A Post-Earthquake Investigation in the Eastern United States

AEG Webinar

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BECHTEL

LCI
Lettis Consultants International, Inc.

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OUTLINE

- Introduction
- Investigation Objectives
  - East Coast Earthquakes
  - Mineral, Louisa County, Virginia M5.8
  - Piedmont-Central Virginia Seismic Zone
  - CEUS SSC
- Scope of Investigation
  - Pre-Field Work
  - Field Work
- Conclusions

Poll Question 1

- How many of you are full member of AEG?
- How many of you are student members of AEG?
- How many students are non-members?

INTRODUCTION

- M 5.8 Earthquake - August 23. 2011
- Louisa Co, VA near Mineral
- North Anna Nuclear Power Plant – safe shutdown
- Did you feel it?
- 148,327 respondents to the USGS
- Widely felt in eastern North America

Poll Question 2

- Did you feel ground motion from the Mineral Earthquake?

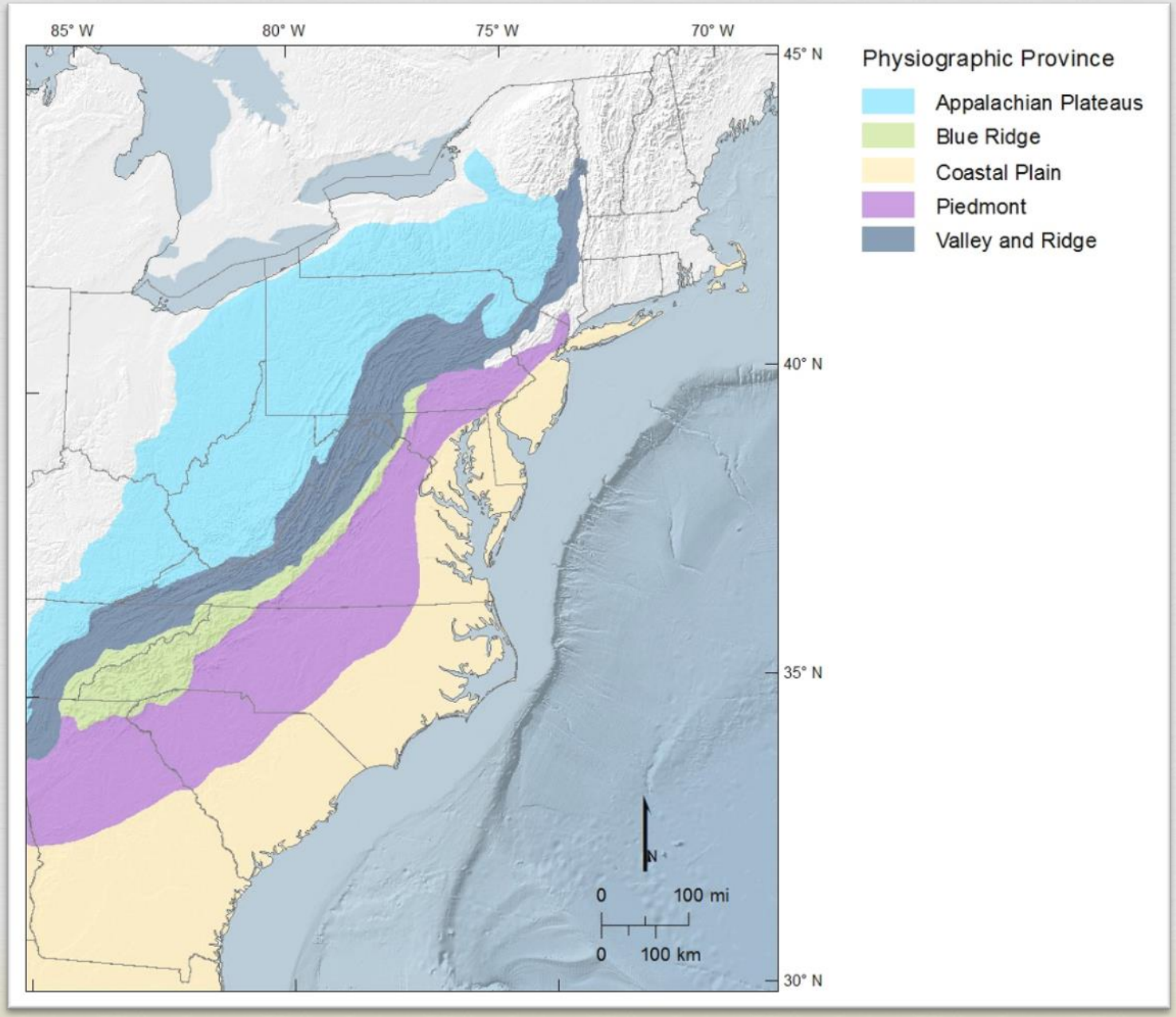
INVESTIGATION OBJECTIVES

- Did the Mineral EQ produce surface faulting?
- Are there geomorphic indications of surface deformation?
- Should the rupture plane be considered a new seismic source?

