

National Earthquake Hazards Reduction Program

... a research and implementation partnership

Statutory Background

Handout for ACEHR Member Notebooks

*Based on NEHRP Presentation to House Science & Technology Committee
and Senate Appropriations Committee Staff Members, May 2007*



FEMA

NIST

National Institute of
Standards and Technology

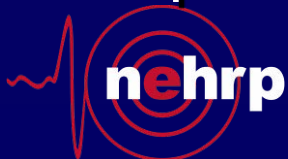


 **USGS**
science for a changing world

national **earthquake** hazards reduction program

Background

- NEHRP was originally established by Public Law (PL) 95-124, the *Earthquake Hazards Reduction Act of 1977*.
- NEHRP is Federal Government's long-term program to reduce U.S. earthquake risks.
- NEHRP legislation authorizes appropriation budget levels for the four principal agencies – **FEMA, NIST, NSF, USGS**. (But does not appropriate any budgets!)
- Congress usually reviews and reauthorizes NEHRP every 2-3 years – traditionally led by House Committee on Space, Science, and Technology.



PL 108-360

NEHRP Reauthorization Act of 2004

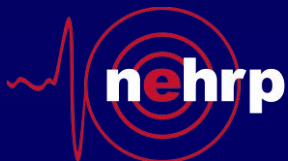
Overview

- Most recent reauthorization - enacted 25 October 2004.
- Followed two-year review of NEHRP, including hearings by House Science Research Subcommittee and Senate Space, Science, and Transportation Subcommittee.
- Observed that new mitigation technologies are being implemented slowly, while urban development has accelerated, resulting in significantly increased societal vulnerabilities.
- Reauthorized NEHRP for FY 2005 – FY 2009 at average annual totals (for all 4 agencies) of ~ \$180M, an increase of \$75M per year from previous levels. *Authorized budgets expired at end of FY 2009.*



Statutory “Program Activities”

- **Improve understanding of earthquakes and their effects** on communities, buildings, structures, and lifelines, through **interdisciplinary** research involving engineering, natural sciences, and social, economic, and decisions sciences.
- **Develop effective measures for earthquake hazards reduction.**
- **Promote adoption of earthquake hazards reduction measures** by Federal, State, & local governments; national standards & model code organizations; architects and engineers; building owners, and others with a role in planning and constructing buildings, structures, and lifelines through:
 - grants, contracts, cooperative agreements, and technical assistance;
 - developing standards, guidelines, and voluntary consensus codes for earthquake hazards reduction for buildings, structures, & lifelines;
 - developing and maintaining a repository of information, including technical data, on seismic risk & hazards reduction.
- **Develop, operate, and maintain Advanced National Seismic Research and Monitoring System; George E. Brown, Jr. Network for Earthquake Engineering Simulation; and Global Seismographic Network.**

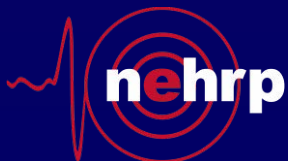


NEHRP Agency Roles

Department of Homeland Security

Federal Emergency Management Agency (FEMA)

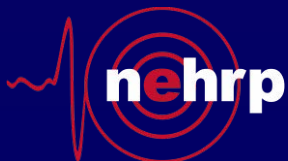
- **Promote** (with NIST) **implementation of research results** by working closely with national standards and model building code organizations.
- **Promote better building practices** within the building design & construction industry (architects, engineers, contractors, builders, & inspectors).
- **Operate program of grants & assistance** to enable States to develop mitigation, preparedness, & response plans; prepare inventories & conduct seismic safety inspections of critical structures & lifelines; update building & zoning codes & ordinances to enhance seismic safety, increase earthquake awareness and education, and encourage development of multi-state groups for such purposes.
- **Support implementation of a comprehensive earthquake education and awareness program**, including development of materials and their wide dissemination to all appropriate audiences and support public access to locality-specific information that may assist the public in preparing for, mitigating against, responding to, and recovering from earthquakes and related disasters.



