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Industrial Minerals in Illinois:

A Key to Growth

- Resources for growth
- Value of industrial minerals
- Transportation costs
- Maintaining access to minerals
- Guidelines for use
- Quality of life
- Research in service of growth
- Shared financing for shared benefits
- Central Great Lakes Geologic Mapping Coalition

Resources for growth

Economic growth or development is often accompanied by the physical expansion of cities and towns. This growth creates employment opportunities and can improve the quality of life.

A key to both economic and physical growth is infrastructure—roads, bridges, sewers, water pipes, homes, sidewalks, shopping malls, schools, hospitals, civil administration, and recreational facilities. Providing this infrastructure involves construction activities that permanently take land away from other uses, such as agriculture, mining, forests, open lands, or nature preserves.

Although all these land uses have tangible economic value, the mining of industrial minerals, such as stone, sand, and gravel, remains the most critical activity for infrastructure development and, therefore, for economic growth. These minerals are the very kind of resources that make the building of infrastructure possible in the first place.

Fortunately, mining need not preclude other land uses, and it can even contribute to improvement of land value when properly planned.

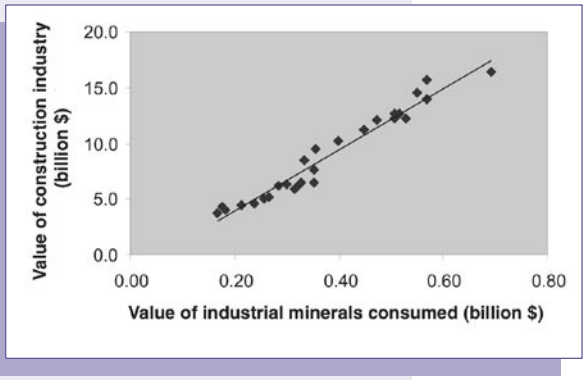


Figure 1: Industrial minerals and construction industry in Illinois.[1]

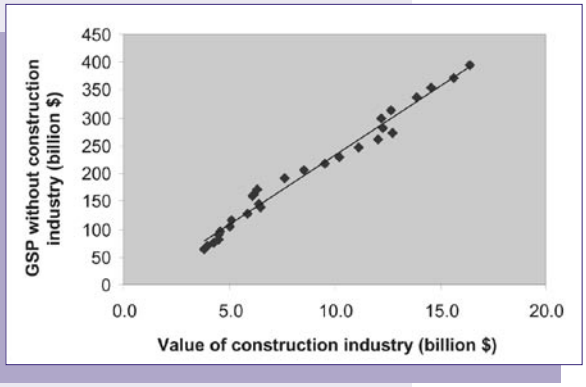


Figure 2: Construction industry and GSP in Illinois.[1]

[1]Source: U.S. Department of Commerce, Bureau of Economic Analysis, Tables on gross state product by component and industry http://www.bea.doc.gov/bea/regional/gsp

Value of industrial minerals

Construction activities directly determine the consumption of sand, gravel, and stone (Figure 1). As Figure 2 indicates, the overall economic activity, measured by the Gross State Product (GSP), shows a direct correlation with the value of the construction activities in the state. In turn, the size of the population that is served influences building, road construction, and road repair activities.

Figures 1 and 2 indicate that every $1 worth of minerals consumed results in about $25 worth of construction, and every $1 worth of construction corresponds to about $22 worth of GSP. Thus, $1 worth of minerals consumed in Illinois makes a direct and indirect contribution of $550 to the state's GSP.

This multiplication of economic effects occurs because of jobs created not only in the production and distribution of minerals but also in the construction industry and in businesses connected with it, as well as in the retail and service sectors, which include activities such as restaurants, clothing shops, and banks.

Illinois is blessed with large, economically viable deposits of sand, gravel, limestone, and dolomite, particularly in the northern half of the state but also in many downstate areas. About 62 percent of the state's population lives in just 5 northeastern counties—Cook, DuPage, Kane, Lake, and Will. Another 10 percent lives in the other 13 counties that constitute District 1 (Figure 3) of the United States Geological Survey (USGS).

District 1 traditionally has been the producer of the largest amount of industrial minerals. About 65 percent of the state's sand and gravel and about 50 percent of the state's stone are produced and used in District 1 counties.