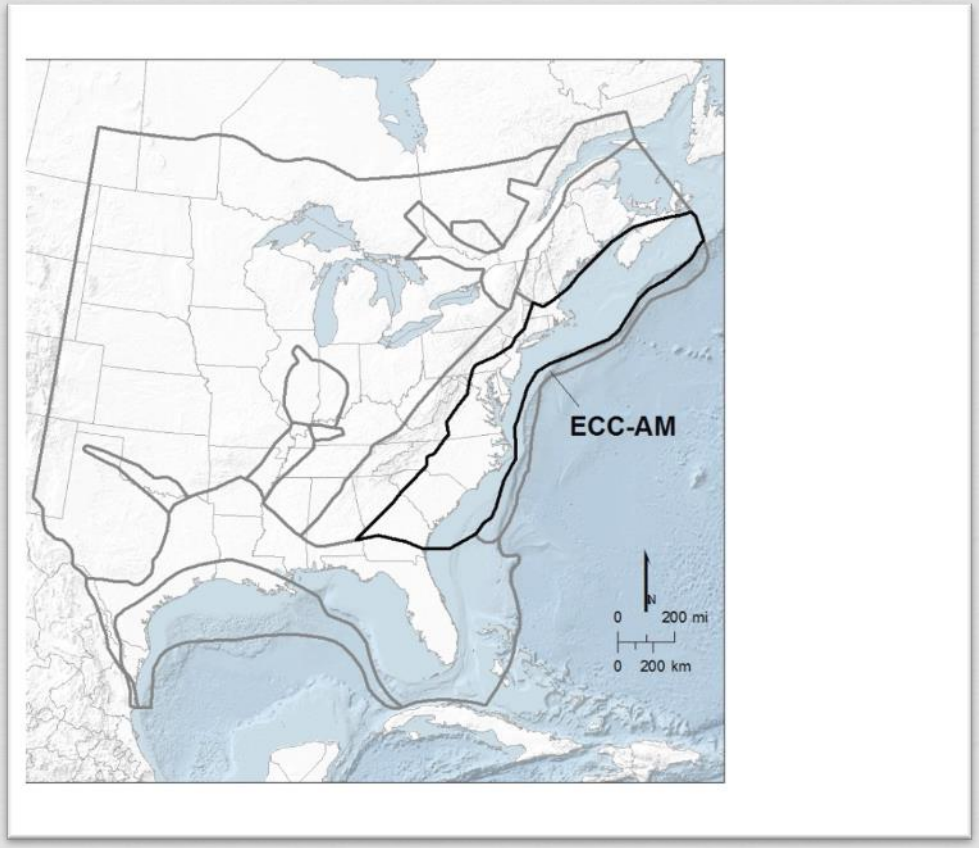
Poll Question 3

- How many of you are certified or licensed professional geologists?
- How many of you are licensed professional engineers?

GENERAL LOCATION



CEUS Seismic Source



PREVIOUS EQs

Relatively Close to Mineral EQ

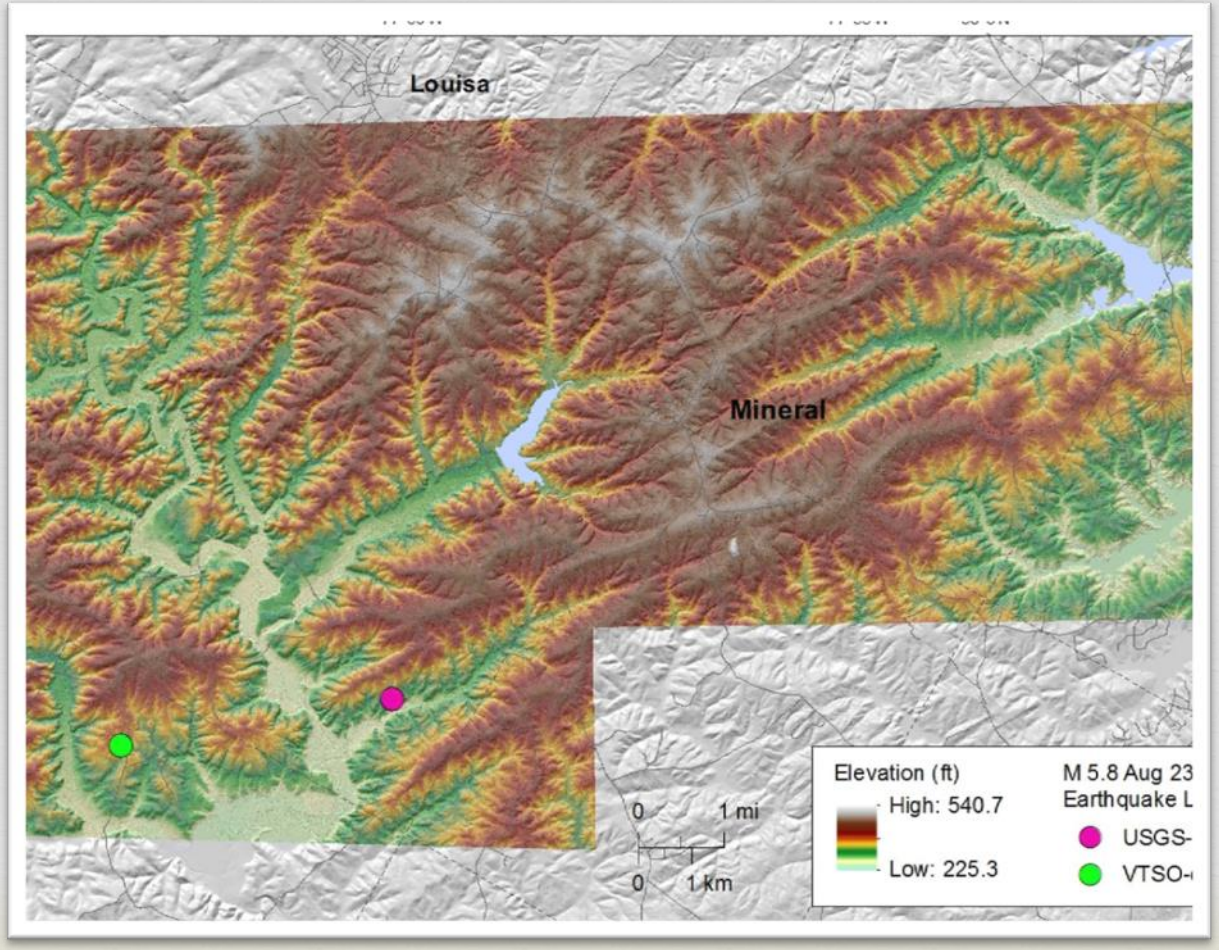
- Mb 5.0 Goochland Co. VA 1875
- Mb 5.8 Giles Co. VA 1887
- M 4.5 Goochland Co. VA 2003
- M 3.4 Germantown, MD 2010

