

FEMA Earthquake Program

March 2016

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FEMA



FEMA Earthquake Program Update

- Agency Overview
- Budget Update
- Recent Accomplishments
- 2016-2017 Plans
- Response to FEMA-related recommendations in 2015 ACEHR report

Agency Overview

Building Science *for Disaster-Resilient Communities*



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Mitigation
Works

Agency Overview

- FEMA NEHRP Mission and Goals
- Current Staffing @ HQ and the Regions
- FIMA Next Re-organization

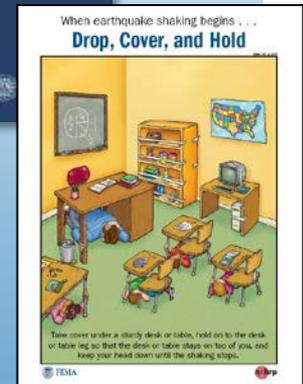
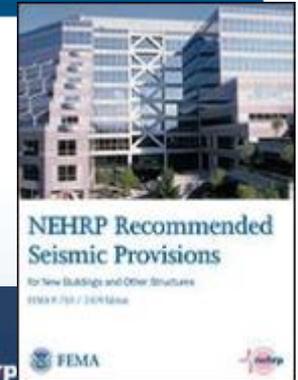
FEMA NEHRP Activities

FEMA has nine responsibilities under NEHRP -

- 1. Promote implementation of research results**
- 2. Promote better building practices**
- 3. Operate program of grants & assistance to enable States**
- 4. Support implementation of comprehensive earthquake education and awareness program,**
- 5. Assist Federal agencies, & private sector groups in preparation & dissemination of seismic design guidance & development of performance-based design guidelines**
- 6. Develop, coordinate, & execute the National Response Plan**
- 7. Develop approaches to combine earthquake hazards reduction with other natural and technological hazards.**
- 8. Provide preparedness, response, and mitigation recommendations to communities after an earthquake prediction has been made.**
- 9. Enter into cooperative agreements or contracts to establish demonstration projects on earthquake hazard mitigation.**

FEMA NEHRP Priorities

- Building Codes and Standards
- Guidance and Tools (books, software, training)
- Program Implementation and Outreach (awareness campaigns, media, articles, initiatives)
- Consortia Partnerships
- Support for Regional EQ Program Managers
- Disaster Support (SME, post-event studies)
- Critical Infrastructure (not doing this)



FEMA NEHRP Staffing Status

- FEMA Headquarters –
 - 4 permanent, full-time positions at FEMA HQ
 - One additional position is being looked at
- FEMA Regional Offices –
 - 10 regional earthquake program manager positions (12 positions with EQ duties total) in 10 regional offices plus Caribbean area office
 - 3 are full time and 8 provide part-time support
 - 7 are currently staffed partially and 5 are currently vacant
 - There are plans to fill 3 of the positions

FEMA NEHRP HQ

Edward Laatsch, P.E. – New - Director,
Safety, Planning & Building Science
Division

Andrew Herseth – New - Guidance
Development

Bill Blanton – New - Building Science
Branch Chief

Mai Tong – PhD. - EQ New Buildings
Guidance/Building Science

Mike Mahoney – Codes/Special Projects
(PBSD, R Factors, Tsunami, etc)

Vice Fernandez – Program Implementation
& Outreach – vacant – Advertise in CY
2016

Wendy Phillips – Consortia/Implementation
& Outreach

Tammy Roy – Management Analyst – partial
support



Cooperative Agreements

- Earthquake Consortia
 - Northeast States Emergency Consortium (NESEC)
 - Central U.S. Earthquake Consortium (CUSEC)
 - Cascadia Regional Earthquake Workgroup (CREW)
 - Western Seismic States Policy Consortium (WSSPC)
 - Southern California Earthquake Consortia (SCEC)
- Federal Alliance for Safe Homes (FLASH)
 - Grassroots outreach and partnership (Disney, ICC, etc.)
- Southern California Earthquake Consortia (SCEC)
 - Nationwide support for Shake Out and EQ Country Alliance

FIMA Re-Organization

- NEHRP now part of Risk Management Directorate
- FIMA has 8 SES positions – up from 2
- Falls under Safety, Planning & Building Science Division (Edward Laatsch Director)
- New Division better aligns NEHRP with regional structure and other statutory programs in FIMA
- New Building Science Branch Chief – Bill Blanton

