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# Ongoing Studies

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The following studies are ongoing BESR activities as of March 2007. They are listed with their project scopes, sponsors, committee chairs, and staff. More information about BESR's ongoing studies, including full committee composition, meeting dates and agendas, and timeframes, can be accessed in The National Academies Current Projects System; <http://www8.nationalacademies.org/cp/>.

### **Assessing the Performance of Surface and Subsurface Engineered Barriers**

In order to develop an improved framework for assessing the effectiveness of surface and subsurface engineered barriers over the long term, an ad hoc committee will complete the following tasks:

1. Identify engineered barrier systems used for surface and subsurface waste containment.
2. Describe how performance is defined, predicted, measured, and monitored.
3. Present information on field performance of engineered barrier systems.
4. Evaluate the information on field performance.
5. Assess methodologies and capabilities for predicting and monitoring performance and for assessing risk.
6. Identify information needed to fill the knowledge gaps.

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Anne M. Linn

### **Coal Research, Technology, and Resource Assessments to Inform Energy Policy**

The study will broadly examine coal resource assessments, technologies, and research and development (R&D) activities in the United States in order to formulate an appropriate, integrated roadmap of future needs. The results of the review will help define and construct a national strategy for coal R&D and resource assessments.

The study shall consider the following issues:

1. Summarize recent projections of coal use as part of U.S. and global energy portfolios over the next 25 years, including projections that take into account the potential roles of coal in future integrated energy and environmental policies, in order to set the context for development of a more comprehensive, strategic roadmap for coal R&D and resource assessments.
2. Describe the full range of local, regional, national, and global issues and challenges, including environmental issues that must be taken into account when considering future production and utilization of coal.
3. Review the coal reserve assessments based on recent trends in the coal sector and examine the current and future role of coal imports and exports.
4. Assess the categories of coal R&D currently being carried out in the U.S. and internationally, and investigate whether and how technology developments in other fields can be applied to the coal sector. Review how technologies are being transferred to coal mine operators and other users, recognizing differences among companies.
5. Determine the priority coal R&D needs, including in the areas of exploration, discovery, reserve assessment (including in terms of commercial feasibility for known reserves), extraction, coal preparation, delivery to market, waste disposal, reclamation, health and safety, community impact, environmental practices, education and training, and productivity.

6. Evaluate the need for a broad-based, coordinated, multi-agency coal research and development program. Review current coal-related research, examine what agencies are conducting it, and determine how much funding is currently being spent throughout the coal life cycle.
7. Examine options for supporting and implementing a broad-based coal R&D program, including approximate costs, and the relative roles and commitments of the public and private sectors now and into the future.

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4. Identify the impacts of disruptions in supply of critical minerals and mineral products on the domestic workforce and economy.
5. Describe and evaluate the current mineral and mineral product databases and other sources of mineral information available for decision making on mineral policy issues.
6. Identify types of information and possible research initiatives that will enhance understanding of critical minerals and mineral products in a global context.

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**Critical Mineral Impacts on the U.S. Economy**

Understanding the likelihood of disruptive fluctuation in the supply of critical minerals and mineral products for domestic applications, and making decisions about policies to reduce such disruptions, requires thorough understanding of national and international mineral sources, mineral production technology, the key uses of minerals and mineral products in the U.S. economy, and potential impediments to the mineral supply.

This study will:

1. Identify the critical minerals and mineral products that are essential for industry and emerging technologies in the domestic economy.
2. Assess the trends in sources and production status of these critical minerals and mineral products worldwide.
3. Examine the actual or potential constraints, including but not limited to geologic, technological, economic and political issues, on the availability of these minerals and mineral products for domestic applications.

**The Effective Use of Data, Methodologies and Technologies to Estimate Sub-National Populations at Risk**

An ad hoc committee under the auspices of the Geographical Sciences Committee will conduct a study on improving demographic data, methods, and tools and their application (1) to better identify populations at risk—groups that are susceptible to the impact of natural or human-made disasters; and (2) to improve decisions on humanitarian intervention, disaster relief, development assistance, and security for those populations at sub-national scales. The study will be organized around a workshop that will address the following tasks:

1. Assess the strengths and weaknesses of existing data, methods (e.g., gaps in spatial and thematic coverage, counting individuals, proxy measures such as those derivable from Earth observations), and tools for estimating population.
2. Identify the limitations of current institutional structures in using existing demographic and other data and tools for

these applications, and potential new approaches resulting from science and technology advances for collecting better data and producing more effective information and analysis tools.

3. Identify ways in which sub-national demographic and geographic data and tools could be used to help decision makers in U.S. federal agencies, foreign governments, international organizations, and international partners provide useful information to populations at risk of facing disasters as well as to better respond to their needs for humanitarian assistance.
4. Review the strengths and limitations of information and data analysis and visualization tools developed by government agencies for responding to conflict, climate, and health-related crises in Mali, Mozambique, and Haiti.
5. Informed by this three-country example, recommend ways to make information collection and data analysis and visualization tools more effective for decision makers responding to humanitarian crises.

