Seismometers and Seismicity in Maryland

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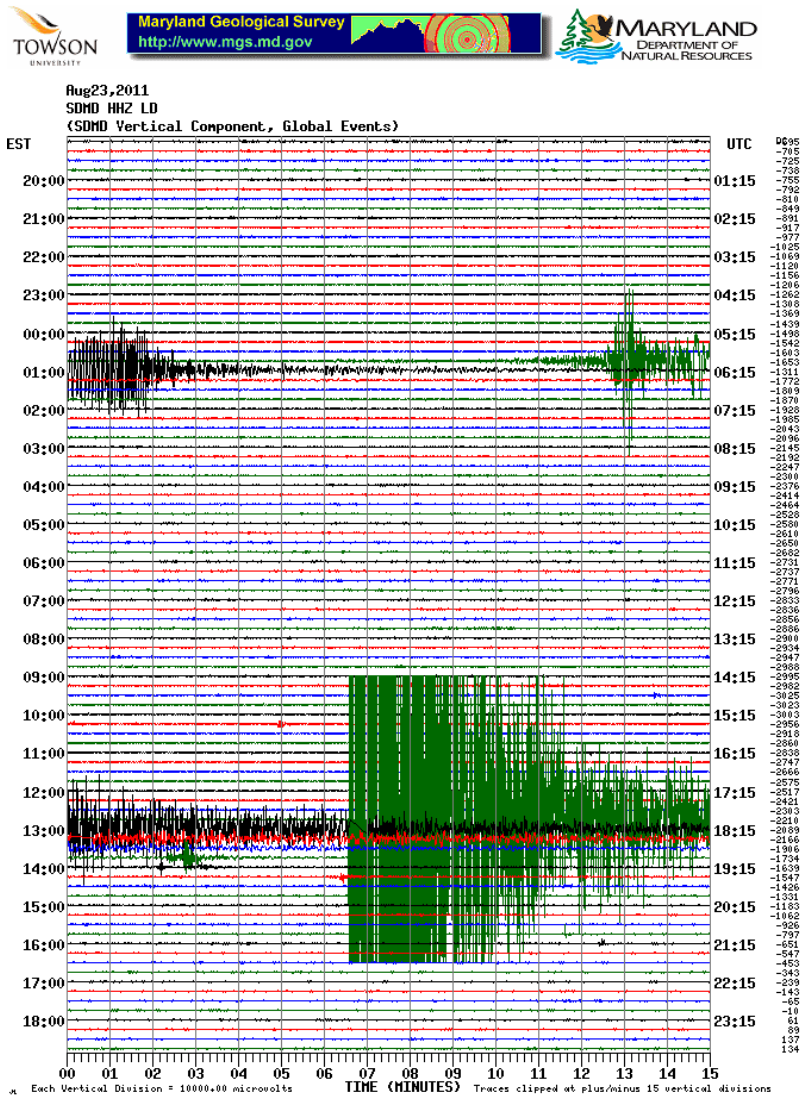
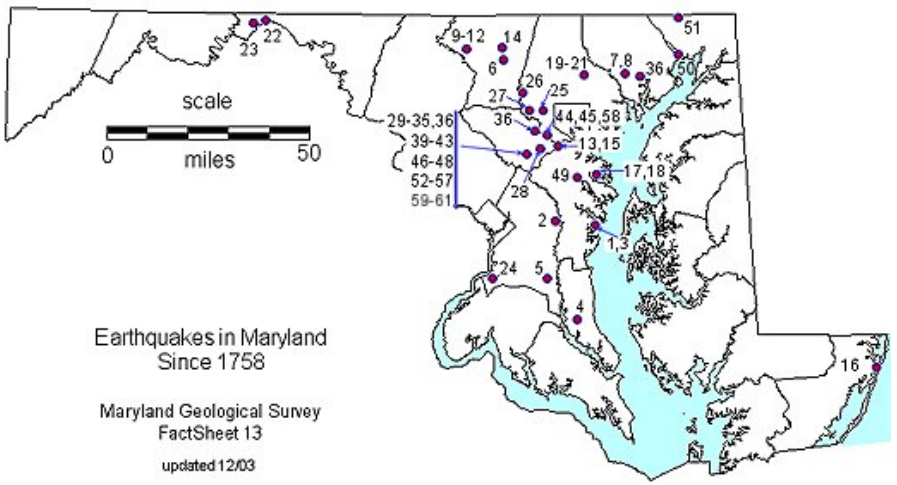
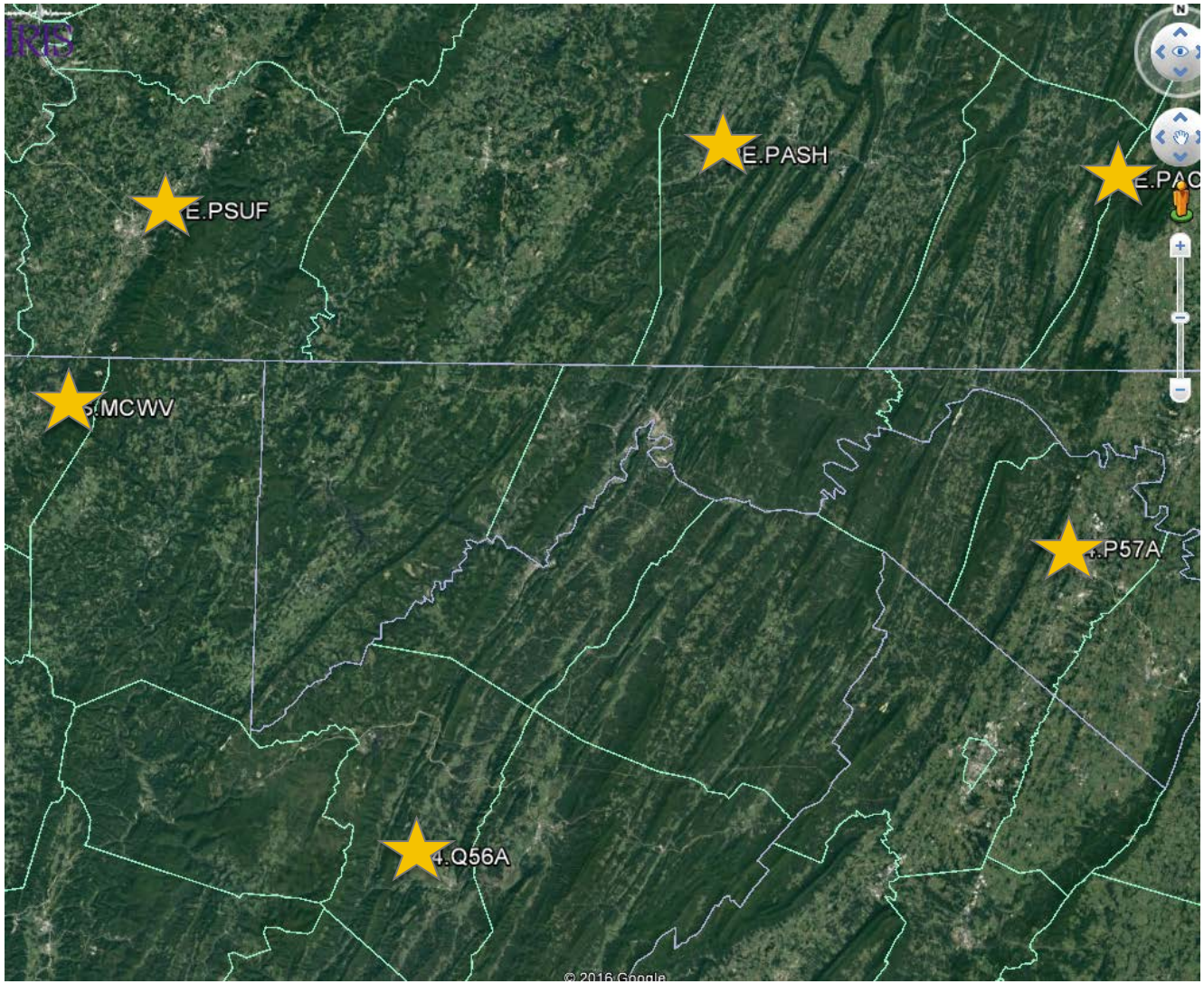