Budget Update

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FEMA NEHRP Funding (2009-2014)

Funding levels for FEMA NEHRP (2009-2014)

Fiscal Year	Allocation	Authorization	S&B	% of Authorized	Comments
2009	\$9,110,000	\$23,640,000	\$1,500,000	39%	Over guidance Request for \$3M
2010	\$8,977,000	\$23,640,000	\$1,000,000	38%	
2011	\$7,792,000	\$23,640,000	\$1,000,000	33%	
2012	\$7,792,000	\$23,640,000	\$1,006,000	33%	
2013	\$8,201,000	\$23,640,000	\$652,000	35%	
2014	\$8,353,000	\$23,640,000	\$610,000	35%	
2015	\$7,887,000	\$23,640,000	\$481,500	33%	
2016	\$7,089,000	\$23,640,000	\$637,800	30%	
2017	\$7,490,000	\$23,640,000	\$1,041,000	32%	

Recent Accomplishments

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Historical Accomplishments

1. Nation's disaster-resistant building codes (EQ, Flood, and Wind)
2. NEHRP Recommended Provisions
3. Technical Subject Matter Experts/Technical Services Bureau (FIMA, FEMA, DHS, other Agencies)
4. Regional Consortia, Quake Smart and outreach partnerships
5. Over 250,000 documents distributed annually
6. 6 guide books completed or revised and over 3,000 trained in FY 2014



Historical Accomplishments

1. NEHRP Recommended Provisions
2. Nation's disaster-resistant building codes
3. Technical services bureau for Mitigation and FEMA
4. Over 300,000 documents distributed annually
5. 9 guide books completed or revised and over 2,200 people trained in FY 2010



Lessons Learned From Earthquakes

- FEMA and NEHRP are capturing Lessons Learned from recent earthquakes in Chile, New Zealand and Japan.
- All three countries have building codes similar to US and experienced damage in buildings similar to US.
- Lessons will ultimately be incorporated into our codes.
- Stay tuned.



Building Codes & Standards

Nation's disaster resistant building codes are a Cornerstone of effective mitigation

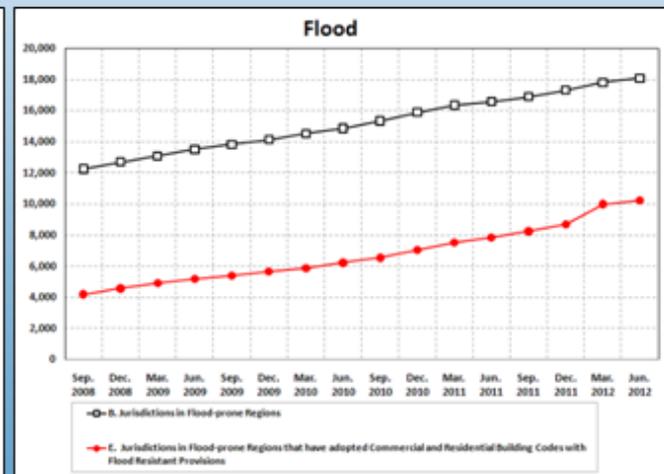
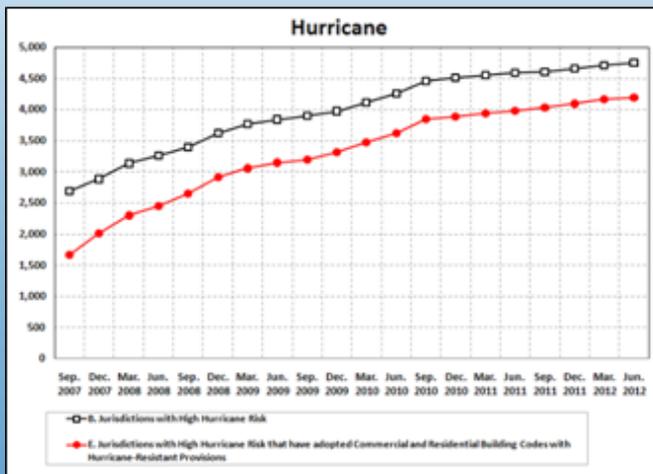
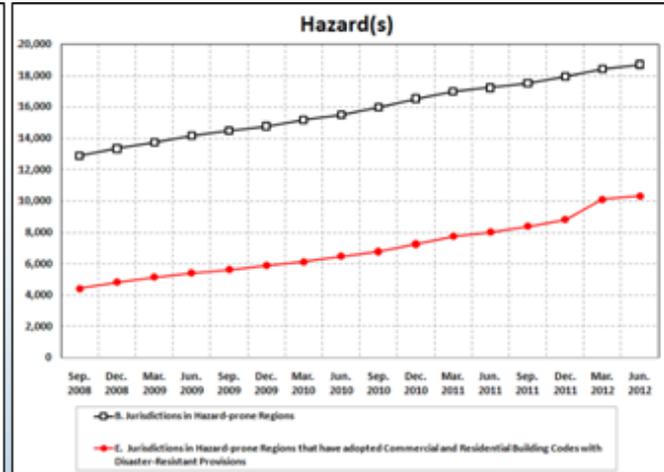
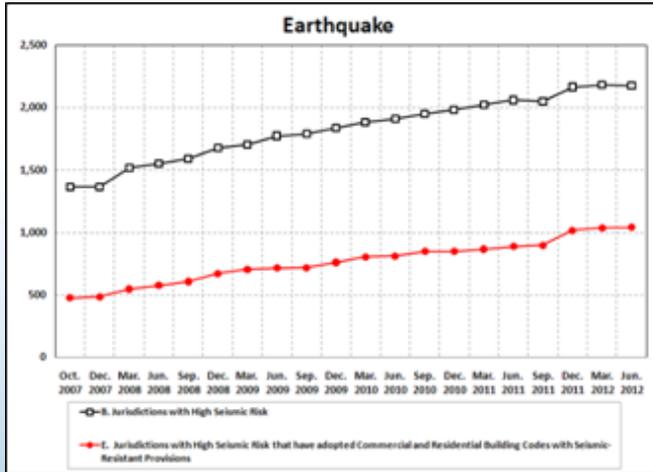
Administrator Fugate understands the importance of strong codes “... make sure we don't add to existing risk by continuing to build in hazardous areas or constructing new development to inadequate/unenforced codes...”