Additional amounts of minerals are brought in from adjacent USGS districts and from the neighboring states to satisfy the District 1 demand. The expansion of existing mines and opening of new mines in District 1 are becoming increasingly difficult because of urban growth.

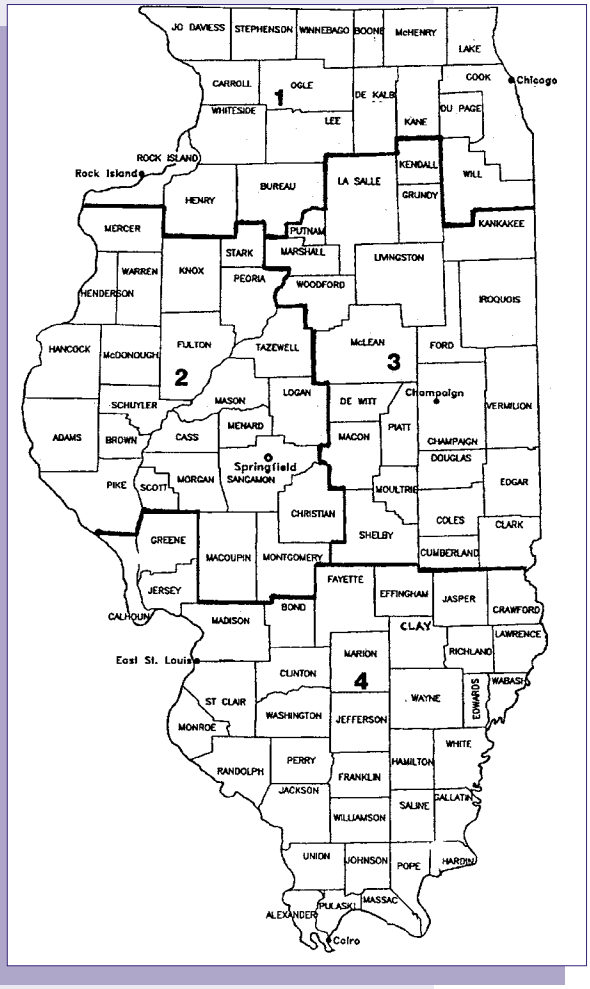


Figure 3: USGS crushed stone and sand and gravel districts.

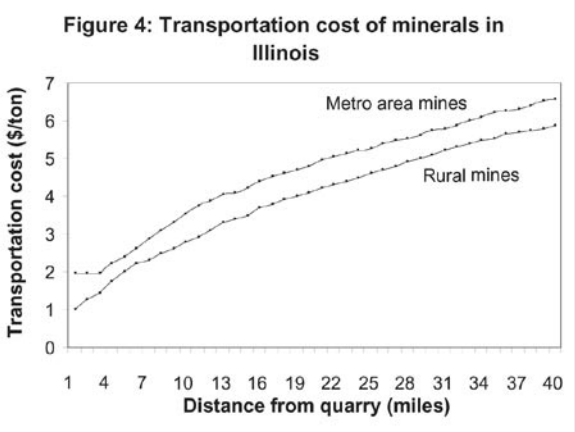


Figure 4: Transportation cost of minerals in Illinois.

