

JULY 14, 2026: RESPONSE TO QUESTIONS FOR DR. NICHOLAS W. HAYMAN

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Regarding June 25, 2026 Testimony Before the House Committee on Natural Resources
Subcommittee on Energy and Mineral Resources

Regarding Reauthorization of the U.S. Geological Survey's Earth Mapping Resources Initiative
(Earth MRI)

From Representative Stauber: In his testimony, Dr. Williams noted that the relationship between the USGS and State Geologists is central to the success of Earth MRI. In your view, how can the Association of American State Geologists and its members help ensure state geological surveys are not only aware of emerging mapping technologies, but also feel empowered to recommend and request the most appropriate geophysical tools, including higher-resolution surveys, when they believe those technologies could improve geological understanding?

Hayman Response: The American Association of State Geologists (AASG) and its member states have the “boots on the ground”. State Geologists and their staff typically know the local and regional geophysical contractors, have good relationships with University research groups, and keep up with science and engineering conferences and publications. State Geologists and their surveys not only are familiar with the latest in geophysical applications, but also implement these applications locally.

The regular meetings of the AASG provide opportunities for the state geological surveys to exchange information and hear from industry and academic partners on geophysical applications. For example, at the 2025 AASG mid-year meeting we heard presentations from Devon Energy, Metallic Minerals, and Colorado School of Mines, all of whom presented applications of geophysics to geothermal energy, mineral prospecting, and data science.

The science of geological sciences has become very interdisciplinary over the years, and nearly all geologists use geophysical techniques and data in some way, shape, or form. However, state surveys vary in how much they support geophysical investigations with in-house resources. In contrast, all surveys conduct some amount of geological mapping and sampling, and are the leaders in the “map baby map” approach articulated by Director Burgum. Therefore, a common way state geological surveys support geophysical work is by coordinating geological mapping with geophysical surveys. The geophysics-geology coordination is a hallmark of the Earth-MRI program, wherein USGS arranges the aerogeophysical surveys with private contractors, and the state surveys conduct the geological work in the same area¹. When combined, a powerful view of the surface and subsurface geology emerges, with layers of geology, geochemistry, and geophysics over the same areas of interest. Such integration of geophysical, geochemical, and geological data is standard practice internationally and serves as the backbone of a resource evaluation program.

Earth MRI also serves as an important workforce development program, providing opportunities for students and early-career geoscientists to gain experience in geologic mapping, geophysics, geochemistry, data science, and resource evaluation through collaborations among state surveys, universities, and federal agencies.

From Representative Gosar: How can Earth MRI data help the U.S. remain competitive with supplies of critical minerals in foreign countries, and thus prioritize domestic mining projects over foreign sources?

Hayman Response: Earth-MRI data is ‘precompetitive’, meaning that it is discoverable and accessible in the public domain, but then serves to drive private competition. As a result, there is a significant return on investment (ROI) from the types of data collected by Earth-MRI^{2,3}. A common example of a national effort to support pre-competitive data acquisition is Australia, where ROIs for greenfield (new resource identification) of 3-5X are commonly cited, with joint investments of up to 15:1 of private:public spending⁴. By providing high-quality baseline geoscience information upfront, Earth MRI reduces exploration risk, helps identify the most prospective areas for investment, and provides regulators and communities with the information needed to make more informed decisions.

Globally, brownfield (e.g., mine waste) development follows similar trends⁵, with national investment by countries such as Chile positioning them for leadership in several mineral-system production areas. In my experience with Oklahoma, such brownfield efforts are opening avenues for industry, who cannot afford the up-front costs needed for scientific resource identification, or take the risks associated with developing old sites.

One aspect of national efforts for pre-competitive resource studies are core and data repositories. The State Geological Surveys host enormous amounts of samples and data that can be used for pre-competitive data. Again, Australia serves as an example where a National Virtual Core Library provides nationwide data for the top mile of the Earth’s crust⁶. In the US, the states conduct such efforts through collaboration with the USGS and the Earth-MRI program, though the national effort is so-far funded at a few percent of similar efforts in other nations, and far less coordinated. State geological surveys serve as long-term stewards of these samples and data, ensuring that information collected today remains accessible for future scientific research, resource evaluations, and emerging technologies. AASG is committed to supporting state-level efforts for pre-competitive data acquisition, preservation, and access.

Although initially developed to support critical mineral supply chains, Earth MRI datasets are also proving valuable for geothermal resource assessments, groundwater studies, carbon storage evaluations, abandoned mine lands investigations, and geologic hazard characterization.

From Representative Gosar: Would the creation of a mining oversight board create competition and encourage greater investments in domestic mining?

Hayman Response: AASG’s primary focus is on the upstream side of resource development. Additionally, many of our member states are either regulators or partner with regulatory

agencies. As such we take no position on the development of such a national oversight board, but would be happy to provide input or recommendations if such a plan develops.

References

1. <https://ngmdb.usgs.gov/emri/#3/40/-96>
2. <https://profession.americangeosciences.org/collections/publications/geological-mapping-economics/>
3. <https://pubs.nbmj.unr.edu/Nevada-Precompetitive-Data-Survey-2025-p/pds-2025.htm>
4. https://www.aph.gov.au/parliamentary_business/committees/house_of_representatives_committees?url=isr/resexp/chapter4.pdf
5. <https://doi.org/10.1016/j.oneear.2025.101563>
6. <https://www.tandfonline.com/doi/full/10.1080/08120099.2026.2693906#abstract>