NEHRP Agency Roles

FEMA, continued

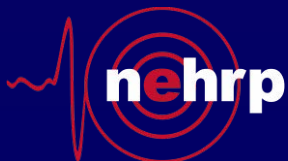
- Assist NIST, other Federal agencies, & private sector groups, in the preparation, maintenance, & wide dissemination of seismic resistant design guidance and related information on building codes, standards, and practices for new and existing buildings, structures, and lifelines; & aid in the development of performance-based design guidelines & methodologies supporting model codes for buildings, structures, & lifelines that are cost-effective and affordable.
- Develop, coordinate, & execute the National Response Plan when required following an earthquake, & support the development of specific State and local plans for each high risk area to ensure the availability of adequate emergency medical resources, search & rescue personnel & equipment, & emergency broadcast capability.



NEHRP Agency Roles

FEMA, continued

- Develop approaches to combine measures for earthquake hazards reduction with measures for reduction of other natural and technological hazards, including performance-based design approaches.
- Provide preparedness, response, and mitigation recommendations to communities after an earthquake prediction has been made.
- Enter into cooperative agreements or contracts with States & local jurisdictions, and other Federal agencies to establish demonstration projects on earthquake hazard mitigation, to link research & mitigation efforts with emergency management programs, or to prepare educational materials for national distribution.



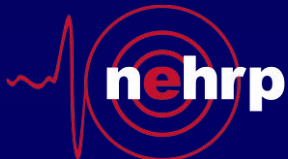
NEHRP Agency Roles

National Institute of Standards and Technology (NIST)

Lead Agency

Responsible for program planning & coordination.

- Ensure that program includes necessary steps to **promote implementation of earthquake hazard reduction measures** by Federal, State, and local governments, national standards & model building code organizations, architects and engineers, and others with roles in planning & constructing buildings & lifelines.
- **Support development of performance-based seismic engineering tools**, & work with appropriate groups to **promote commercial application** of such tools, through earthquake-related building codes, standards, and construction practices.
- **Request assistance of Federal agencies other than the Program agencies, as necessary to assist** in carrying out the (Program).
- **Work with FEMA, NSF, & USGS, to develop a comprehensive plan for earthquake engineering research to effectively use existing testing facilities and laboratories, upgrade facilities & equipment as needed, & integrate new, innovative testing approaches** to the research infrastructure in a systematic manner.



NEHRP Agency Roles

NIST, continued

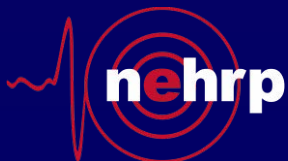
- Work closely with national standards and model building code organizations, in conjunction with FEMA, to promote implementation of research results.
- Promote better building practices among architects and engineers.
- Work closely with national standards organizations to develop seismic safety standards and practices for new and existing lifelines.
- Support development & commercial application of cost-effective and affordable performance-based seismic engineering by providing technical support seismic engineering practices & related building codes, standards, & practices development.



NEHRP Agency Roles

National Science Foundation (NSF)

- **Fund (fundamental) research on earth sciences** to improve understanding of causes & behavior of earthquakes, earthquake engineering, & human response to earthquakes. *Note: Earthscope is maintained as a related non-NEHRP activity.*
- **Encourage prompt dissemination** of significant findings, sharing of data, samples, physical collections, & other supporting materials, & development of intellectual property so research results can be used by appropriate organizations to mitigate earthquake damage.
- In addition to **supporting individual investigators, support university research consortia & centers for research in geosciences & in earthquake engineering.**
- **Work closely with USGS to identify geographic regions of national concern** that should be the focus of targeted solicitations for earthquake-related research proposals.
- **Support research that improves the safety & performance of buildings, structures, & lifeline systems using large-scale experimental and computational facilities of the (George E Brown, Jr) Network for Earthquake Engineering Simulation (NEES) & other institutions engaged in research & implementation of NEHRP.**



NEHRP Agency Roles

NSF, continued

- **Emphasize** in earthquake engineering research, **development of economically feasible methods to retrofit existing buildings and protect lifelines** to mitigate earthquake damage.
- **Support research that studies the political, economic, & social factors that influence the implementation of hazard reduction measures.**
- **Include to the maximum extent practicable diverse institutions, including HBCUs and those serving large proportions of (minorities) and other underrepresented populations.**
- **Develop in conjunction with FEMA, NIST, & USGS, a comprehensive plan for earthquake engineering research to effectively use existing testing facilities and laboratories, upgrade facilities & equipment as needed, & integrate new, innovative testing approaches** to the research infrastructure in a systematic manner.