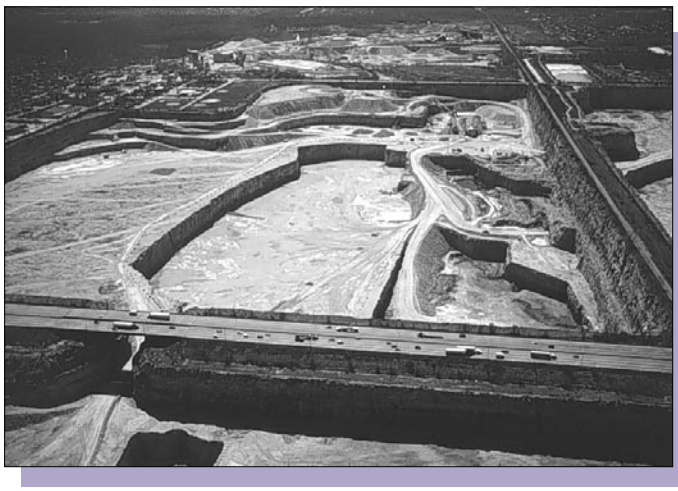
Transportation costs

Transportation of stone and sand and gravel is expensive. Figure 4 presents the transportation cost by truck in relation to the distance from the mine. An instructive way to interpret Figure 4 is to compare the cost of transportation with the price of sand or stone at the mine. In 1997, the price of sand at the mine in Illinois averaged $4.20 per ton and the price of crushed stone about $5.50 per ton. If sand has to be transported 15 to 21 miles from the mine to the point of consumption, its transportation cost would equal its price at the mine. In other words, the price of sand doubles in 15 to 21 miles. The price of crushed stone doubles when it is transported 27 to 34 miles from the mine. Such multiplication of the cost of minerals by transportation increases the cost of construction and repair of infrastructure facilities that must be paid by the government or by the private citizen.

Maintaining access to minerals

Economic growth requires infrastructure, which typically accompanies urban and suburban expansion. Both require the raw materials for construction—stone, sand, and gravel—but access to these materials is made increasingly difficult as a result of urban and suburban expansion. Preserving access to mineral deposits in order to maintain the supply of low-cost materials needed for growth often conflicts with the desire to avoid any mining activity in or near communities.

Decisions about preferred land use are usually made at the community level in Illinois, mostly without regard to their long-term local and statewide implications on the availability and cost of construction materials.



Thornton Quarry, a major supplier of limestone, is constrained on all sides by development. Adjacent to residential and commercial structures and surrounding Interstate 80, Thornton Quarry serves as an example of the need to balance mining interests with urban devel-

Guidelines for use

Resource utilization guidelines could be established in Illinois through the collaboration of the Illinois Department of Natural Resources, Illinois Association of Aggregate Producers (IAAP), and representatives of cities and municipalities. The Illinois State Geological Survey (ISGS) could provide crucial assistance in this process by preparing geologic maps delineating the location, quantity, and quality of resources in the state. Studies in Canada have shown that the existence of provincial-level guidelines for mineral resource utilization resulted in a better management of resources for sustainable growth in Ontario than in British Columbia, where such guidelines did not exist.[2]

The primary objective of the guidelines would be to guide growth in ways that would permit the mineral extraction needed to sustain the growth. The result would be sustainable growth for future generations.

[2] Baker, Douglas, Richard Poulin, and A.G. McLellan, An Analysis of Mineral Aggregate Resource Policies in Ontario and British Columbia, Center for Resource Studies, Queens University, Kingston, Ontario, Canada, December 1996, 110 p.

Quality of life

The most important reason citizens do not want mining activity to go on communities is aesthetic; pollution issues, such as noise and dust, are re under current laws. Another concern is groundwater contamination from and fuel spills. It is important to ensure that mining does not unduly int normal life and that the mine sites are put to new uses after mining ceas

Post-extraction utilization of land requires imagination and advance plan also offers opportunities to increase property value and to improve the q Residential and recreational use of lakes created after mineral extraction contributes to these benefits.

Advance land use planning should help to alleviate citizen concerns abou thetic and environmental impacts of mining and increase their willingne access to mineral deposits near communities.

This beautiful recreational and residential area illustrates how post-mining land use can greatly increase land value and improve quality of life.

Research in service of growth

One of the most logical ways to protect the environment while mining resources is to maximize the use of a mine site by reducing material wastes. For example, limestone producers estimate that 5 to 15 percent of stone mined at any site never leaves the mine because it is so fine that it cannot be used currently. Collaborative research by industry, state agencies, and academia could find uses for the fine-sized limestone, thus prolonging the life of the mine and postponing the opening of a new mine.

Recycling of pavements, building debris, and power plant ash can reduce the need for freshly mined construction materials. However, not all the material thus available is actually usable without a loss of quality. Research on ways to maximize the secondary use of recycled construction materials in an economically profitable manner could benefit industry, the community, and the environment.

The acceptance of research results by community planners requires an effective outreach program; without an outreach effort, wise growth options will not be exercised. An existing collaborative agreement between the ISGS and the IAAP can be used for research and outreach activities.

The ISGS has a mapping program in place (see back page). This program needs support from communities and the mineral industry. The resource maps to be prepared under this program would allow advance planning for multiple sequential use of the land, first for mining and later for various post-mining purposes.

