

Where is the greatest risk to our mineral resource supplies?

21 February 2020, by Alex Demas



Bastnaesite (the reddish parts) in Carbonatite. Bastnaesite is an important ore for rare earth elements, one of the mineral commodities identified as most at-risk of supply disruption by the USGS in a new methodology. Credit: Scott Horvath, USGS

sector. These commodities are vital for mobile devices, renewable energy, aerospace and defense applications, among others.

"Manufacturers of new and emerging technologies depend on mineral commodities that are currently sourced largely from other countries," said USGS scientist Nedal Nassar, lead author of the methodology. "It's important to understand which commodities pose the greatest risks for which industries within the manufacturing sector."

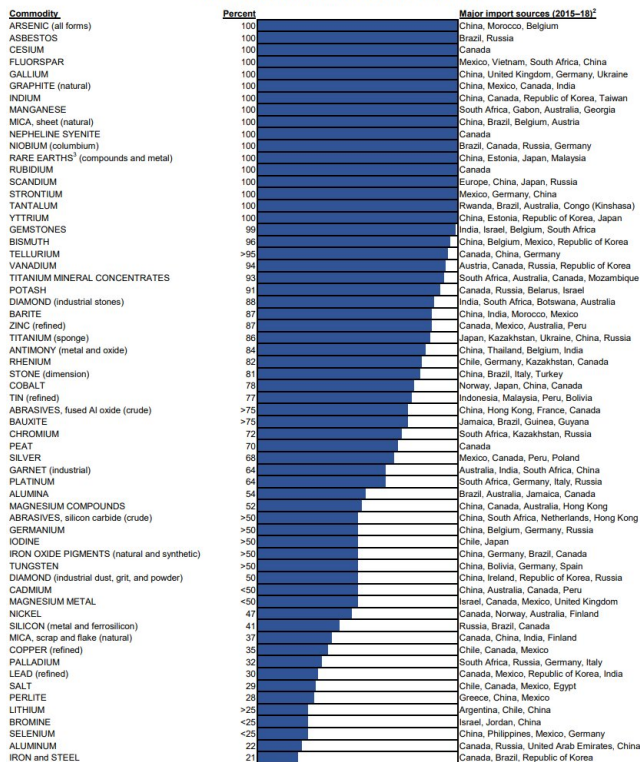
The supply risk of mineral commodities to U.S. manufacturers is greatest under the following three circumstances: U.S. manufacturers rely primarily on foreign countries for the commodities, the countries in question might be unable or unwilling to continue to supply U.S. manufacturers with the minerals; and U.S. manufacturers are less able to handle a price shock or from a disruption in supply.

Policymakers and the U.S. manufacturing sector now have a powerful tool to help them identify which mineral commodities they rely on that are most at risk to supply disruptions, thanks to a new methodology by the U.S. Geological Survey and its partners.

"This methodology is an important part of how we're meeting our goals in the President Trump's Strategy to ensure a reliable supply of critical minerals," said USGS director Jim Reilly. "It provides information supporting American manufacturers' planning and sound supply-chain management decisions."

The methodology evaluated the [global supply](#) of and U.S. demand for 52 mineral commodities for the years 2007 to 2016. It identified 23 mineral commodities, including some [rare earth elements](#), cobalt, niobium and tungsten, as posing the greatest supply risk for the U.S. manufacturing

2019 U.S. NET IMPORT RELIANCE¹



¹Not all mineral commodities covered in this publication are listed here. Those not shown include mineral commodities for which the United States is a net exporter (abrasives, metallic; boron; clays; diatomite; gold; helium; iron and steel scrap; iron ore; kyanite; molybdenum concentrates; sand and gravel; industrial; soda ash; titanium dioxide pigment; wollastonite; zeolites; and zirconium mineral concentrates) or less than 21% import reliant (beryllium; cement; kelpspar; gypsum; iron and steel slag; lime; nitrogen (fused)-ammonia; phosphate rock; pumice; sand and gravel; construction; stone, crushed; sulfur; talc and pyrophyllite; and vermiculite.) For some mineral commodities (hafnium; mercury; quartz crystal; industrial; thallium; and thorium), not enough information is available to calculate the exact percentage of import reliance.

²In descending order of import share.

³Data include lanthanides.

A graph showing the net import reliance of the United States for more than 90 different mineral commodities. Credit: USGS

"Supply chains can be interrupted for any number of reasons," said Nassar. "International trade tensions and conflict are well-known reasons, but there are many other possibilities. Disease outbreaks, natural disasters, and even domestic civil strife can affect a country's mineral industry and its ability to export mineral commodities to the U.S."

Risk is not set in stone; it changes based on global market conditions that are specific to each individual mineral commodity and to the industries that use them. However, the analysis indicates that risk typically does not change drastically over short periods, but instead remains relatively constant or changes steadily.

"One thing that struck us as we were evaluating the

results was how consistent the mineral commodities with the highest risk of supply disruption have been over the past decade," said Nassar. "This is important for policymakers and industries whose plans extend beyond year-to-year changes."

For instance, between 2007 and 2016, the risk for rare earth elements peaked in 2011 and 2012 when China halted exports during a dispute with Japan. However, the supply of rare earth elements consistently remained among the highest risk commodities throughout the entire study period.

In 2019, the U.S. Department of Commerce, in coordination with the Department of the Interior and other federal agencies, published the interagency report entitled "A Federal Strategy to Ensure a Reliable Supply of Critical Minerals," in response to President Trump's Executive Order 13817. Among other things, the strategy commits the U.S. Department of the Interior to improve the geophysical, geologic, and topographic mapping of the U.S.; make the resulting data and metadata electronically accessible; support private mineral exploration of critical minerals; make recommendations to streamline permitting and review processes enhancing access to critical mineral resources.

The methodology is entitled "Evaluating the Mineral Commodity Supply Risk of the U.S. Manufacturing Sector," and is published in *Science Advances*.

More information: Evaluating the mineral commodity supply risk of the U.S. manufacturing sector, *Science Advances* 21 Feb 2020: Vol. 6, no. 8, eaay8647, DOI: [10.1126/sciadv.aay8647](https://doi.org/10.1126/sciadv.aay8647), advances.sciencemag.org/content/6/8/eaay8647

Provided by United States Geological Survey

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