Abstract

Earthquakes, which were previously rare events in the Dallas-Fort Worth (DFW) Metroplex, have become increasingly common in the last five years. In a five-month period, Irving alone had 26 earthquakes over magnitude 2.0. Damage has been minimal, but larger earthquakes have not been ruled out as new fault lines have been discovered and their precise structure is only beginning to be understood. This project's goal was to show how HAZUS can be used to demonstrate possible earthquake effects on the new fault lines, and how the results from HAZUS can be used to assess the impact of damaged bridges on the road network and shelter accessibility. Two fault lines discovered in the last couple of years were digitized and loaded into the HAZUS model. Historical earthquake data were used to form a hypothetical earthquake scenario that characterizes local conditions. The scenario was run twice, once on each fault.

To explore how these results can inform emergency planning, output from the HAZUS scenarios regarding the amount of people needing shelter per census tract, as well as damage to bridges and their location, was imported into ArcMap. A road network was built to support a location-allocation model to assign people needing shelter to potential shelters and the damaged bridges were added as barriers. A centroid was calculated for each census tract to provide population source points. Lacking data on the location of existing emergency shelters, all schools throughout the two counties were designated as potential shelter destinations. Then location-allocation analysis was conducted on each county's data to determine the closest accessible shelters with available capacity. The demonstration scenario resulted in not enough shelters, as several source points were unallocated. It is hoped that the demonstrations provided by this study will encourage city planners to begin to address emergency planning in the region for these newly identified hazards.