Mitigation has an MOU with the International Code Council

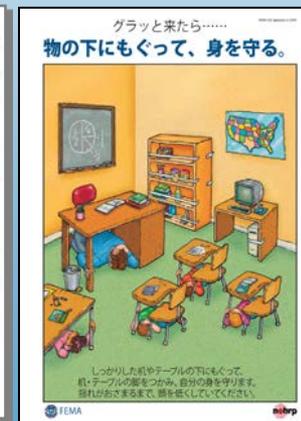
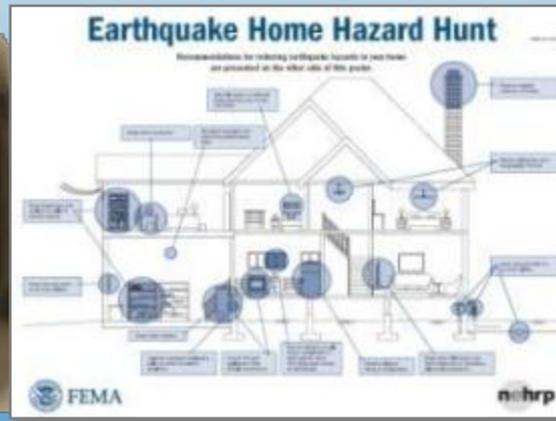
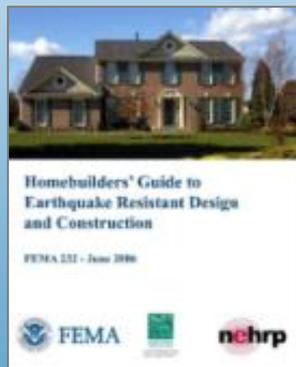
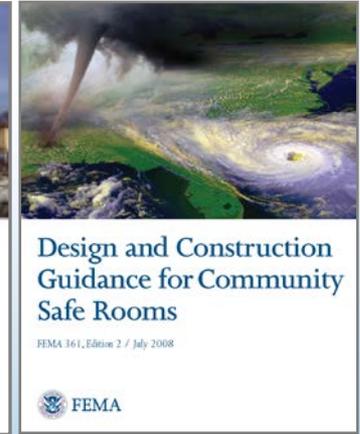
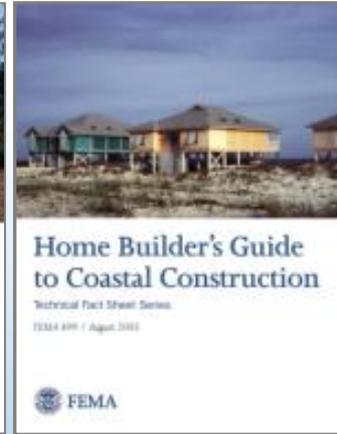
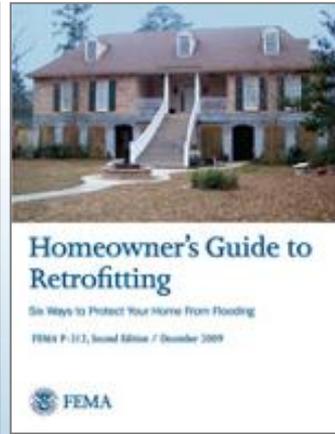
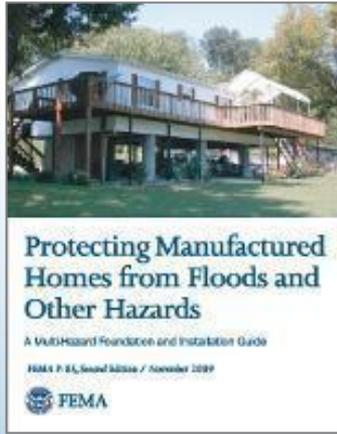
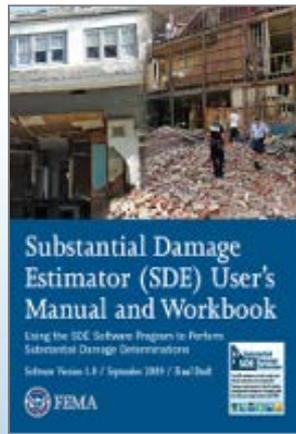
Every year the number of jurisdictions in hazard-prone regions that have disaster resistant codes grows