Seismometers around Western Maryland



–Six Seismometers surround Western Maryland

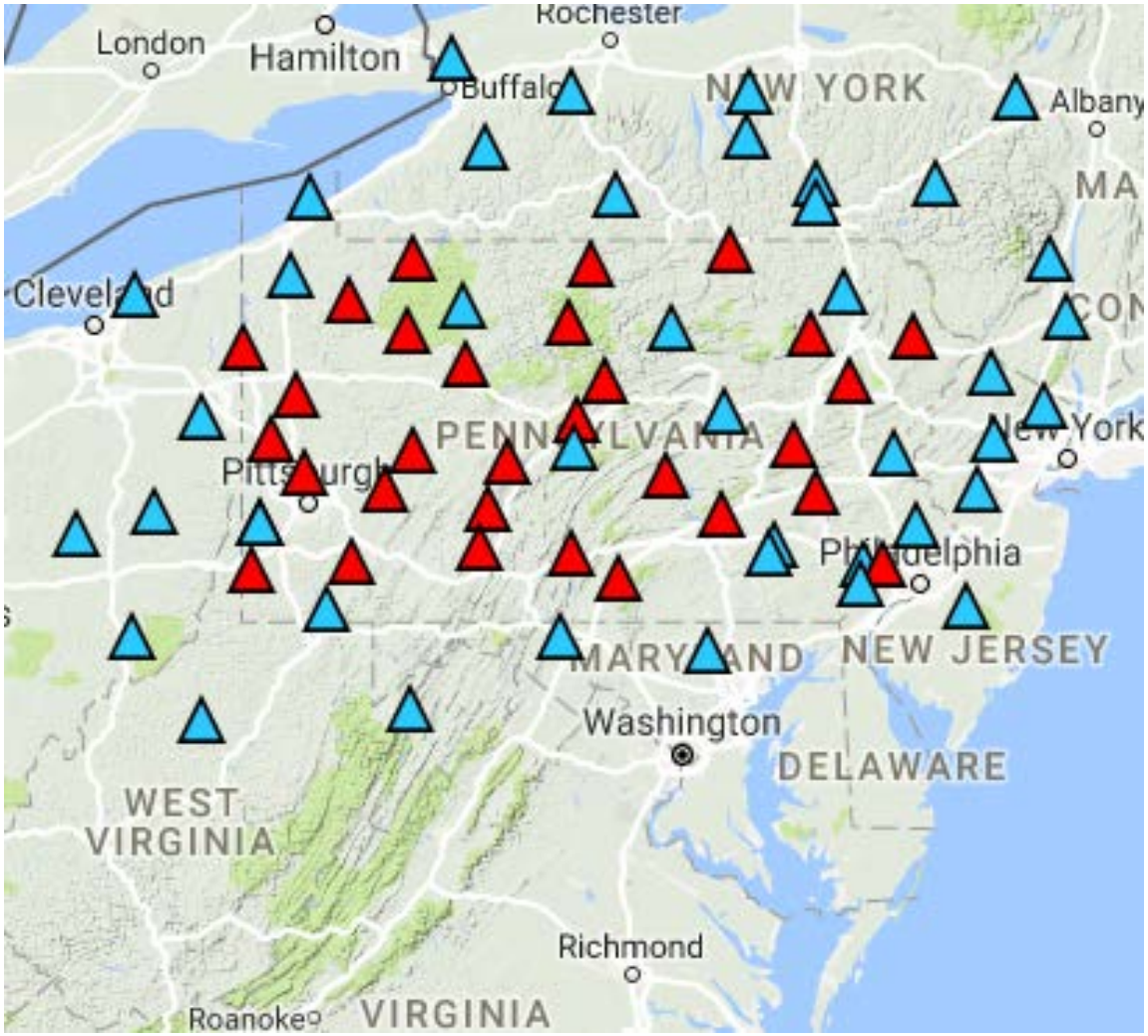
–Three Seismometers are newly installed Pennsylvania seismometers operated by Penn State. These only started broadcasting realtime data three months ago.