Shared financing for shared benefits

Experience shows that applied research, such as is needed to promote the wise use of our industrial minerals, has the best chance of success if the beneficiaries bear part of the financial responsibility. In the case of industrial minerals, the State of Illinois supports the activities of the ISGS through tax dollars.

Taxpayer support could be significantly enhanced by the financial participation of communities and the mineral industry as the principal beneficiaries of the research. Communities could provide financial assistance for geologic mapping, and the mineral industry could support product research through a moderate “check-off” program to set aside funds under its own control. A similar check-off program exists in Illinois in agriculture.

Smart growth or sustainable development helps the economy as well as the environment by maximizing resource and land use. Concerted efforts by government agencies, communities, industry, and academia are essential to recognize the key role of industrial minerals in making smart growth possible. The challenges to be overcome are matched by opportunities waiting to be seized.

Related Readings:

RPR 1980-R. Factors Favoring Expanded Underground Mining of Limestone in Illinois, James W. Baxter. (Reprinted from Mining Engineering, v. 32, no. 10, p. 1497–1504, October 1980.)

RPR 1981-M. High-Calcium, High-Reflectance Limestone Resources of Illinois, Jonathan H. Goodwin and James W. Baxter. (Reprinted from Geological Society of America Bulletin, pt. I, v. 92, no. 9, p. 621–628, September 1981.)

RPR 1986-L. Urban Encroachment on Dolomite Resources of the Chicago Area, Illinois, Donald G. Mikulic and Jonathan H. Goodwin. (Reprinted from Proceedings of the Twentieth Forum on the Geology of Industrial Minerals, May 15–18, 1984, Baltimore, MD, Industrial Minerals of the Mid-Atlantic States: J. D. Glaser and J. Edwards, eds., Maryland Geological Survey Special Publication no. 2, p. 125–131, 1985.)

IMN 102. Proceedings of the 23rd Forum on the Geology of Industrial Minerals, Randall E. Hughes and James C.

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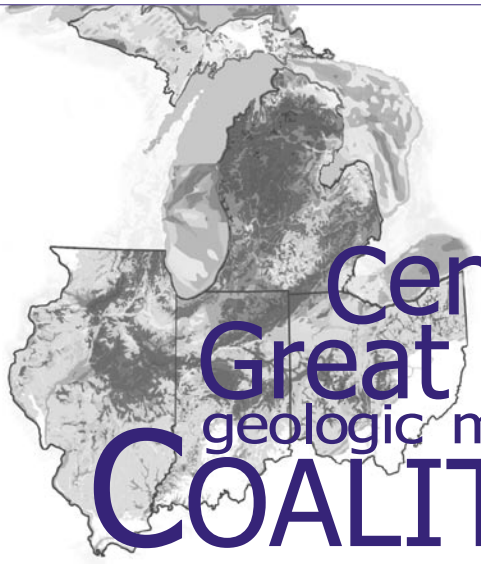

Central Great Lakes geologic mapping COALITION

Recognizing their common glacial geology, the Illinois, Indiana, Michigan, and Ohio geological surveys, together with the U.S. Geological Survey, have formed the Central Great Lakes Geologic Mapping Coalition. The coalition intends to produce geological maps of the glacial deposits and the surface of the bedrock in the area at a scale of 1: 24,000 (1 inch on the map = 2000 feet on the ground). The coalition both enhances and benefits from the statewide program of the Illinois State Geological Survey to map the near-surface deposits as well as the bedrock formations at greater depths. Maps in such detail are essential to develop appropriate growth strategies for the 21st century. These maps will be needed by county and city planners, water and other utilities, public health agencies, transportation departments, environmental protection agencies, builders and developers, agricultural agencies, insurance companies, U.S. Army Corps of Engineers, mining companies, and consulting and engineering firms.

Geologic maps are especially important in the northernmost 20 counties in Illinois because three of four Illinoisans live there and because the population in some of the counties is growing at record rates. A conflict is often created between competing uses of land for development, environmental concerns, and resource extraction. Growth strategies must be based on sound knowledge of geology. Industrial minerals, especially crushed limestone and dolomite, and sand and gravel, are key to the building of infrastructure facilities without which no growth is possible. This brochure is dedicated to the discussion of issues involved in the prudent use of minerals for growth and the opportunities that exist for future planning.

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