SCOPE OF INVESTIGATION

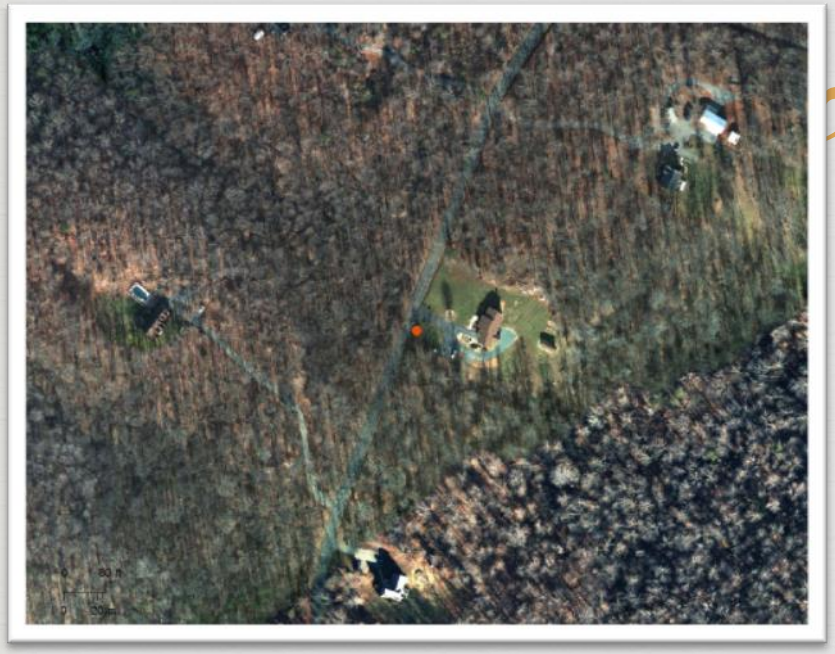
PRE-FIELD

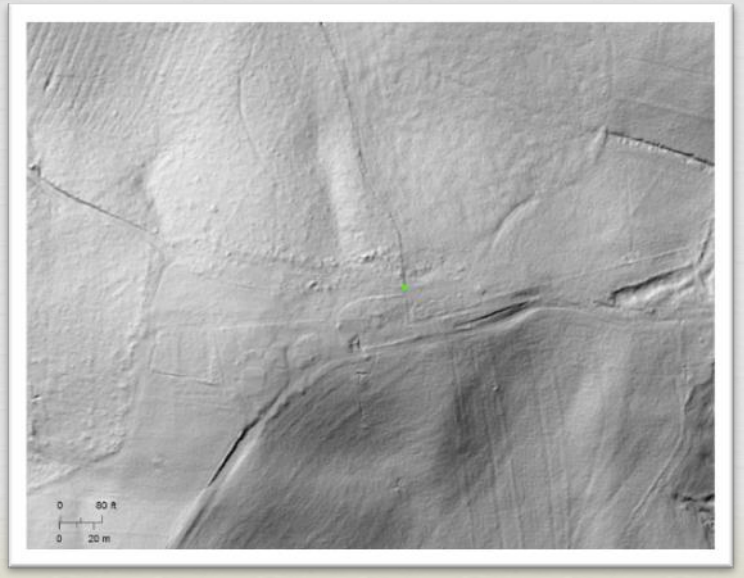
- Acquire Lidar Data
- Obtain Available Information
  - Geologic Maps
  - Seismologic Data
  - Preliminary Interpretations
- Contact Researchers
- Attend Technical Meetings

