

GAO@100 Highlights

Highlights of [GAO-21-129](#), a report to congressional committees

Why GAO Did This Study

Earthquakes and related hazards are a significant threat to people and infrastructure in the U.S. For instance, magnitude 6.4 and 7.1 earthquakes centered west of Searles Valley in California, struck in July 2019, causing over \$5 billion in damage. USGS is the lead federal agency for providing earthquake monitoring and notification. USGS began implementing ShakeAlert, its earthquake early warning system, in California, Oregon, and Washington State in 2012.

GAO was asked to assess, among other things, USGS efforts to identify earthquake hazards. This report addresses, among other things, (1) USGS actions to identify earthquake hazards, (2) the extent USGS actions to achieve its earthquake hazard mission meet leading practices; and (3) what progress USGS and its partners have made implementing ShakeAlert. GAO evaluated agency guidance and other planning documents, such as USGS's ShakeAlert implementation plans; assessed its ShakeAlert cost estimate; conducted site visits to selected cities; and interviewed federal and state officials, among others.

What GAO Recommends

GAO is making 7 recommendations, including that USGS develop a strategic plan, including measures, and conduct a staffing gap analysis for the EHP that identifies the resources needed to achieve its mission and goals; follow best practices for a comprehensive ShakeAlert cost estimate; and complete the stakeholder outreach plan for its earthquake early warning system. USGS generally concurred with GAO's recommendations

View [GAO-21-129](#). For more information, contact Chris Currie at (404) 679-1875 or curriec@gao.gov.

March 2021

EARTHQUAKES

Progress Made to Implement Early Warning System, but Actions Needed to Improve Program Management

What GAO Found

The U.S. Geological Survey (USGS), through its Earthquake Hazards Program (EHP), has made several efforts to identify the dangers from earthquakes, such as tsunamis and landslides, to inform the public and help decision-makers ensure public safety and mitigate losses. For example, USGS publishes national seismic hazard maps, which are used to strengthen building codes throughout the nation. USGS officials, state geologists, and other stakeholders GAO interviewed stated that the program's capacity to meet its mission has been impeded by flat discretionary resources for its core capabilities, such as conducting applied science research or urban hazard assessments.

In response, USGS implemented cost-cutting and cost-saving actions to meet EHP's mission that are consistent with some but not all leading practices for strategic planning, performance measurement, and human capital planning identified in past GAO work. For example, USGS lacks a strategic plan that, among other things, identifies the resources needed to achieve the EHP's mission and goals for all major functions of the EHP, such as conducting applied earthquake science research or urban hazard assessments. Further, USGS has not conducted an analysis of staffing needs consistent with leading practices for effective strategic workforce planning principles, such an analysis could include succession planning and a data-driven assessment of its needs for critical skills and competencies. By developing a strategic plan that identifies the strategies, priorities, and resources needed to reach these goals and conducting a staffing gap analysis, USGS can better ensure it has well-thought-out strategies to achieve results-oriented goals with Congress understanding the tradeoffs USGS made in applying its resources toward its goals.

USGS has made progress implementing seismic stations; however, some challenges remain to fully implement the ShakeAlert system. GAO found that USGS had not followed best practices in establishing schedules, milestones, and timeframes for its ShakeAlert implementation, and has not completed its plan for coordinating outreach with stakeholders. By developing schedules and milestones, USGS will be able to track completion of key activities that impact the overall cost of ShakeAlert. By updating and completing its ShakeAlert outreach plan, USGS can better ensure all stakeholders have a shared understanding of how to communicate and educate the public on the ShakeAlert system.

Engineers Installing an Earthquake Early Warning Seismic Station on Mt. St. Helens



Source: Marc Barc Biundo / University of Washington. | GAO-21-129