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House Committee on Natural Resources
Subcommittee on Energy and Mineral Resources
"Beneath the Surface: Earth MRI and America's Resource Potential"
Thursday, June 25, 2026

Introduction

Chairman Stauber, Ranking Member Ansari, and Members of the Subcommittee, thank you for the opportunity to testify. My name is Graham Lederer. I am a professional geologist working at the intersection of artificial intelligence and critical minerals at Jataware. For ten years before that, I served at the U.S. Geological Survey, where my work focused on mineral resource assessment and economic geology. I offer this testimony from both vantage points: as a former federal scientist who worked with exploration data, and as a private practitioner who sees how industry and AI systems use it.

My message is direct. Earth MRI is doing what Congress mandated it to do, yet the work is unfinished. In authorizing the program, Congress required completion of a comprehensive national modern surface and subsurface mapping and data-integration effort by November 15, 2031, but authorized funding only through fiscal year 2026 (30 U.S.C. 31l). That authorization expires this year. The question before the Subcommittee is whether to reauthorize and fund Earth MRI through completion of the national effort that Congress has already mandated. I urge you to do so.

The objectives of Earth MRI have remained clear throughout several administrations. The initiative was officially launched in 2019 and accelerated by the bipartisan Infrastructure Investment and Jobs Act in 2021, and has since partnered with 40 states and territories to roughly triple the area of the country covered by high-quality airborne geophysical surveys (USGS, 2024). Despite considerable progress, modern high-resolution coverage remains limited to a fraction of the nation, and the complete dataset required for a comprehensive national mineral assessment is unlikely to exist before the current funding expires (NASEM, 2025). Stopping now would leave a congressionally mandated effort half-finished, just when momentum is at its highest in decades and the urgency of critical mineral issues facing the nation has increased.

How the Private Sector Uses Precompetitive Data

What happens to the data once it is disseminated, and why is public data decisive for private investment?

Earth MRI produces what the industry calls precompetitive data, foundational geoscience information that any company, university, or individual can obtain at no cost. Congress specifically required that this data be made electronically and publicly accessible (30 U.S.C.

31l). That requirement is what makes Earth MRI a catalyst for private investment rather than a substitute for it. The public availability of the data is the mechanism by which a relatively modest federal outlay mobilizes far larger private spending on exploration.

Exploration is a process of narrowing a search space. A company begins with a broad region and, through successive rounds of data acquisition, narrows it toward discrete drill targets. At each stage, it faces a decision to drill, deal, or drop, weighing the cost of acquiring more information against the value that information provides. Exploration and evaluation, the first phase of any mining project, commonly takes from two to ten years. Reliable precompetitive data compresses those timelines and lowers the risk attached to each decision. In its absence, an area is often perceived as less prospective, and capital moves to better-characterized jurisdictions abroad. The Fraser Institute's Annual Survey of Mining Companies captures this directly, treating the quality of a jurisdiction's geological database as a factor in companies' investment decisions (Mejía and Aliakbari, 2026). A recent survey of explorers in Nevada found the same pattern at the state level (Jowitt and Fisher, 2025).

Comprehensive data even has value where it finds nothing. Confirming that an area is barren is itself worth paying for, because it lets a company rule the area out and redirect capital. Reducing geological uncertainty by identifying both true positives (mineralized) and true negatives (barren) is the core objective of geologic exploration, and it enables companies to focus on the remaining economic, technical, and other risks.

The economic justification for Earth MRI can be inferred from analyses of comparable national precompetitive geoscience programs. For example, a study by Geoscience Australia estimated returns on public investment of about 500:1 (Deloitte, 2023). The National Academies has recommended that the USGS commission a comparable U.S. study (NASEM, 2025). I would support that recommendation, and I expect a domestic analysis to show a return similarly weighted in the public's favor.

Converting Data into Knowledge

There is an underappreciated feedback relationship between artificial intelligence and geoscience information. The data centers that power modern AI are themselves driving demand for critical minerals, which makes domestic discovery more urgent. At the same time, AI is becoming one of the most powerful tools available for converting geoscience data into discoveries. AI models fuse observations from magnetic, radiometric, electromagnetic, and hyperspectral data to reveal patterns a human analyst may miss, but their outputs depend fundamentally on the quality of the inputs. Only a program of Earth MRI's scale can supply the coverage and resolution required. Federal research efforts targeted at critical minerals at the Department of Energy and DARPA rely on Earth MRI data for this purpose.

Earth MRI has prioritized data collection, creating an opportunity to leverage new tools to aid interpretation. The National Academies recommends developing AI and machine-learning tools

to accelerate interpretation and release (NASEM, 2025). This is among the highest-leverage problems the Subcommittee could direct resources toward, and reauthorization is an opportunity to finish the data collection and to modernize how that data reaches the people who use it.

The same logic applies to the nation's legacy data. Much of our geoscience information resides in maps, charts, tables, and paper records that predate digital archives. Through the National Geological and Geophysical Data Preservation Program, which Earth MRI funds to support state surveys, that material is being preserved and digitized. As it is digitized, it becomes usable as training data, following the same path that digitized text corpora have made possible for today's language models. Federal exploration programs going back to the Defense Minerals Exploration Administration of the 1950s produced discoveries that remain in production today, and that legacy data still helps target modern surveys (Frank, 2016). Preserving and digitizing it converts an underutilized archive into a durable national asset.

Partnerships and Workforce

Earth MRI is built on partnerships, anchored by the cooperative relationship between the USGS and the state geological surveys and extending to other federal agencies, tribes, universities, and private industry. The program has also rebuilt workforce capacity, enabling state surveys to hire and train geologists and geophysicists and giving early-career professionals a path that was disappearing a decade ago. This matters because expertise in economic geology and minerals is being lost to retirement faster than it is being replaced; the National Academies has documented the contraction of the mining and geoscience education pipeline (NASEM, 2024). Sustained funding allows institutional knowledge to be transferred rather than lost.

The Decision Before You

Earth MRI sits beneath every downstream goal this Subcommittee has identified, from securing critical mineral supply chains to the responsible development of federal resources. The data it produces derisks private exploration, the analysis it enables turns that data into discoveries, and the legacy it preserves compounds in value over time. Congress has already decided this work is worthwhile and set a 2031 deadline to complete it. The choice now is whether to fund the remaining years or to halt a national effort halfway through a mandate Congress itself established. I respectfully urge the Subcommittee to reauthorize and fund Earth MRI through completion.

As Clarence King, the first director of the U.S. Geological Survey, wrote in its First Annual Report: *"We have only begun; we have the great work still before us"* (King, 1880).

Thank you for the opportunity to testify. I welcome your questions.

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