–Mont Chateau, West Virginia is a Long term seismometer that has demonstrated significant noise based upon location and is only valuable for large earthquake determination. It is a long term station which will likely be operational for many years.

–The two southerly seismometers were designed to be transient seismometers. Their funding is limited at this time.

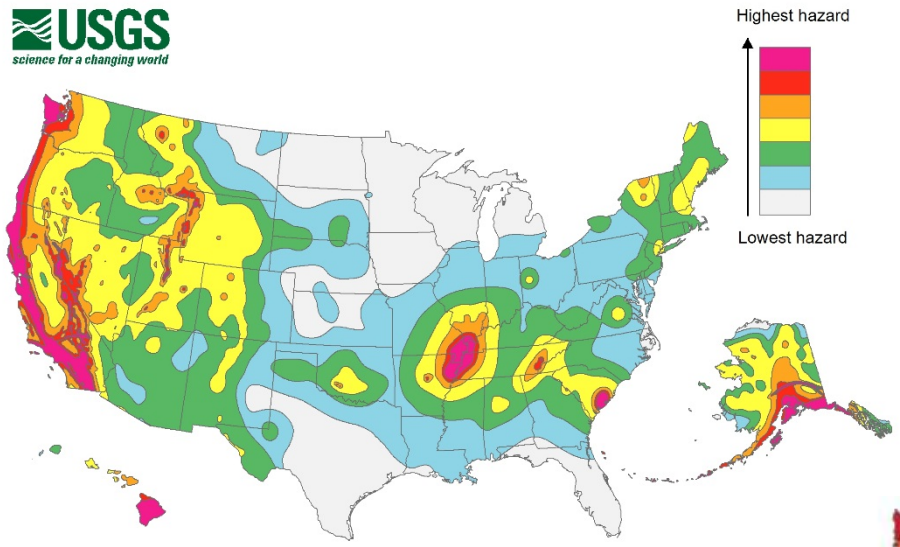
–These seismometers can easily detect M3.0+ events.

Pennsylvania State Seismic Network



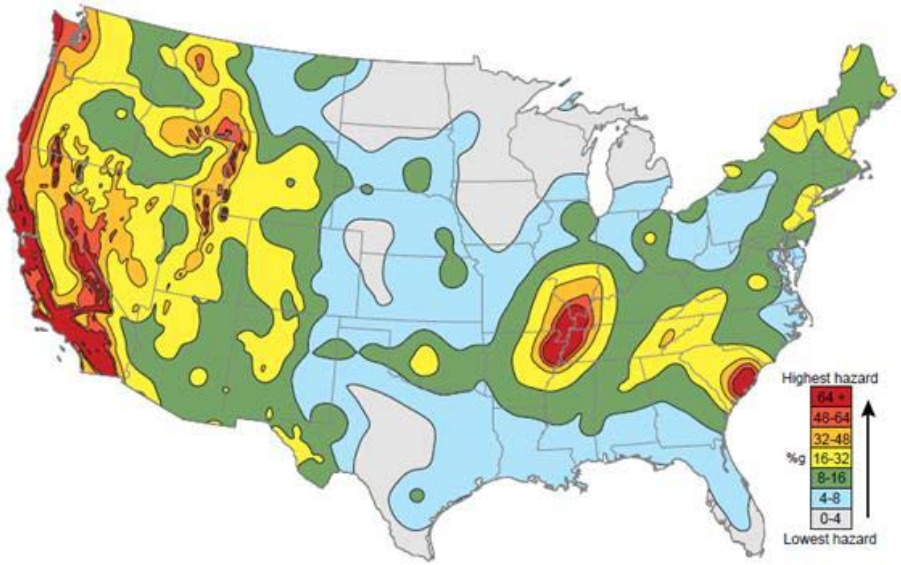
–**Red Stations are new Stations installed by Pennsylvania within the last year.**

Why Do we Care?