Adoption of Building Codes



Guidance & Tools Development



Training and Technical Assistance

- Earthquake Engineering Research Institute
 - Technical training and workshops
 - Academic Partnership
- National Earthquake Technical Assistance Program (NETAP)
 - Training development and delivery
 - Trains over 2,500 local officials annually in over 25 States and territories
 - Technical assistance
 - Special projects & Pilots

Outreach & Implementation



Collaborating with Other Organizations



Regional Activity

- FEMA NEHRP works closely with Regional counterparts to support partnerships with the States and local communities in implementing and executing NEHRP reduction activities
- Regional partners support local outreach, training delivery, oversight and execution of cooperative agreements, disaster operations, and technical assistance on local projects.
- Their active involvement and forthcoming support ensures that the NEHRP mission, building codes, standards, and other building science principles are integrated in local mitigation planning, grant decisions, and other local activities.

2016 – 2017 Plans

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2016 – 2017 Plans

- Earthquake State Assistance
- Beginning work on next NEHRP Recommended provisions including the ATC-17 project
- 2018 ICC Code Change proposed changes
- Building Rating System developments

Earthquake State Assistance

- Currently, a variety of support for our states will be provided including:
 - educational webinars and training for all states and territories
 - new publications in the form of CDs, pamphlets, videos, a media outreach plan
 - inventorying of critical structures
 - regional and local in-person seminars and meetings
 - travel to a national earthquake managers meeting for in-person education for all states and territories
 - ShakeOut support with the development/improvement of individualized state webpages
 - support for continuing projects in high risk states such as CA and their “Concrete Coalition Project”
 - earthquake scenario development,
 - nationwide education toolkit.

Earthquake State Assistance

- FEMA continues to look at the possibility of re-visiting Earthquake State Assistance and the decision to allocate that support thru Consortia and Other Partners.

ACEHR Report Responses

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Critical Observation 2

- ACEHR believes a fundamental assessment of the nation's earthquake risk reduction progress to date is essential for guiding future direction and funding levels for improving national earthquake resilience. This assessment should address the extent to which the federal government, states, localities, tribes, and the private sector are taking steps to address the seismic vulnerability of buildings, critical infrastructure and lifeline systems. The assessment should be performed either prior to or as part of a new NEHRP authorization.

