Seismic Hazards Along the Lake Mary Fault, near Flagstaff, Arizona.

by Danielle C. Cox

A Thesis

Submitted in Partial Fulfillment

of the Requirements for the Degree of

Master of Science

in Geology

Northern Arizona University

December 2001

Approved:

David Brumbaugh,
Committee Chair

Paul Morgan,
Committee Member

Richard Holm,
Committee Member

Douglas B. Bausch
Doug Bausch,
Committee Member

ABSTRACT

SEISMIC HAZARDS ALONG THE LAKE MARY FAULT, NEAR FLAGSTAFF, ARIZONA.

DANIELLE C. COX

Seismic hazard is an important issue for the city of Flagstaff. Flagstaff is located within the Northern Arizona seismic belt and is situated just north of the Lake Mary fault, an active fault within the Cataract Creek fault system. The goal of this investigation is to evaluate, for the city of Flagstaff, the seismic hazards along the Lake Mary fault. Methods involved in the seismic study included surface mapping, seismic refraction surveys, analysis of historical seismic data, computer modeling of gravity and magnetic data and use of HAZUS™ to evaluate the seismic hazard for Flagstaff.

The GIS program HAZUS, developed by the Federal Emergency Management Agency (FEMA) was used to estimate possible losses (economic/casualties) from potential earthquakes. By using HAZUS to simulate five earthquake scenarios along the Lake Mary fault (and Ashurst Run fault), loss estimates have been made for the city of Flagstaff in the event of a future earthquake. Results from HAZUS forecast that a Mw 6.9 earthquake along the Lake Mary fault could produce damage totaling $930 million and 11

fatalities. The city of Flagstaff would face as many as 530 minor injuries as well as essential facilities (including fire/police stations, hospitals, and schools) suffering at least slight damage.

The computer program HAZUS, along with geophysical investigations, including gravity, magnetics, and seismic refraction, aid in providing additional information concerning the Lake Mary fault. These methods assist in the awareness of potential earthquake hazards possibly having a major effect on the city of Flagstaff sometime in the future.

Table of Contents

List of Tables

List of Figures

A complete text version is located at [NAU's Cline Library]