

RAS J-59

New England not immune to strong temblors Specialists say major event only a matter of time

By Bryan Bender, Globe Staff | April 16, 2006

RESTON, Va. — Could a big one hit Boston? It has before.

In 1638, less than a generation after the Pilgrims arrived at Plymouth Rock, a powerful earthquake approaching those that have rocked Los Angeles struck central New Hampshire, shaking homes in Boston and spurring aftershocks for two weeks, according to first-person accounts.

The largest quake ever recorded in the Northeast was estimated to be a magnitude 7.0 on the Richter scale, based on the geological effects. It hit Quebec in 1663, shattering chimneys in Boston, nearly 400 miles away.

The ground opened up in Eastern Massachusetts in 1755 when a quake with its epicenter at Cape Ann formed natural springs and even toppled the grasshopper atop Faneuil Hall.

Major earthquakes are most commonly associated with fault-ridden California. But it is only a matter of time before the Northeast is struck by a major temblor, according to earthquake specialists at the US Geological Survey in Virginia, who have placed Boston on a list of the top 26 risk areas in the nation. Indeed, a major quake has occurred somewhere in the Eastern United States about every 100 years.

Yet Boston and other urban areas, vastly more populated than when the colonists felt the earth shake several centuries ago, are far less prepared than the West Coast, according to earthquake hazard specialists.

Water mains and buildings are not reinforced against collapse, especially masonry structures. And large swaths of Boston that sit on landfill are in heightened danger, subject to what specialists call "liquefaction," when the soil effectively turns into mush. If a quake struck in winter, every gas-heated home would potentially be an ignition source for fires.

"The daily risk of a damaging earthquake in much of the Eastern US is very low, but a repeat of any of these [past] events today would be a disaster on a scale that is difficult to comprehend," declares a soon-to-be-published report by the Geological Survey. "Although the probability that a major earthquake will hit the Eastern US is much lower than in the West, the potential impact is significantly higher."

There is no reliable map of earthquake faults in the Eastern United States, according to researchers. Nevertheless, the rocks transmit earthquake waves more easily than in the West. Therefore, a rupture, brought on by pressure built up over hundreds of years, would be felt over a much larger geographic area.

Two back-to-back quakes in Missouri in the winter of 1810-1811 shook the White House, nearly half a continent away; President James Madison remarked that he thought a burglary was in progress. The tectonic shift that resulted redirected the flow of the Mississippi River, according to geologists.

Smaller earthquakes occur regularly in the Eastern states, including New England. On November 17, a minor quake, measuring 2.5 on the Richter scale, was detected 17 miles southeast of

U.S. NUCLEAR REGULATORY COMMISSION

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NRC Staff Other _____
IDENTIFIED on 4-10-08 Witness/Panel _____
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Whitman. Last March, a moderate quake, measured at 5.4, struck 55 miles north-northwest of Dickey, Maine; nearly 600 residents reported having to hold onto something to avoid falling down.

(For each increase in the Richter scale, a quake's strength grows by an order of magnitude. For example, a 5.0 is 10 times greater than a 4.0. The amount of energy released goes up even more. The 9.0 quake that caused the Asian tsunami in 2004 was a thousand times more powerful than the 7.0 Loma Prieta quake that interrupted the World Series in San Francisco in 1989).

But in the event of a big one, Boston and other East Coast cities like Charleston, S.C. -- almost entirely leveled by a 7.3 quake in 1886 -- are not ready.

"They happen so infrequently that they are not part of people's everyday thinking," said David Applegate, a Massachusetts Institute of Technology-trained geologist who is a senior scientist at the Geological Survey. "But after the [tsunami of 2004] we gave more thought to areas that have infrequent events."

Indeed, the forthcoming government report says "many people are unaware of the potential for a major earthquake to hit the Eastern United States, and fewer still know what to do and what not to do during and immediately after an earthquake."

For geologists in Boston, the biggest concern is those areas built on landfill.

"About two-thirds of Boston is on made land," said John Ebel, a professor of geology and director of the Weston Observatory at Boston College. Walking "from Boston Common to the Public Garden you would have been underwater in the 1700s. The Back Bay is literally a bay that was filled in. Those areas have the potential for greater damage than if you get on to Beacon Hill or the hard rock areas like Brookline." ■