LIDAR SURVEY

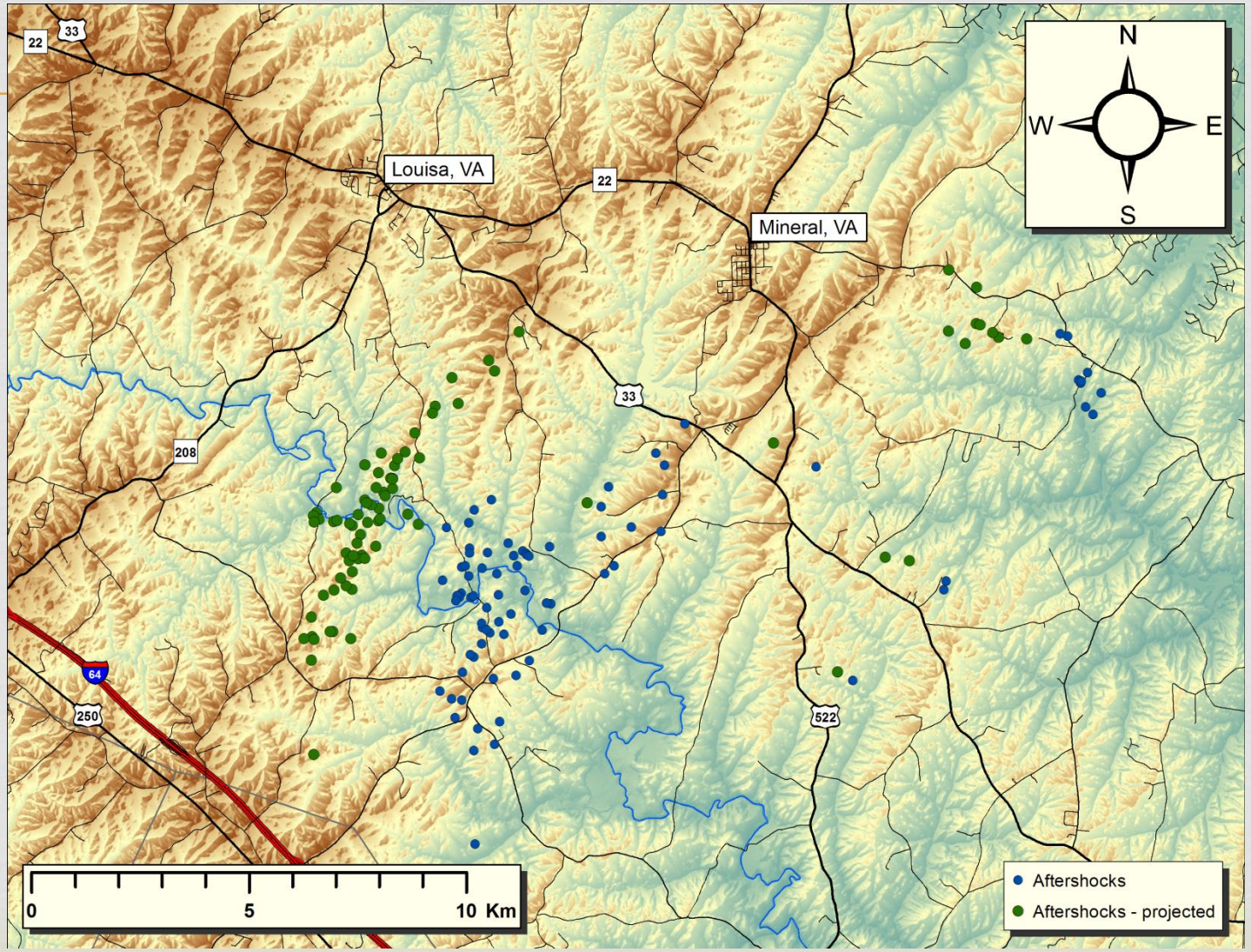


ADVANTAGES OF LIDAR

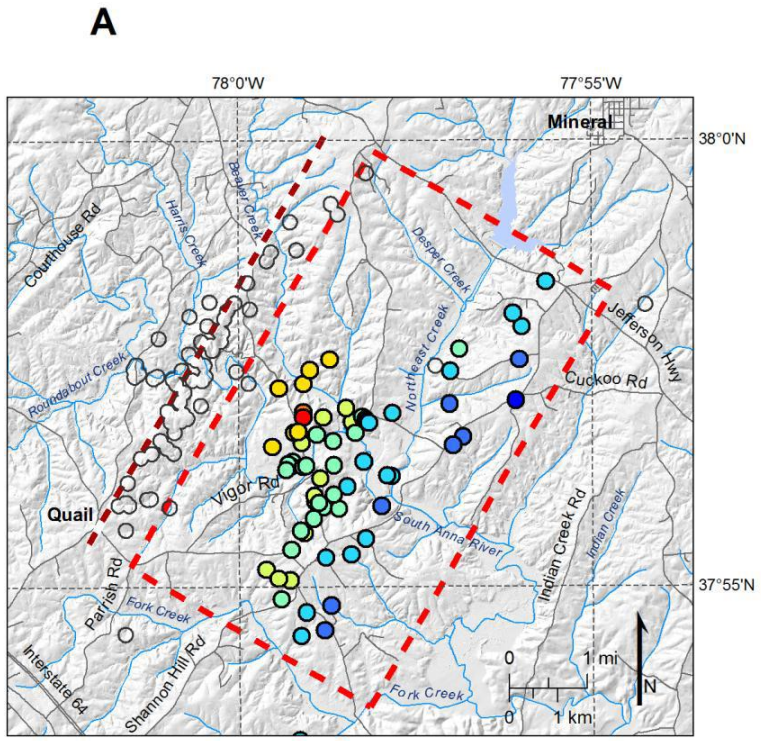


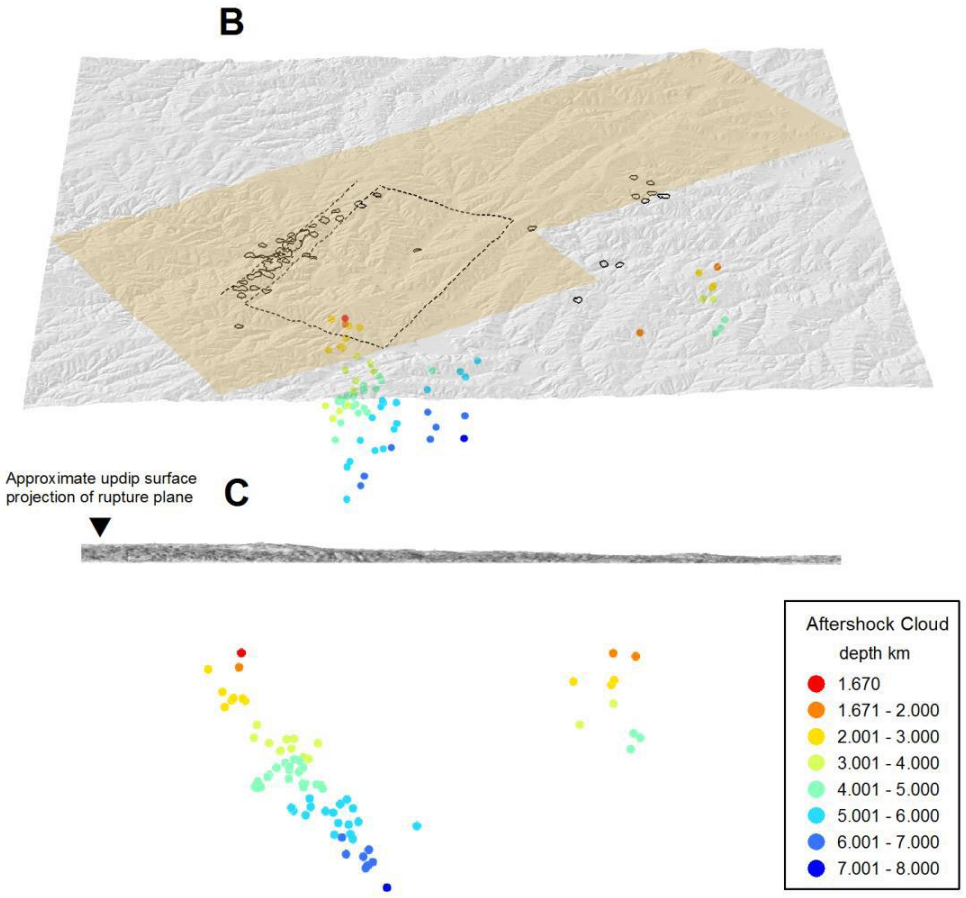


