

## **About the New Madrid Seismic Zone**

The New Madrid seismic zone (NMSZ) extends more than 120 miles southward from Cairo, Illinois, at the junction of the Mississippi and Ohio rivers, into Arkansas and parts of Kentucky and Tennessee. It roughly follows Interstate 55 through Blytheville down to Marked Tree, Arkansas, crossing four state lines and the Mississippi River in three places as it progresses through some of the richest farmland in the country.

The greatest earthquake risk east of the Rocky Mountains is along the NMSZ. Damaging earthquakes are not as frequent as in California, but when they do occur, the destruction covers more than 15 times the area because of the underlying geology and soil conditions prevalent in the region. The zone is active, averaging about 200 earthquakes per year, though most of them are too small to be felt. With modern seismic networks, the capability to detect earthquakes has greatly increased, and many more very small earthquakes are being detected now than in the past. There is a common misconception that the number of earthquakes has increased over the years, but the increase is due to more sophisticated recording methods that can detect earthquakes that were previously unrecorded. The history of the region tells us, however, that the earthquake risk is the most serious potential disaster we could face.

In the winter of 1811-1812, a series of very large earthquakes occurred along the fault system buried deep within the NMSZ. Using felt information reported in newspapers and from eyewitness accounts of effects, magnitudes have been estimated to be 7.8, 8.0, and 8.1. In addition to the main shocks in December, January, and February, there were more than a thousand aftershocks, some of which were almost as large as the main shocks. The earthquakes were felt throughout the eastern United States and into Canada, ringing church bells as far away as Richmond, Virginia, and Charleston, South Carolina. Closer to home, much of the area was flooded, making it unfit for farming for many years, and most of the building infrastructure in the epicentral region was destroyed. In some areas, land rose or subsided as much as 20 feet, and small waterfalls or rapids were observed on the Mississippi River, causing part of the river to flow backwards for a short time. Seismologists now believe the New Madrid earthquakes represent the greatest known release of seismic energy in the world. As a result of the earthquakes, Congress passed the nation's first disaster assistance bill, offering arable land to farmers in exchange for ruined cropland, the initiation of a federal disaster policy that continues today.

Since 1811 and 1812, two more large earthquakes have occurred in the NMSZ — an estimated magnitude 6.4 near Marked Tree, Arkansas, in 1843, and an estimated magnitude 6.8 near Charleston, Missouri, in 1895. While scientists believe magnitude 8.0 earthquakes are very rare in this area, they are concerned about smaller but potentially damaging earthquakes similar in size to those in 1843 and 1895, which occur more frequently. With the older infrastructure in our region and the relatively unprepared population, even a magnitude 6.0 event could be devastating to people and communities in the epicentral region.

Scientists have also learned that the New Madrid fault system may not be the only fault system in the Central U.S. capable of producing damaging earthquakes. The Wabash Valley fault system in Illinois and Indiana shows evidence of large earthquakes in its geologic history, and there may be other, as yet unidentified, faults that could produce strong earthquakes.