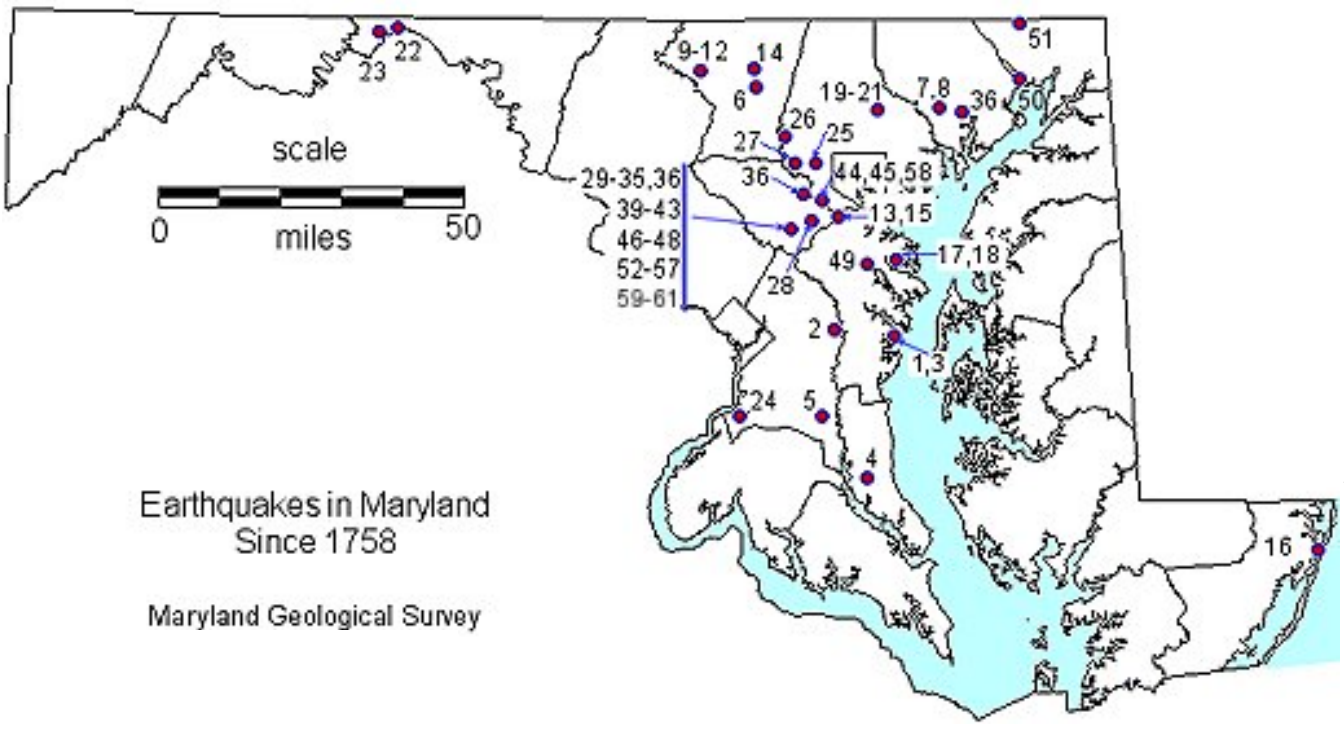


–Earthquake risk maps place probability of damage due to an earthquake in the Moderate category for Maryland. These probabilities are for natural seismic events.

–%g is a variation of gravity. For example, a 10% g force means that a 150 pound person would feel that they weight 135 lbs, then 165 lbs, then back to 135 lbs over several iterations during an earthquake. This is more than enough to cause one to collapse.



Earthquakes Do Occur in Maryland



68 Earthquakes that had their epicenters in MD or were considerably felt in MD have been documented since 1758.

With the exception of Mineral, VA, the range of these earthquakes is M1.0 -M3.7

–Many more earthquakes have occurred at the lower magnitudes but not enough measurements are available to document and determine the location and magnitude of the earthquake.

