sharing between states, or include products and activities that could be adapted for use by other states or territories. Examples include:

Be 2 Weeks Ready. The creators' vision for this program is that it will continue to be taken up by other states nationwide and will replace Map Your Neighborhood. A few of the inland EQPMs (e.g., Nevada) have expressed interest in or have already begun to adopt it.

Earthquake early warning. Three states have implemented earthquake early warning systems: California, Oregon, and Washington. The earthquake program managers of Idaho, Nevada, and Montana expressed an interest in developing and implementing earthquake early warning in their own states. Nevada's EQPM indicated that Nevada has already had conversations about this with California, Oregon, USGS, and FEMA Region IX.

Earthquake clearinghouses.

- Arizona's earthquake program was seeking funding via a BRIC grant for this purpose.
- Cal OES plans to expand California's earthquake clearinghouse; the intention is to use it for all natural hazards (earthquake, tsunami, volcano), thus making it a natural hazards clearinghouse. The needs and uses are the same: sharing on-the-ground data, research, and information.
- Idaho developed an earthquake clearinghouse, which became digital/virtual when the Stanley earthquake occurred in the midst of the COVID-19 pandemic (March 2020). Idaho is now focused on developing a regional clearinghouse plan.

Financial preparedness tool kit. FEMA Region IX's earthquake program manager has headed an earthquake insurance project team that is developing a financial resilience tool kit, of which a new earthquake insurance and financial preparedness [fact sheet](#) (published in 2021) is the first product. The tool kit is a pilot project—the initial focus is a California audience—but the intention is that the tool kit will eventually be adapted for use in other states and territories.

Interest in Multistate Collaboration

A few topic areas stood out when CREW asked earthquake program managers to identify project areas that would either be scalable for multistate application, or be more feasible if undertaken as a multistate project. Examples include:

National Earthquake Technical Assistance Program (NETAP) training. It was noted that it is often easier to provide the requisite number of people for a training if multiple states participate. Training constraints during the pandemic also demonstrated the possibilities for more virtual training options, depending on the nature of the training.

URM Inventories and related projects: A number of the earthquake program managers expressed interest in tackling various aspects of the problem of unreinforced masonry buildings (URMs). For example:

- Several earthquake program managers mentioned the need for funding to inventory URMs and to help building owners and low-income homeowners retrofit dangerous buildings.
- Utah recently produced and published the [Wasatch Front Unreinforced Masonry Risk Reduction Strategy](#) (March 2021), which involved consultation with other states and can be adapted for use by any state or community with URMs. Utah's EQPM would also like to expand Salt Lake City's Fix-the-Bricks program.
- Nevada has done URM inventories in areas of high population and is now looking to inventory the state's less populous rural areas. The EQPM would then like to move on to planning solutions.
- Oregon's EQPM expressed interest in making use of Utah's expertise to address Oregon's URM building stock in a two-year, two-phase process. The first phase would involve information gathering, the second a series of workshops and production of a final report. Policy development might then follow as a third phase.
- Washington's EQPM indicated that a top priority is providing technical expertise and guidance regarding funding sources to help people address their URMs and mitigate other seismically vulnerable buildings, particularly schools. (Retrofitting of school buildings was identified as a priority by the Region X earthquake program manager as well.)
- Wyoming's EQPM expressed interest in creating an inventory of buildings in need of mitigation as a preliminary step toward applying for BRIC funding. The state has some initial data in the form of a state building database and results of a 2010 Hazus run.

Valued Resources and Needs

In discussing their programs, the earthquake program managers highlighted some of the resources that they use and value to administer their programs and accomplish tasks. They also mentioned resources that they lack and would like to have, as well as their more critical needs. These are summarized in the following table.