NEHRP Agency Roles

U.S. Geological Survey (USGS)

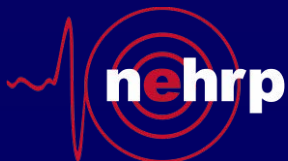
- Conduct research & other activities necessary to characterize and identify earthquake hazards, assess earthquake risks, monitor seismic activity, and improve earthquake predictions.
- Conduct a systematic assessment of seismic risks in each region of the Nation prone to earthquakes, including, where appropriate, the establishment and operation of intensive monitoring projects on hazardous faults, seismic microzonation studies in urban & other developed areas where earthquake risk is determined to be significant, & engineering seismology studies.
- Work with officials of State & local governments to ensure that they are knowledgeable about specific seismic risks in their areas.
- Develop standard procedures, in consultation with the Director of FEMA and Director of NIST, for issuing earthquake predictions, including aftershock advisories.



NEHRP Agency Roles

USGS, continued

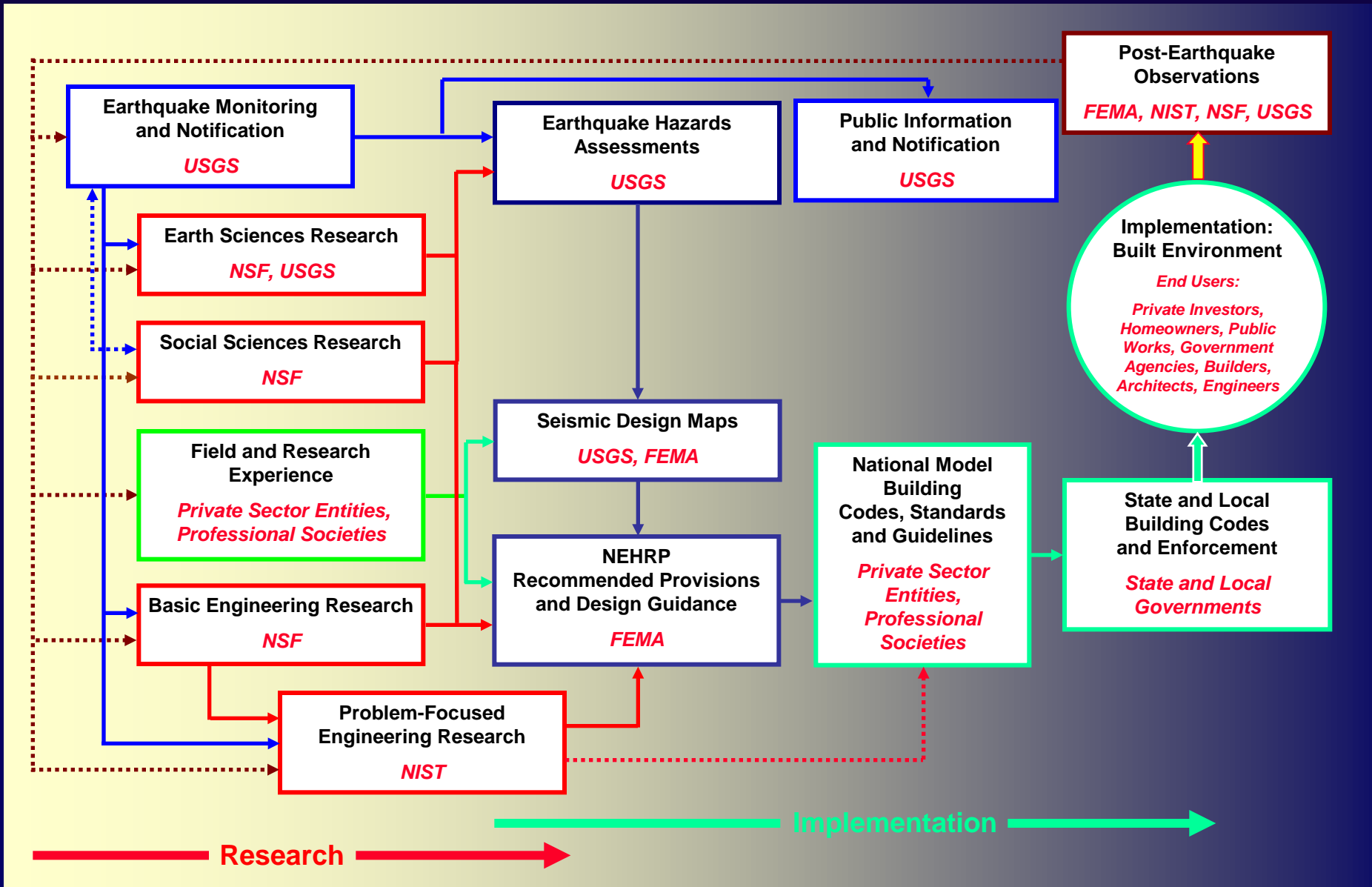
- Issue, when necessary, and notify the Director of FEMA and Director of NIST, an earthquake prediction or other earthquake advisory, which may be evaluated by the National Earthquake Prediction Evaluation Council.
- Operate, using the National Earthquake Information Center (NEIC), a forum for the international exchange of earthquake information.
- Operate a National Seismic System (ANSS).
- Support regional seismic networks, which shall complement the National Seismic Network.



