MAP 15

LIMESTONE AND DOLOMITE DISTRIBUTION IN PENNSYLVANIA

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF
CONSERVATION AND NATURAL RESOURCES
BUREAU OF GEOLOGICAL SURVEY
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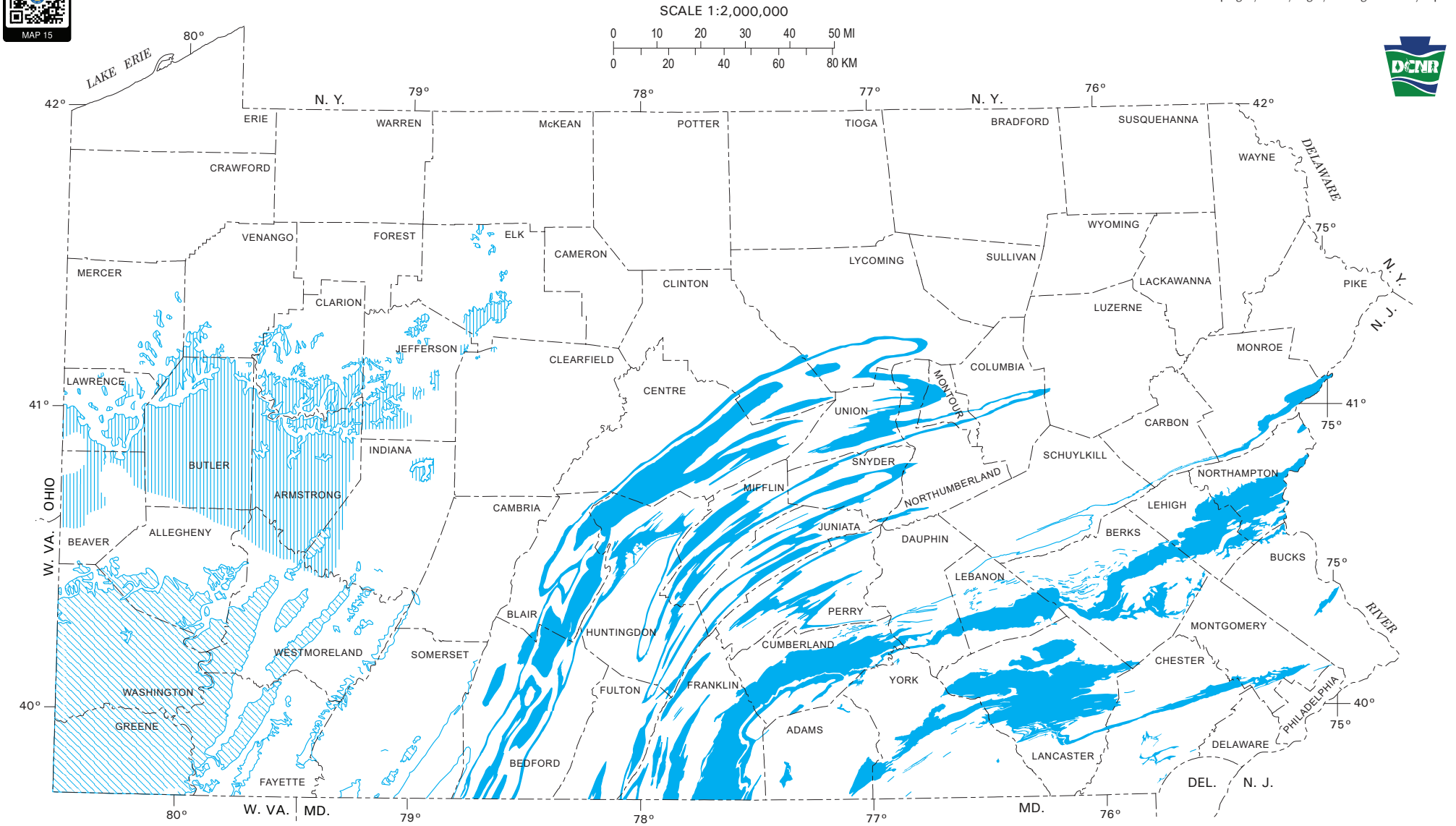

EXPLANATION

Area where limestone, dolomite, or both are at the suface. Layers are usually strongly folded and steeply dipping. Includes economically important high-calcium limestones of the Kinzers, Annville, Benner, and Keyser Formations and the Cockeysville Marble, as well as the high-magnesian dolomites of the Ledger Formation and the Cockeysville Marble. This area is most susceptible to sinkhole development.

Area underlain by flat-lying, generally thin, but locally thick, limestone beds, which are discontinuous in places and are commonly interbedded with shale.

Area underlain by the generally flat lying Pennsylvanian Vanport Limestone, a high-calcium limestone. This limestone is generally overlain by less than 100 feet of sedimentary rocks, except in the southern part of the area.