Critical Observation 2

- FEMA strives to gauge the progress of State and local adoption of disaster-resistant building codes for new construction, including the “I-Codes” (the International Building Code and International Residential Code).
- PL 108-360 directed that NEHRP develop effective earthquake risk reduction measures & promote their adoption by governments, codes & standards organizations, designers, building owners, others.

Critical Observation 2

- FEMA is the lead agency for program implementation & outreach. PL 108-360 specifies FEMA responsibilities as promoting implementation of research results & better building practices; operating a program of grants and assistance to the States; support comprehensive earthquake risk education and public awareness programs; and work with NIST & others to develop, maintain & disseminate seismic design guidance.

NEHRP Secretariat Recommendation

- **ACEHR recommends the NEHRP Secretariat work with the four NEHRP agencies to promote the development of consensus standards for a market-based, private-sector-led rating system for the seismic performance of buildings.**

NEHRP Secretariat Recommendation

- FEMA worked with NEHRP agencies to promote the development and use of a building rating system for the seismic performance of buildings (see *NEHRP Response to 2013 ACEHR Recommendation Regarding Building Rating Systems*) submitted in response to a 2013 ACEHR recommendation.
- A private sector-led rating system was released by the U.S. Resiliency Council (USRC) – a framework originally developed by the Structural Engineers Association of California with FEMA support – that applies the std (ASCE/SEI) 41 *Seismic Evaluation and Retrofit of Existing Buildings* to develop the ratings.

NEHRP Secretariat Recommendation

- USRC rating system incorporates FEMA's *Performance Based Seismic Assessment Methodology* (FEMA P-58) as an evaluation tool. The only way a building can receive a USRC "five star" rating is by using FEMA P-58.
- Similar systems could support enhanced community resilience. FEMA's *Simplified Seismic Assessment of Detached, Single-Family, Wood-Frame Dwellings* (FEMA P-50) and *Seismic Retrofit Guidelines for Detached, Single-Family, Wood-Frame Dwellings* (FEMA P-50-1) provides a residential rating system which could be adapted for buildings – used by CEA.

NEHRP Secretariat Recommendation

- Developing and applying a building rating system should consider the perspectives of building owners, insurers, and lenders, as well as State and local governments. The ultimate goal should be a national consensus-based building rating system that is consistent with building codes promulgated by the International Code Council (ICC), ASCE & ANSI design standards accreditation process. Application to Federal buildings should be in accordance with OMB Circular A-119 and Interagency Committee on Seismic Safety in Construction (ICSSC) policies.

FEMA Recommendation 1

- **ACEHR recommends FEMA increase support for its earthquake mitigation mission and NEHRP- related implementation and outreach activities.**

FEMA Recommendation 1

- FIMA Administration is strongly encouraging the Nation to learn what to do before, during, and after an earthquake & they support cooperative agreements with partners like SCEC to provide support to states and territories with moderate to high earthquake risk. FIMA has partnered with FEMA Regions, States & territories, local governments, educators, and the private sector to understand the importance of the *Great ShakeOut* drills. The first *ShakeOut* drill was held in California in 2008 had over 5 million participants. These drills have grown nationally, and internationally, to include 53 states and territories reaching over 21.2 million participants in 2015.

FEMA Recommendation 1

- FEMA provides support to regional, non-profit, earthquake consortia & other partners to support earthquake mitigation- working closely with States and territories on EQ mitigation.
- FEMA support to 33 at risk States and territories produced focused mitigation to reduce their seismic risk. Recent studies have shown that as many as 48 states/territories have an increased seismic risk.
- Other outreach activities include our work with the *Quake Smart* earthquake business program.

FEMA Recommendation 2

- **ACEHR recommends FEMA return to a directly-funded state-based program for earthquake hazard mitigation, planning, education and preparedness efforts and work, as part of a future NEHRP reauthorization, to ensure its full funding.**

FEMA Recommendation 2

- The current NEHRP re-authorization and CFR 44, part 361 describe the policies for providing assistance to the States and Territories. 44 CFR, Part 361 states that funding for the cooperative agreements requires each State or territory to match FEMA funding with a “cash” match contribution – dollar for dollar.
- A 2012 survey of the 33 State Earthquake Program Managers (EPM’s) showed less than half of the States/territories could meet the required full cash match and direct funding to the States and territories was discontinued.