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**Extending Observations and Research Results to Practical Applications: A Review of NASA's Approach**

The committee will examine NASA's Applied Sciences program and

1. identify strengths and weaknesses in NASA's approach to achieve its strategic objectives to realize economic and societal benefits from Earth science, information, and technology,
2. determine the extent to which the partner agencies and national organizations (e.g., Climate Change Science Program) have found that their collaboration with NASA is helping them carry out their decision-support goals,
3. evaluate the extent to which the program has been able to engage the broader community (e.g., private sector, academia, non-governmental organizations) in developing improved decision-support tools, and
4. assess possible issues in assuring that the transfer of NASA's research results into decision support products maintains the scientific integrity of the data and models.

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**Grand Research Questions in the Solid-Earth Sciences**

The committee will formulate a short list of grand research questions driving progress in the solid-earth sciences. The research questions will cover a variety of spatial and temporal scales, from sub-atomic to planetary, and from the past (billions of years) to the present and beyond. The questions will be written in a clear, compelling way and will be supported by text and figures that summarize research progress to date and outline future challenges. The report will not discuss implementation issues (e.g., facilities, recommendations aimed at specific agencies) or disciplinary interests.

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**Land Parcel Databases: A National Vision**

Land parcel databases (also known as cadastres) describe the rights and interests in property. Complete, uniform parcel databases are invaluable as society increasingly emphasizes multi-sector, cross-jurisdictional collaboration to address such challenges as homeland security, growth, and development. These databases are critical to the operations of county government in particular, and to the operations of all levels of government and numerous private-sector entities in general. As such, they are a central component of the National Spatial Data Infrastructure (NSDI). Yet, this layer is the least accessible in digital form of the seven NSDI Framework data layers. Building from the NRC's 1980 report "Need for a Multipurpose Cadastre," this study will highlight the status of land parcel databases in the United States, provide a vision for the future, and develop a strategy to complete this NSDI Framework data layer.

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**Research Priorities for the USGS Center of Excellence for Geospatial Information Science**

A committee under the auspices of the Mapping Science Committee will recommend research goals and priorities for the Center of Excellence for Geospatial Information Science (CEGIS) that will best meet the needs of the USGS for future capabilities in GIScience. Using knowledge of the current state of the art in GIScience, and information from USGS on current and future needs and capabilities, the committee will determine which areas of research would be most effective for the CEGIS to pursue.

The committee will undertake three main tasks:

1. Identify current and future USGS needs for GIScience capabilities.
2. Assess current capabilities in GIScience research at the USGS and recommend strategies for strengthening these capabilities and for collaborating with others to maximize research productivity.
3. Using knowledge of the current state of the art in GIScience, make recommendations regarding the most effective research areas for the CEGIS to pursue.

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*NAVTEQ Corporation*

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**Review of the NIOSH Mining Safety and Health Research Program**

A committee under the auspices of the Committee on Earth Resources will review the NIOSH Mining Safety and Health Research Program with respect to its impact, relevance, and future directions. In particular, the committee will address the following:

1. Progress in reducing workplace illness and injuries through occupational safety and health research through an analysis of relevant data about workplace illnesses and injuries for the Mining Safety and Health Research Program and an evaluation of the effect that NIOSH research has had in reducing illness and injuries.
2. Progress in targeting new research to the areas of occupational safety and health most relevant to future improvements in workplace protection.
3. Significant emerging research areas that appear especially important in terms of their relevance to the mission of the NIOSH.

The committee will evaluate the performance of the Mining Safety and Health Research Program for the impact of the program in the workplace and for the success of the program in achieving its goals using the assessment framework developed by the NRC/IOM Committee to Review the NIOSH Research Program (framework committee). For cases where the impact is difficult to measure, the committee reviewing the Mining Safety and Health Research Program may evaluate performance by using existing intermediate outcomes to estimate impact. The evaluation will consider not only what the NIOSH research program is producing, but will also determine whether NIOSH research can reasonably be credited with changes in workplace practices, or whether such changes are the result of other factors unrelated to NIOSH.

**SPONSOR**

National Institute for Occupational Safety and Health

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**Studies in Development**

BESR is working on several new studies that have been congressionally mandated, requested, or self initiated. The most advanced of these follow:

- Deep-Time Geologic Records for Understanding Climate-Change Impact
- The Earth System Context for Hominin Evolution
- FEMA Flood Maps: Accuracy Assessment and Cost Effective Improvements
- Causes and Consequences of Sea-Level Rise (with the Division o Behavioral and Social Sciences and Education)
- Emerging Workforce Trends in the U.S. Energy and Mining Industries
- Understanding the Impacts of Commercial Oil Shale Production
- Coalbed Methane
- Carbon Sequestration in Geologic Formations
- Discrete Global Grids
- A National Agenda for Development and Application of Land-Change Models
- The Role of the National Map in the National Spatial Data Infrastructure of the Future
- Challenges and Opportunities in Earth Surface Processes
- Research Frontiers at the Interface of Biology and Geology (with the Board on Life Sciences)
- Earth Sustained: New Opportunities in a New Century
- Risk-Informed Methods for Critical Infrastructure Decision Making
- Lifecycle Geoengineering for Critical Infrastructure and Engineered Facilities
- Sustainable Management of Municipal Solid Waste
- Future Seismographic Instrumentation Supply Issues
- Assessment of Solid-Earth Contribution to Sea-level Fluctuations (with the Ocean Studies Board)
- Science Requirements for Tsunami Prediction (with the Ocean Studies Board and the Disasters Roundtable)
- Minimizing the Adverse Effects of Coal Mine Blasting
- Workshop on Evolving EOSDIS
- Methane Hydrate Research