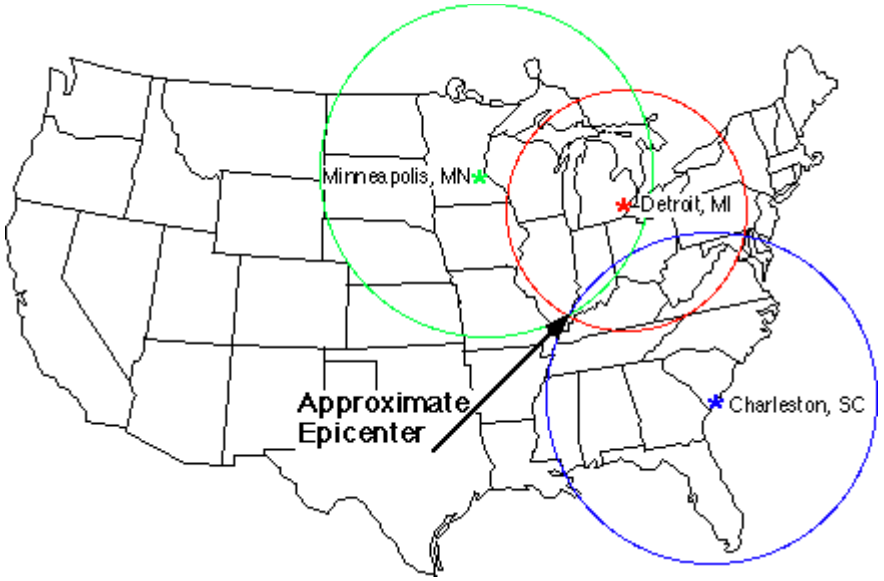
- Generally, people can feel a M2.0 or greater earthquake.

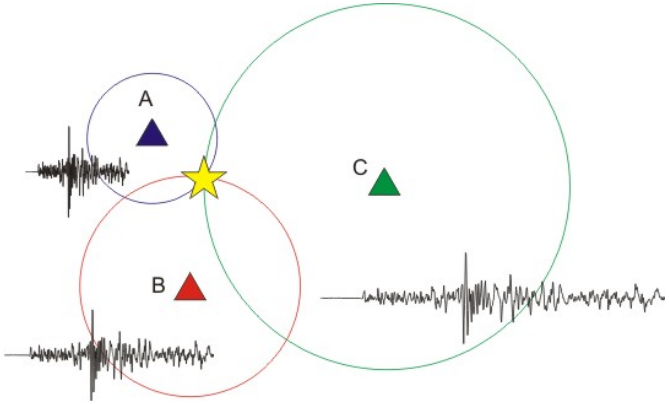
Induced Seismicity

- Induced Seismicity is any seismic event created by manmade activities:
  - Construction of a Reservoir/Lake; removal of same
  - Large dewatering operations
  - Mining / Construction operations; Blasting
  - Railroad operations
  - Waste Water Disposal
  - Geothermal Well Cycling (industrial; not home geothermal)

- Maryland can regulate these practices in MD; however, MD can not regulate surrounding States.

Location, Location, Location





- A minimum of three seismometers are needed to determine the location of an earthquake. The earthquake signal must be observable and distinguishable on each seismometer signal.