AFTERSHOCK EVENTS

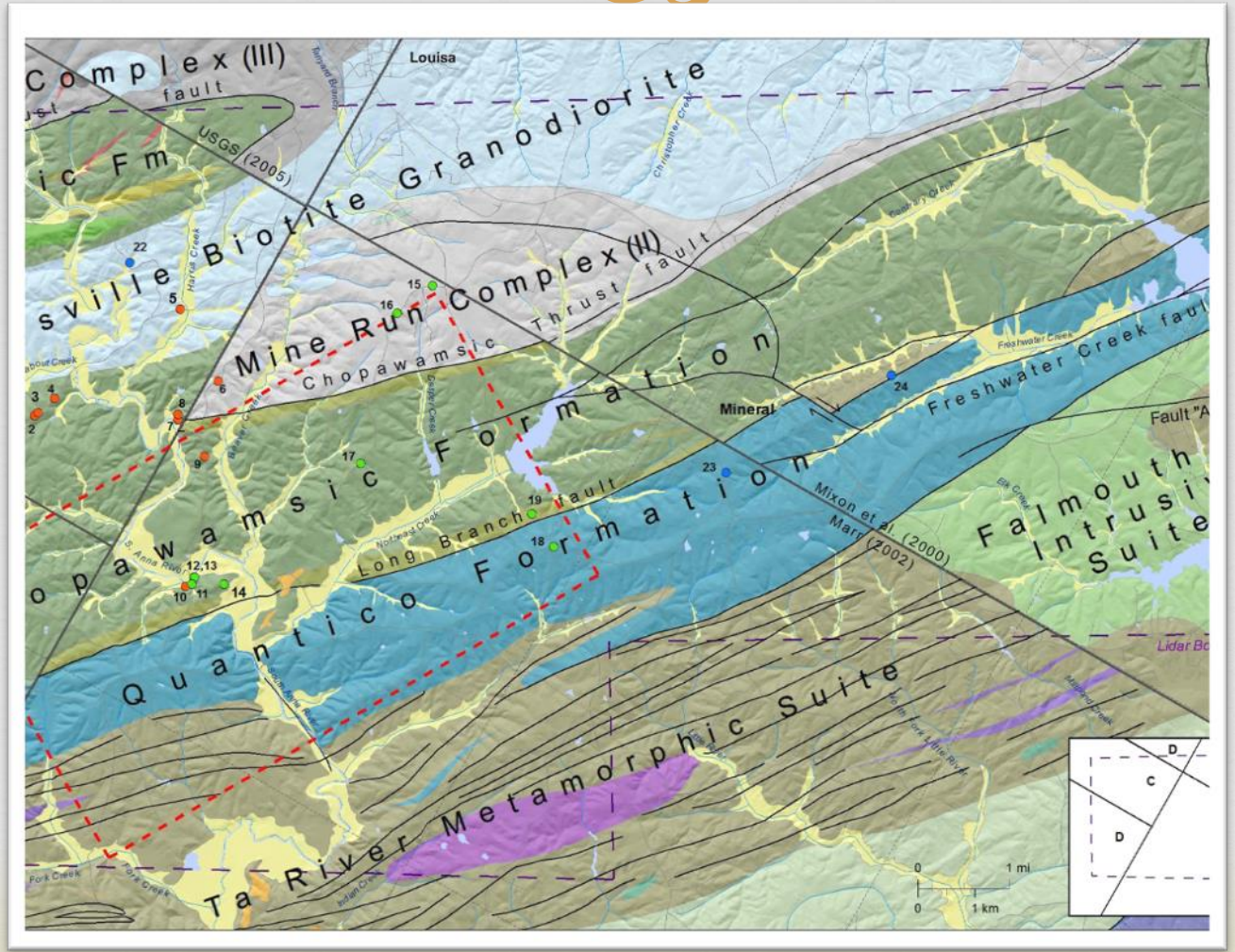


ANALYSIS OF AFTERSHOCKS





COMPOSITE GEOLOGIC MAP

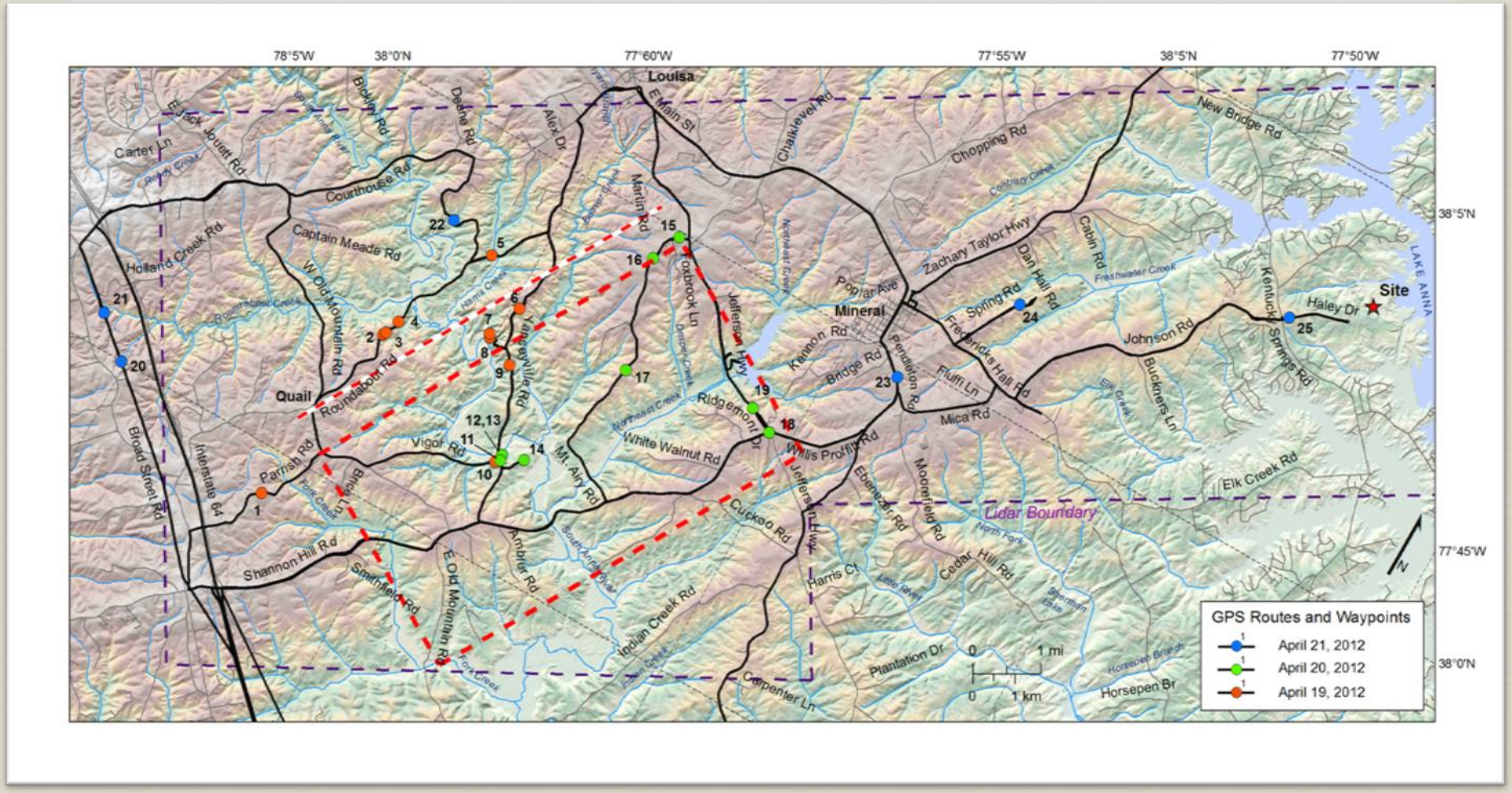


SCOPE OF INVESTIGATION

FIELD WORK

- Plan Field Work
- Discuss Access
- Document Observations at GPS way points
- Observe Damages