| <i>STATE/TERRITORY</i> | VALUED RESOURCE, WANT, OR NEED |
|------------------------|--|
| <i>Arizona</i> | Valued: NEPM. NEHRP funds (going directly to states). NEHRP funding for ShakeOut. Needs: More staffing. BRIC funding to build out an EQ clearinghouse and to repair/refurbish Broadband Seismic Network. NETAP training. Resources for school seismic safety program or inventory. |
| <i>California</i> | Valued: Funding from NEHRP, NOAA (for tsunami mapping, etc.), EMPG, HMPG; partnership with Earthquake Country Alliance for the Redwood Coast (for public outreach). Needs: Funding for more staffing. |
| <i>Guam</i> | Valued: Funding from NEHRP and NETAP. Local and federal grants that support mitigation work (i.e., mitigation plan). Communication with FEMA IX personnel. Needs: Guam lacks a state geologist/earth scientist and needs a qualified consultant. |
| <i>Hawaii</i> | Valued: Communication with & support from FEMA IX EQPM. Needs: Recognition & understanding of Hawaii's differences from the continent. Help formulating fresh ideas/projects for FEMA-NEHRP grant. Help constructing budgets to provide match for funds. Easier NEHRP-grant management or more assistance with it. |
| <i>Idaho</i> | Valued: Federal and state agency partnerships that provide needed expertise. Support from FEMA X EQPM. Needs: Support from FEMA and more streamlined grant process. NETAP training. Internal IT and management support. Public/private sector support and stable support/involvement from partner agencies. Dedicated source of state mitigation funding for projects at local and state levels. |
| <i>Montana</i> | Valued: FEMA-NEHRP support for public education & outreach (as for story map project). USGS-NEHRP support for study of Bitterroot fault. Needs: Funds to operate, upgrade & maintain Montana Regional Seismic Network. NEHRP-USGS grant funds to continue study of Bitterroot fault. More funding to evaluate & document faults and publicize seismic hazards. |
| <i>Nevada</i> | Valued: Knowledgeable help (contractor) & expanded staff. Communication with & support from FEMA IX EQPM. Needs: More work space. A higher level of NEHRP funding to expand program's capacity. |
| <i>Oregon</i> | Valued: Federal support. Needs: Greater support from state. Additional funding and staffing (e.g., for administrative help or grant writing). Elimination of the requirement to provide 25% match for NEHRP funding. |
| <i>Utah</i> | Valued: NEHRP funds (going directly to states). FEMA/NEHRP publications. Communication with & support from FEMA VIII EQPM. NEPM. Earthquake consortia. Needs: Increased NEHRP grant funds. More FEMA/NEHRP publications (more user-friendly). Recommends: Stronger federal earthquake program, with more funds and EQPMs in all high-risk & very high-risk states. |

STATE/TERRITORY

VALUED RESOURCE, WANT, OR NEED

Washington

Valued: EMPG grant funding (supports 2 staff positions). A 2-year state allocation (for EEW coordinator). NEHRP funding for ShakeOut and outreach campaigns. State funding for seismic monitoring station build out. **Needs:** Another position to continue EEW coordination. More funding to update & improve assessments of earthquake risk & secondary hazards. More assistance to apply for funding for mitigation projects.

Wyoming

Valued: NEHRP funds (going directly to states) & allowing states to have more say in what it goes towards. **Needs:** Training opportunities. Training to better understand BRIC grant process. A low match requirement for the NEHRP grant.

Next Steps

This survey has functioned as a useful starting point not only for articulating essential, practical similarities and differences between the earthquake programs of the western region, but also for cultivating productive relationships and exploring opportunities both for wider collaboration and for the sharing of knowledge and expertise among programs.

A number of the insights that emerged suggest avenues for further investigation and discussion, with a view ultimately to formulating specific projects, tools, and modes of assistance that help earthquake program managers to obtain the resources or support that they need in order to meet their programs' objectives. For example, one such avenue would be further inquiry into the relationships between earthquake programs and their respective state seismic safety committees, where these exist. Earthquake program managers described their needs for various kinds of expertise and contacts in order to accomplish their work, and a state seismic safety committee was remarked on as a resource with great potential for this purpose. A more comprehensive inquiry would be helpful as a means of comparing the models for and roles of the existing seismic safety committees, and it could produce well-defined ideas, models, and best practices that encourage development of both an active committee and a strongly supportive relationship with the earthquake program.

Another example of such an avenue for further inquiry and development was noted previously as an undertaking with potential for multi-state collaboration: a number of earthquake program managers discussed the need to address unreinforced masonry buildings (URMs), in particular by conducting or expanding building inventories. Utah, as a pilot project undertaken with FEMA, created a risk reduction strategy for URMs that can be adapted and applied to other states. One aim of a deeper investigation into the URM-related objectives and projects described by each of the earthquake program managers would be to discover what may be needed to encourage and facilitate adoption and use of

the URM risk reduction strategy in other states, with their differing attitudes to building codes and varying political and cultural landscapes. Another aim would be to identify possible options for collaboration that might help contain costs of the inventories.

Finally, this survey, while it revealed robust relationships between FEMA's earthquake program (especially in the form of the regional earthquake program managers) and the earthquake program managers of the states and territories, also drew attention to a pronounced difference in understanding and priorities when it came to the use of NEHRP funding for outreach and education. Facilitation of further dialogue about this issue would be a logical next step toward better mutual understanding and alignment.

As these examples illustrate, the survey has provided useful insights and inspiration for the development of focused and worthwhile support of the western region's earthquake programs. CREW will continue to revisit the information gathered during this inquiry and use it as a springboard for ideas, ongoing engagement with earthquake program managers, and future projects.