Best Location to Monitor Seismic Events in Western MD

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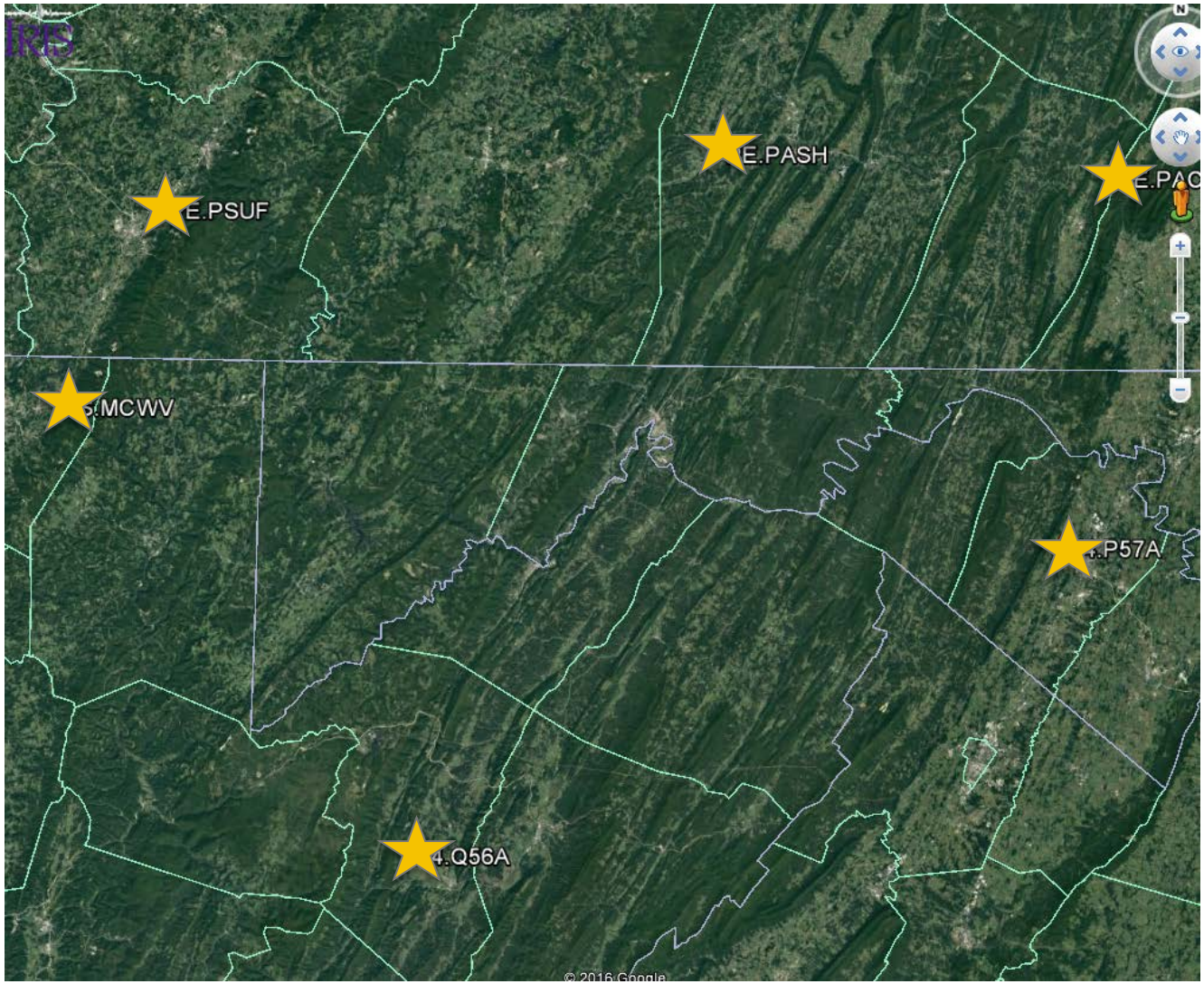

–Best is a tradeoff of logistics, management, long term ownership, cost, and signal quality.

Ideal Site:

- ¼ mile or greater from road
- 1 mile or greater from railroad
- Is owned by the government or other long term land tenant
- Has Internet within 100 yards of site
- Has power within 100 yards of site
- Has bedrock within 2 to 3 feet of surface.
- Is seismically quiet (no water pumps, motors, powerlines, trees, etc. that make motion into ground)
- Has tenant that could perform minor checks and maintenance.