ROUTES & WAYPOINTS



DAMAGED ROOF IN MINERAL, VA

Piedmont Weathering

Ellisville Pluton above Harris Creek Alluvial Terrace

ELLISVILLE PLUTON

Old Yancey Mill – site of sand boils after EQ

SANDBOILS

CHOPAWAMSIC FM

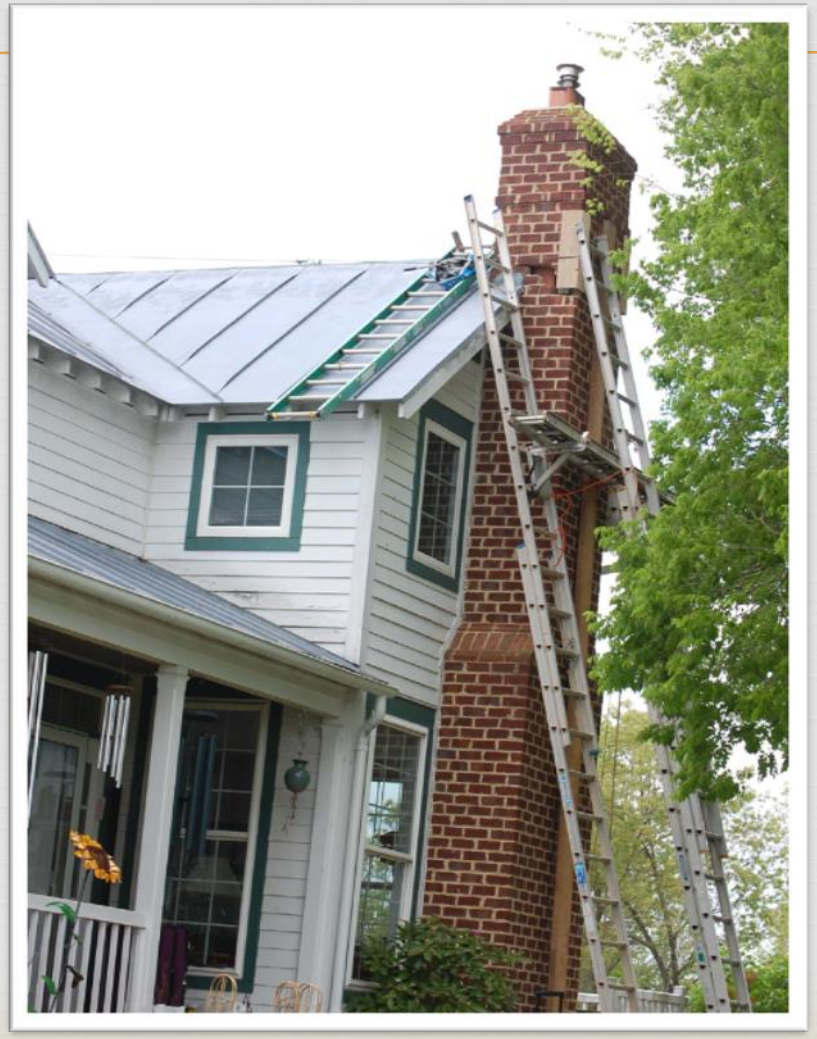
PIEDMONT LITHOLOGIES

SLIGHT EQ DAMAGE

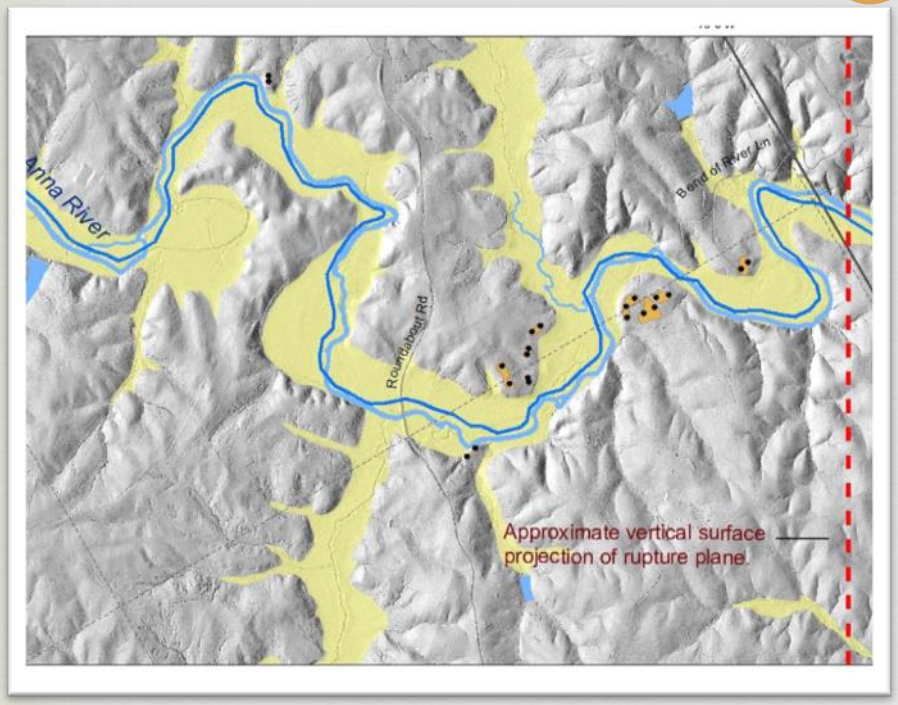
USGS EPICENTER LOCATION

