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Testimony on “Opportunities to Improve and Expand Infrastructure Important to Federal Lands,
Recreation, Water, and Resources”
U.S. Senate Committee on Energy and Natural Resources
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Chairman Murkowski, Ranking Member Cantwell, and Members of the Committee:

My name is David Spears and I am President of the Association of American State Geologists. Our members are the chief executives of the state geological surveys. Almost every one of your states has a geological survey, either in an executive branch agency or in a state university. Like the U.S. Geological Survey, our activities are focused on geologic and topographic mapping, identification and assessment of mineral, energy, and water resources, and the reduction of risk from geologic hazards such as earthquakes, volcanoes, and landslides. We collaborate closely with the USGS on these topics, often through cooperative programs such as the National Cooperative Geologic Mapping Program, the National Earthquake Hazards Reduction Program, and the National Geological and Geophysical Data Preservation Program. We are proud of the positive impact our activities have on our nation’s economic prosperity, national security, and environmental protection.

We’re here today to talk about infrastructure, and no input is more essential to infrastructure than minerals. I’m using the term “minerals” broadly to include all nonfuel mineral materials: sand, gravel, crushed stone, metals, and industrial minerals. These are the raw materials essential to building almost anything. Road construction and maintenance require large quantities of crushed stone for the road base, and either asphalt or concrete for the road surface. Constructing one mile of two-lane highway requires between 20,000 and 40,000 tons of sand, gravel, and crushed stone. According to the United Nations, *“Sand and gravel represent the highest volume of raw material used on earth after water.”* These materials have a relatively low unit price, but because they are bulky, transporting them is expensive. Therefore, having adequate supplies available locally is important to the economy of every community.

Constructing buildings, bridges, airports, power plants, and water infrastructure requires limestone and aggregate for concrete, clay for bricks, copper for wiring, and steel for framing, along with other minerals for paint, fixtures, pipes, and appliances. With changing technology, demand for new mineral commodities is growing. We’ve all heard about the rare earth elements which are essential for cell phones, solar panels, wind turbines, and military applications.

Currently, the U.S. is one hundred percent reliant on imports for the rare earths. According to the USGS, in 2016 there were twenty essential mineral commodities on which the U.S. was 100% import-reliant. The largest supplier of minerals imported to the U.S. was China.

Much of our nation's mineral production comes from federal lands, especially in the West. Potash for fertilizer is produced from federal land in Utah. Lithium for batteries is produced from federal land in Nevada. Metals such as copper and gold are mined in Alaska, Arizona, Nevada, and Montana. These are just a few examples of the dozens of mineral commodities contributed to the U.S. economy by federally-owned land. According to USGS, the value of nonfuel mineral raw materials produced at mines in the U.S. in 2016 was nearly \$75 billion. These raw materials, combined with domestically recycled materials, were consumed by downstream industries to produce products worth an estimated \$2.78 trillion.

The primary source of information about the location and quantity of mineral materials for infrastructure construction is geologic mapping. Geologic maps also help reduce infrastructure costs by identifying landslides, sinkholes, and otherwise unstable ground which should be avoided early in the planning stages of construction. State and federal geoscience agencies have produced geologic maps to cover about half of the U.S. at a level of detail sufficient for making wise land-use decisions, but large data gaps remain.

Airborne data-collection technologies such as magnetics, radiometrics, gravity, and LiDAR are helping to expand our knowledge of the nation's geology, and are leveraging investment in "boots-on-the-ground" geologic mapping and physical sampling. Detailed mapping enables smart decisions on which lands to protect, and which lands to develop.

In summary, expanding and maintaining our nation's infrastructure will require minerals. Responsibly managing our mineral resources, reducing reliance on imports, and reducing the risk of natural hazards will require cooperation between state and federal geological surveys to fill the significant gaps in our current knowledge. Investment in infrastructure will require investment in geology. Thank you.