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POSSIBLE ROLES FOR THE U.S. GEOLOGICAL SURVEY IN IMPACT HAZARD ANALYSIS AND RESPONSE

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ABSTRACT

Asteroid and cometary impacts large enough to warrant public concern are low probability but high consequence events. A detailed understanding of the physical, social and economic consequences of even a small asteroid or cometary impact would be beneficial to national security, emergency preparedness and the advancement of scientific understanding. The USGS has many decades of experience dealing with infrequent but catastrophic natural hazards including floods, earthquakes, tsunamis, volcanic eruptions, and landslides. In the process, the USGS has developed a variety of tools and procedures that can be applied to understanding the primary and secondary consequences of an impact. These include models for predicting the cooling of the crater and ejecta (from the Astrogeology Program); to assess the likely damage from the ground motion induced by the impact (from the Earthquake Hazards Program); the dispersal of dust in the atmosphere, including the effect on air traffic (from the Volcano Hazards Program); water supply disruption, (Water Resources Program); and the implications for environmental health. Furthermore, the USGS is experienced in coordinating and implementing full-scale, multi-hazards, multi-agency disaster scenarios like “ShakeOut” and “ARkStorm.” ShakeOut has 13.2 million registered participants, including over 8.7 million who plan to participate in a drill on October 18, 2012. These scenarios have been used by emergency managers throughout California and incorporated into federal, state, local, tribal and business catastrophic preparedness plans. The use of this methodology is expanding and now includes international participation. The creation of these disaster scenarios led to new understanding of the vulnerabilities associates with disasters and the fragility of interdependencies that can be address through mitigation and preparedness. In addition, the scenarios

have produced models that have applications beyond emergency preparedness (e.g., CoSMoS and California Landslide Susceptibility Map). These scenarios highlight the value in clearly delineating the information and decision making chain for an event like an impact. The most effective emergency response comes when local leaders are well informed and they articulate the actions to be taken in the most appropriate manner for their local community. This in turn requires building effective relationships between scientists and local leaders, a process that takes significant time and effort to establish and sustain. There is a special challenge in building a reputation for providing reliable information about impact hazards to the public and decision makers when impacts are such rare events. Leveraging the related work of the USGS may be one way to address this issue.