



**EXPLANATION**

- Lahar-Hazard Zones**  
Channels that head on Mombacho volcano are subject to lahars generated by landslides, debris avalanches, torrential rains, and earthquakes. Distal hazard zones are subdivided into four zones on the basis of a range of hypothetical lahar volumes [3].
- Area that could be inundated by a lahar having a volume of 1 million cubic meters. Highest probability.
  - Area that could be inundated by a lahar having a volume of 2 million cubic meters.
  - Area that could be inundated by a lahar having a volume of 4 million cubic meters.
  - Area that could be inundated by a lahar having a volume of 8 million cubic meters. Lowest probability.
- Debris Avalanches**  
Areas now underlain by deposits of debris avalanches.



**NOTE:** Although the map shows sharp boundaries for hazard zones, the degree of hazard does not change abruptly at these boundaries. Rather, the hazard decreases gradually as distance from the volcano increases (small volume events are more common than large volume events). The hazard decreases rapidly as elevation above the valley floor increases. Areas immediately beyond outer hazard zones should not be regarded as hazard-free, because the boundaries of hazard zones can be located only approximately, especially in areas of low relief. Many uncertainties about the source, size, and mobility of future events preclude locating the boundaries of zero-hazard zones precisely.

Numeral in brackets refer to end notes in the report.

Base maps from Nicaragua 1:50,000 scale series: Managua quadrangle, 1972 (2011); Nandaime quadrangle, 1972 (2001); Isla Zapatera quadrangle, 1972 (2001); Río Coco quadrangle, 1972 (2001). If there are no available source Digital Base Maps from Fina Avenier, Inc. Universal Transverse Mercator projection, Zone 18, Horizontal Datum North American 1983, Vertical Datum Mean Sea Level, Spheroid Clarke 1866.

This map is preliminary and has not been reviewed for conformity with U.S. Geological Survey national standards or with the North American Geographic Code. Any use of trade, product, or firm names is for descriptive purposes only and does not imply endorsement by the U.S. Government.

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by  
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