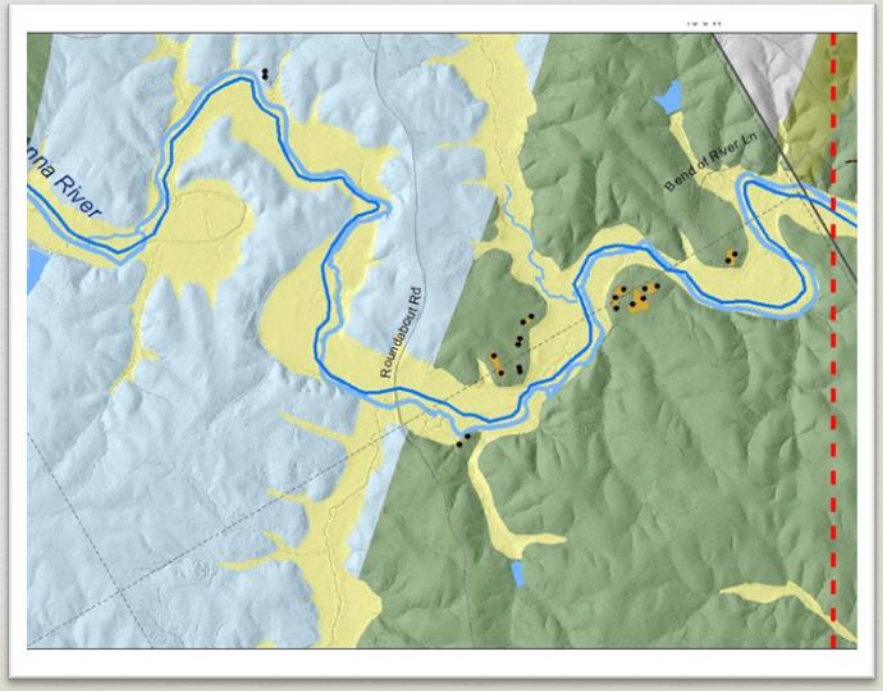
FOUNDATION DAMAGE

CHIMNEY DAMAGE



GEOMORPHIC STUDY

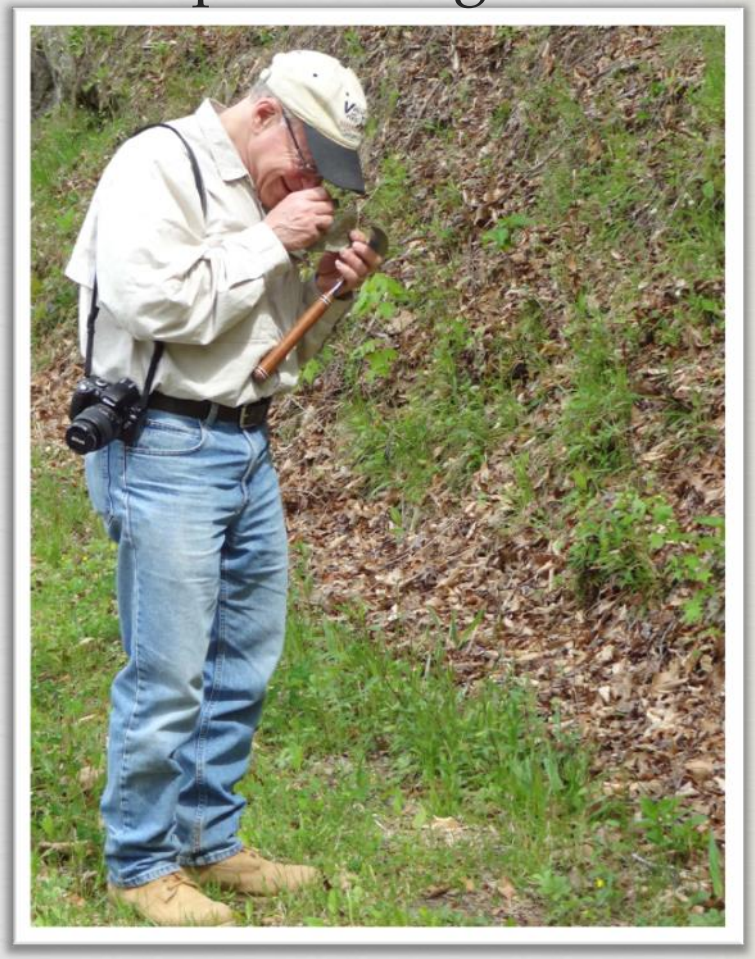




CONCLUSIONS

- Absence of Surface Faulting
- Absence of Geomorphic Indicators of deformation
- No Data on Mmax
- No Data on Slip Rate or Recurrence
- Not a New Seismic Source

Dave keeps looking!




Any
Questions?