The United States is the world’s largest user of mineral resources. We use them to build our homes and cities, fertilize our food crops, and create wealth that allows us to buy goods and services. Individuals rarely use nonfuel mineral resources in their natural state—we buy light bulbs, not the silica, soda ash, lime, coal, salt, tungsten, copper, nickel, molybdenum, iron, manganese, aluminum, and zinc used to convert electricity into light.

The USGS Mineral Resources Program (MRP) is the sole Federal source of scientific information and unbiased research on nonfuel mineral potential, production, and consumption, as well as on the environmental effects of minerals. The MRP also provides baseline geochemical, geophysical, and mineral-deposit data used to understand environmental issues related to extraction and use of mineral resources. Understanding how minerals, water, plants, and organisms interact contributes to our understanding of the environment, which is essential for maintaining human and ecosystem health. To support creation of economic and national security policies in a global context, MRP collects and analyzes data on essential mineral commodities from around the world.

Program Mission and Personnel

The MRP provides timely and unbiased analyses of minerals and inorganic materials to (1) improve stewardship of public lands and resources; (2) support national and international economic and security policy; (3) sustain prosperity and improve our quality of life; and (4) protect and improve public health, safety, and environmental quality.

The MRP supports about 400 USGS research specialists. Cooperative agreements with universities, industry, and other governmental agencies support collaborative research and information exchange, and through grants the MRP supports additional mineral research on topics consistent with program goals.
The MRP supports research on how and where mineral deposits form and supports development of methods to detect potential mineral resources. This research facilitates assessments of undiscovered mineral resources, most of which are not easily identified at the Earth’s surface because they are hidden by non-mineral bearing rocks or dense vegetation. Geophysical tools and techniques allow us to see geologic units and structures beneath the Earth’s surface and build three-dimensional models of an area to understand how mineral resources are distributed. Innovative geochemical tools and methods are being developed to reduce uncertainty in mineral resource assessments.

Natural and Man-Made Chemicals in North American Soils

Soils play a key role in human health and ecosystem integrity, support food production, and contribute to natural recycling of carbon and essential nutrients in the environment. Limited knowledge of the concentration and distribution of naturally occurring and man-made chemicals in North American soils makes it difficult to establish standards for soil clean-up, evaluate effects of chronic exposure to contaminated soils on human health, and determine the impact of new land-use practices on the environment. MRP scientists along with colleagues at the Geological Survey of Canada and the Servicio Geológico Mexicano are sampling and mapping the spatial distribution of elements and selected chemicals in soils throughout North America.

Minerals Information

Information on domestic and international supplies and uses of minerals and mineral materials is essential to the U.S. economy and to national security. Public and private organizations rely on this objective information to make informed decisions, to understand the impact of mineral materials on the economy, and to forecast future mineral supply and demand. The MRP collects data on mineral production, consumption, recycling, inventory, and shipments from the U.S. mining and mineral processing industry. In addition, production data, trade data, and other information on more than 80 commodities from about 100 countries are compiled and published. Materials flow studies, such as a recent lead wheel-weight study, use available data to study life cycles of mineral products.

Lead Wheel Weights

The implications of lead deposited along the Nation’s highways when lead weights used to balance tires are dislodged and spread by wind and water is one example of a recent materials flow study supported by the MRP. Estimates of the amount of lead lost from wheels, such as the 1 ounce clip-on wheel weights, shown here both new and abraded by traffic, ranged from 2,000 to 5,000 tons in 2003. Lead wheel weights have been used on vehicles for about 70 years so the cumulative amount of lead dispersed in the environment is significant. The complete study can be found at http://pubs.usgs.gov/of/2006/1111.
Decisions that ensure a secure supply of mineral commodities depend on information on the location, quality, and quantity of resources. The MRP supports studies that produce scientifically accurate and reproducible mineral resource assessments. To prepare for an assessment, data are collected and compiled. Research studies are conducted to understand the geologic history and characteristics of the area, define what processes formed the mineral deposits, and identify keys to predicting undiscovered deposits. Teams of experts analyze available information, identify characteristics that suggest the presence of undiscovered mineral deposits, and evaluate the quality and quantity of potential mineral deposits.

Assessments at a variety of scales provide valuable information to a range of users, including Federal, State, and local land-use managers. Assessments currently supported by the MRP range from one in central Colorado designed to facilitate land-use planning on and near Federal lands to one working with partners from around the world to assess select nonfuel minerals on a global scale.

In addition, MRP supports development of tools and techniques designed to understand what happens when mineral deposits are weathered or mined. Mineral environmental assessments use understandings of mineral deposits to anticipate environmental challenges associated with abandoned mines and the effects of developing new mineral deposits, providing specific information on the potential release of contaminants into the environment, an issue of concern to a wide range of land managers.
The U.S. imported 100 percent of these mineral commodities in 2006:

- Arsenic
- Asbestos
- Bauxite and alumina
- Columbium
- Fluorspar
- Graphite
- Indium
- Manganese
- Rare Earth Elements
- Rubidium
- Strontium
- Thallium
- Thorium
- Vanadium
- Yttrium

Nonfuel minerals are important in many items we use every day. Rare metals, such as platinum, ruthenium, and indium, play an increasingly important role in new technologies, such as fuel cells, electronic vehicles, and in everyday items, such as cell phones and video and computer monitors.

- Manganese
  - Used to make dry cell batteries
  - Imported from Gabon, South Africa, Australia, and Brazil

- Thallium
  - Used in cardiovascular imaging
  - Imported from Belgium, Russia, the Netherlands, and France

- Yttrium
  - Used to make television and computer monitors
  - Imported from China, Japan, France, and Austria

For more information contact:

Mineral Resources Program Coordinator  
Phone: 703-648-6100
Fax: 703-648-6057
Email: minerals@usgs.gov
Home page: http://minerals.usgs.gov

http://mrddata.usgs.gov

Internet-based geochemical, geophysical, mineral-deposit, and lithologic data for the United States