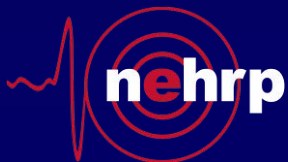
NEHRP Agency Roles

USGS, continued

- Work with NSF, FEMA, & NIST, to develop a comprehensive plan for earthquake engineering research to effectively use existing testing facilities and laboratories, upgrade facilities & equipment as needed, & integrate new, innovative testing approaches to the research infrastructure in a systematic manner.
- Work with other Program agencies to coordinate Program activities with similar earthquake hazards reduction efforts in other countries.
- Maintain suitable seismic hazard maps in support of building codes for structures and lifelines, including additional maps needed for performance-based design approaches.



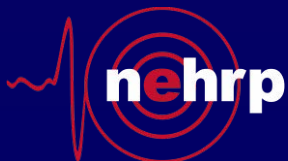
NEHRP Impact on the Built Environment



Major Technical Priorities

The reauthorization endorsed priorities identified in 2001-2005 NEHRP Strategic Plan (FEMA 383), which was developed in partnership with the stakeholder community (private sector, state & local governments, & academia):

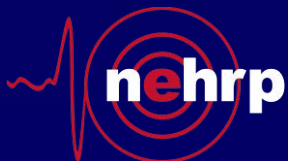
- Development and commercial application of performance-based seismic engineering tools, codes, standards, and practices (FEMA, NIST).
- Completion of USGS Advanced National Seismic System (ANSS).
- Operation and maintenance of and conduct of research using NSF George E. Brown, Jr., Network for Earthquake Engineering Simulation (NEES).
- Operation and maintenance of Global Seismographic Network (GSN) by USGS & NSF.



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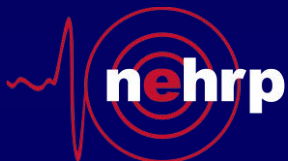
Leadership & Management Priorities

- Interagency Coordinating Committee.
- Advisory Committee on Earthquake Hazards Reduction.
- NIST to be Lead Agency.
- Updated Strategic Plan.
- Management Plan.
- Coordinated interagency budget and Annual Report to Congress.



Interagency Coordinating Committee (ICC)

- Directors of FEMA, NIST (Chair), NSF, & USGS, Office of Science & Technology Policy (OSTP), and Office of Management & Budget (OMB).
- Oversees planning, management, & coordination.
- Responsible for developing and updating strategic and management plans, coordinated interagency budgets, and annual program reports.



Advisory Committee on Earthquake Hazards Reduction (ACEHR)

- **Purpose:** Assess trends and developments in science and engineering; program effectiveness; need for program revision; and program management, coordination, and implementation activities.
- **Composition:** *At least 11* qualified members (no Federal employees) representing research and academic institutions, industry standards development organizations, state & local governments, and financial communities. **(Currently target 15 members, plus SESAC Chair)**
- **Congressional direction:**
 - ACEHR reports to NIST Director biennially on its assessments.
 - ACEHR considers recommendations of USGS Scientific Earthquake Studies Advisory Committee (SESAC).
 - ACEHR has flexibility to report to Congress on program-related issues.

