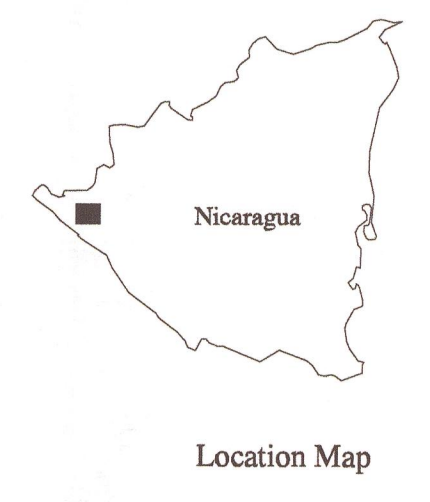


**EXPLANATION**

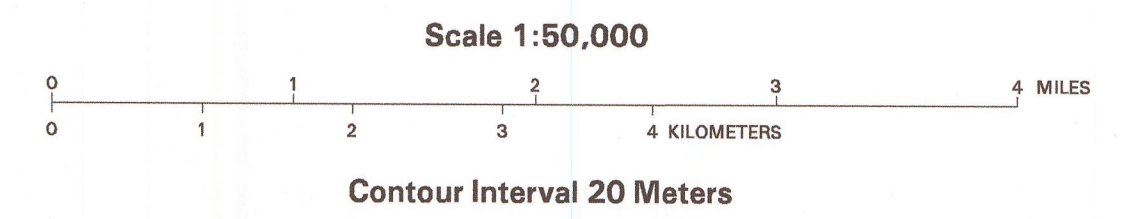
- Proximal Lahar-Hazard Zone**  
 Areas that could be affected by slope failures, avalanches, and lahars from San Cristóbal Volcano. During a single rainfall event, or earthquake, some drainages may be affected by avalanches and lahars, while others may be completely unaffected. Avalanches and lahars originate within the proximal hazard zone, but are likely to move farther downstream and beyond the limit of this zone.
- Distal Lahar-Hazard Zones**  
 Channels that head on San Cristóbal Volcano are subject to lahars triggered by torrential rains and earthquakes that generate landslides, avalanches, and lahars. Distal lahar-hazard zones are subdivided into four zones on the basis of a range of hypothetical lahar volumes [5]. A fifth zone includes areas likely to be inundated by floods and watery debris flows.
- Area that could be inundated by a lahar having a volume of 125,000 cubic meters. Highest probability.
  - Area that could be inundated by a lahar having a volume of 250,000 cubic meters.
  - Area that could be inundated by a lahar having a volume of 500,000 cubic meters.
  - Area that could be inundated by a lahar having a volume of 1 million cubic meters. Lowest probability.
  - Area that could be inundated by watery debris flows and floods.



**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: Tonalá quadrangle, 1964 (2754 II); Villa 15 de Julio quadrangle, 1971 (7) (2854 III); Chinandega quadrangle, 1971 (2753 I); Telus quadrangle, 1973 (2853 IV); from best available source. Digital Base Maps from Trimble Avenor, Inc. Universal Transverse Mercator projection, Zone 16, Horizontal Datum North American 1927, Vertical Datum Mean Sea Level, Spheroid Clarke 1866.



This map is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards or with the North American Stratigraphic 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  
 J.W. Vallance, S.P. Schilling, G. Devoli, M.E. Reid, and M.M. Howell  
 2001