FEMA Recommendation 2

- In FY 2013, funding for the “State Assistance Program” was distributed to FEMA NEHRP’s Earthquake Consortia and Partners who then provided needed support to the States and territories. This support mechanism used the teamwork of the earthquake consortia and other partners to work individually with the States and territories to jointly develop, manage, and deliver successful earthquake resilience projects.
- A 2015 follow-up survey revealed that the percentage of States able to meet the match had not changed measurably.

FEMA Recommendation 3

- **ACEHR recommends FEMA restore and give priority to its earthquake hazard mitigation and resilience initiative for critical infrastructure and lifeline systems.**

FEMA Recommendation 3

- FEMA's responsibilities assist NIST & other Federal agencies in preparation of seismic resistant design guidance on building codes, standards, and practices for new and existing buildings, structures and lifelines, and aid in the development of performance-based codes for buildings, structures, and lifelines.
- Until the mid-1990's FEMA addressed the development of mitigation guidance for lifelines & published several voluntary mitigation guidelines that addressed lifelines and related issues.

FEMA Recommendation 3

- These publications included:
 - *Earthquake Resistant Construction of Electric Transmission and Telecommunication Facilities Serving the Federal Government*, 1990 (FEMA 202),
 - *Seismic Vulnerability and Impact of Disruption of Lifelines in the Conterminous United States*, 1991 (FEMA 224),
 - *Collocation Impacts on the Vulnerability of Lifelines during Earthquakes with Applications to the Cajon Pass, California: Study Overview*, 1991 (FEMA 221),
 - *Inventory of Lifelines in the Cajon Pass, California*, 1992 (FEMA 225),
 - *Earthquake Resistant Construction of Gas and Liquid Fuel Pipeline Systems Serving or Regulated by the Federal Government*, 1992 (FEMA 233).

FEMA Recommendation 3

- FEMA recognizes the importance of addressing earthquake risk mitigation of critical infrastructure systems as well as the critical interdependencies that exist between buildings and infrastructure. This highlights that mitigating risks only for buildings, but not lifeline systems, still leave communities unable to recover quickly.
- FEMA has invested resources in the study of selected critical infrastructure including our work with the American Lifelines Alliance during the 1990's and early 2000's until resource limitations significantly limited our work in this area.

FEMA Recommendation 4

- **ACEHR recommends FEMA invest in maintaining Hazus® as a utilizable, publicly available earthquake hazard mitigation tool and ensure that the tsunami module is fully integrated and functioning within the Hazus® software platform.**

FEMA Recommendation 4

- HAZUS®, a widely used multi-hazard loss estimation platform, is an effective tool that supports FEMA, States and local communities' disaster preparedness, planning, and post disaster response and recovery. FEMA continues to maintain and update HAZUS for the user community. Recent HAZUS modernization is critical. The General Building Stock was updated with 2010 Census data & functional enhancements were centered around the HAZUS flood module.

FEMA Recommendation 4

- The HAZUS earthquake module plays a key role in developing earthquake scenarios for FEMA's national and regional exercises & communities use earthquake scenarios for local earthquake preparedness and mitigation activities such as building inventories, risk awareness for URM buildings, and seismic screening and school retrofit.
- Calibration of earthquake damage functions & comparison of loss estimations against recent earthquake loss data including the 2011 Mineral, VA, earthquake and the 2014 South Napa, CA EQ.

FEMA Recommendation 4

- Recent updates to the earthquake module include integration of USGS ShakeMap, adoption of USGS updated seismic hazard maps.
- The HAZUS tsunami module methodology was developed in 2013. In 2015, FEMA Region X completed a pilot study to validate and test the methodology for two coastal counties, Grays Harbor and Pacific, WA. FEMA Region IX is also conducting a similar study for Hilo, HI, and Crescent City, CA.

FEMA Recommendation 4

- A pilot study provided valuable information about potential damage & economic losses by scenario tsunami events induced from Cascadia fault ruptures.
- FEMA strives to reduce tsunami risk in hazard-prone communities. Implementation of the tsunami methodology is beyond the scope of current HAZUS modernization & FEMA is exploring possible collaboration with federal partners.
- FEMA provides support to regional earthquake consortia & partners who work closely with States and territories on mitigation. This funding supports State and territorial strategy & project development that educates the public to take pre-earthquake mitigation actions.



FEMA

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