Goal: Best Coverage in Western MD for Long Term Measurements

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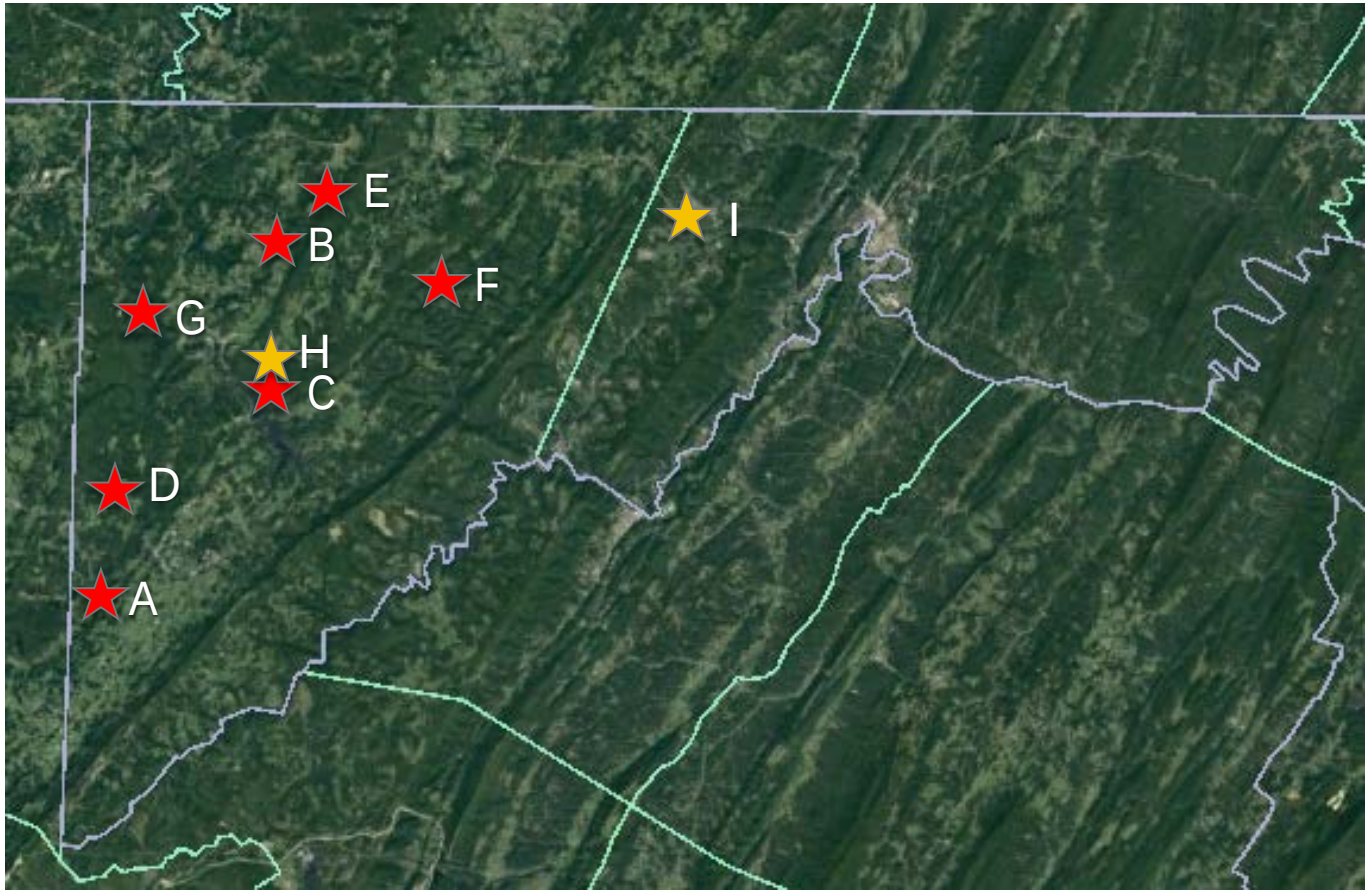
Potential Sites for Installation



A. Crellin Elementary School
B. Accident Elementary School
C. Deep Creek Lake State Park
D. Herrington Manor State Park / Swallow Falls
E. Bear Creek Fish Hatchery
F. New Germany State Park
G. Sang Run Rd. Property

H. Garrett College
I. UMCES Appalachian Labs

Other Sites?

- We welcome any input to explore other sites. Please email suggestions to Richard.ortt@Maryland.gov

- Scientific Needs – Quiet, not near highways, no pumps, no railroad tracks, on bedrock.

- Logistic Needs – Power source, Internet connection within 100 meters, long-term property agreement.

What Does a seismometer Look Like?

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