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Carbonate rocks, consisting of limestone and dolomite, are significant among the great variety of rock types in Pennsylvania. These rocks affect man's activities in three major ways: as hazards, as mineral resources, and as groundwater reservoirs. This map shows the distribution of limestone and dolomite in Pennsylvania and will be of assistance to those engaged in planning and development in these carbonate areas.

HAZARDS–Carbonate rocks can present potential construction problems and hazards due to the presence of solution cavities and bedrock irregularities in the subsurface and sinkholes at the surface. The cavities are the result of the gradual dissolving of the rock by water, particularly along fractures or joints. In turn, joints and cavities are enlarged and can form caves. Related features, such as surface depressions and sinkholes, are caused by the movement of surficial materials into the cavities shaped by the dissolving process. Sinkholes also can result from the collapse of the roof of a cave. Because the potential exists for sinkhole development in most of the carbonate rocks of Pennsylvania, areas underlain by these rocks should receive a thorough subsurface investigation prior to construction so that remedial measures may be designed to cope with these hazards. These investigations should include local geologic mapping, test borings, and possibly geophysical surveys to establish subsurface conditions for such structures as highways, dams, bridges, disposal sites, transmission lines, and buildings.

RESOURCES–Limestone ($CaCO_3$-rich) and dolomite ($MgCO_3$-rich) are major sources of mineral raw materials for the construction, agricultural, and manufacturing industries of the Commonwealth. Except for coal, carbonates are the major rock type mined in Pennsylvania, accounting for about 80 percent of all nonfuel mineral production. Significant uses of mined limestone and dolomite in Pennsylvania include (1) crushed stone for roads, concrete, and railroads; (2) agricultural lime and grit; (3) the manufacture of cement; (4) fluxstone and refractory materials for the steel industry; (5) acid neutralization; (6) raw material for the glass industry; and (7) mineral fillers and whiting. Thus, the carbonates in various parts of Pennsylvania should be recognized as a valuable mineral resource, and land use planners should take this into account.

WATER–Because of the development of solution cavities in carbonate rocks, these rock formations may contain and yield large quantities of underground water. Areas underlain by limestones and dolomites may supply the water needs of a community through the proper development of the subsurface water resources. Those charged with the planning and development of water supplies should recognize the existence of this valuable underground water source.

The permeable nature of the carbonate rocks also makes them natural conduits for conveying solid and liquid wastes. Using these conduits, contaminants can rapidly enter the groundwater system and travel long distances underground over a relatively short period of time. Therefore, it is important to be particularly careful in conducting industrial, agricultural, or construction activities in limestone-dolomite areas to prevent the contamination of valuable groundwater resources.

STATEWIDE REFERENCES

ES 11 Sinkholes in Pennsylvania, 2nd ed., W. E. Kochanov, 2015, 30 p.

G 66 Geology and biology of Pennsylvania caves, W. B. White, ed., 1976, 103 p.

Map 1 Geologic map of Pennsylvania, T. M. Berg, W. E. Edmunds, A. R. Geyer, and others, compilers, 2nd ed., 1980. Scale 1:250,000 (1 inch = 4 miles), 3 sheets.

M 20 Limestones of Pennsylvania, B. L. Miller, 1934, 729 p.

M 50 Atlas of Pennsylvania's mineral resources.

Part 1, Limestones and dolomites of Pennsylvania, B. J. O'Neill, Jr., 1964, 40 p., 6 maps, scale 1:250,000.

M 50 Atlas of Pennsylvania's mineral resources.

Part 1, Supplement, Limestones and dolomites of Pennsylvania, G. F. Deasy, P. R. Griess, R. F. Balazik, and J. W. Burnett, 1967, 83 p.

Part 4, The distribution of limestones containing at least 90 percent $CaCO_3$ in Pennsylvania, B. J. O'Neill, Jr., 1976, 2 p., 1 map, scale 1:500,000.

M 83 Reconnaissance survey of potential carbonate whiting sources in Pennsylvania, S. W. Berkheiser, Jr., 1983, 53 p.

OTHER PUBLICATIONS

There are many Fourth Pennsylvania Geological Survey publications containing information on limestones and dolomites. These publications are listed in an Excel spreadsheet that includes descriptions and hyperlinks to ZIP files for each report.

The Survey's list of publications is packaged in a ZIP file that can be downloaded from this URL: https://elibrary.dcnr.pa.gov/GetDocument?docId=1751959&DocName=Hyperlinks_PaGeoSurveyPubs. The spreadsheet is sorted by series, and a user can find a publication on a topic of interest by using the search function. Maps that show areas of sinkholes and closed depressions can be found under the Open-File Reports and Maps series. Publications focused on stratigraphy or mineral resources can be found under Atlas Series, County Reports, General Geology Reports, Information Circulars, and Mineral Resource Reports.

PaGEODE, a web-mapping application that derives its name from Pennsylvania Geologic Data Exploration, can be used to search the Fourth Survey publication series by geographic area. Visit PaGEODE here: https://gis.dcnr.pa.gov/pageode/.

Prepared by Bureau of Geological Survey.
Fourth Edition, 1990; Fourth Printing, Revised, 2023.