



# E-GeoNews

News from the Indiana Geological Survey

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## IN THIS ISSUE

[Hidden Water Resource](#)  
[Coal Gasification Project](#)  
[Lifetime Achievement Award](#)  
[IU Campus Limestone Tour](#)  
[Best Presentation Award](#)

## QUICK LINKS

[IGS Homepage](#)  
[IGS Bookstore](#)  
[IndianaMap](#)  
[Upcoming Events](#)  
[Professional Licensing](#)  
[Jobs at the IGS](#)

[Join Our Mailing List!](#)

## New IGS Report Explores Hidden Water Resource

Abandoned coal mines scattered across southwestern Indiana may be a future source of valuable groundwater that could be used for a variety of purposes.

More than 194,000 acres of Indiana are underlain by underground coal mines, and the amount of groundwater that fills the voids of these abandoned mines may be as much as 172 billion gallons. These potentially high-yielding coal-mine aquifers may represent resources of significant public and commercial value.

"Abandoned underground coal mines have often been forgotten once their intended purpose has been exploited," said John C. Steinmetz, IGS director. "Now, however, with this study, a potential new resource has been revealed. Not only does it document a source of water in the state that has heretofore not even been considered, but it opens possibilities for such other purposes as renewable geothermal heat-pump and cooling systems, and even for energy storage."

At the same time, little is known about the quality of water within flooded coal mines, the mechanisms of recharge and discharge, or the hydrodynamics of individual mine pools. [Characterization of Groundwater in the Coal-Mine Aquifers of Indiana](#) summarizes the limited data specific to Indiana that are available, and suggests lines of research that promote the future use -- and remediation, where necessary -- of this potentially valuable resource.



Authors of the report are IGS researchers Denver Harper, Tracy D. Branam, and Greg A. Olyphant. It is available from the [IGS Bookstore](#).

## IGS Working with European Union's Underground Coal Gasification Project

The IGS is partnering with 15 international institutions from the United Kingdom, Poland, Denmark, Netherlands, Canada, Australia, China, South Africa, Hong Kong, and Slovenia in a three-year collaborative project to evaluate future technology options for coupled underground coal gasification and carbon dioxide capture and storage. The project is an innovative approach to underground coal gasification site selection, which considers carbon dioxide mitigation through geological storage, as well as high-value end-use options for the produced gas. Maria Mastalerz, senior IGS research scientist, represented the United States at the project kick-off meeting in London in November 2013.

### Lifetime Achievement Award Goes to IGS Scientist Brian Keith

Brian D. Keith was presented the Lifetime Achievement Award at the 2013 Annual Meeting of the Professional Geologists of Indiana, held in Indianapolis. A geologist at the IGS for the past 35 years, Brian will retire in May 2014. His main areas of research are in petroleum and carbonate geology, reservoir characterization, and bedrock geologic mapping of Indiana and the Illinois Basin. He has authored many papers and abstracts and has also produced more than 20 bedrock geologic maps of south-central Indiana. As an adjunct faculty member of IU's Department of Geological Sciences, he served as chairman or member on many graduate student research committees and taught a graduate-level carbonate sedimentology course for more than 25 years.



Brian's work on the Middle Mississippian Salem Limestone, known to most of us as Indiana Limestone, showed that a rock unit that was typically considered uniform in texture and homogeneous in structure contains a hierarchy of depositional features. He and his students mapped the three-dimensional architecture of the Salem in several quarries and demonstrated that certain architectural elements have distinct petrological, petrophysical, and geophysical characteristics that have implications for Salem reservoirs in Indiana. Brian is a valuable resource for the region's dimension stone industry and also has become a popular leader of campus tours of the stone architecture on the Indiana University Bloomington campus. (See the item about his upcoming class and tour below.)

## IU Campus Limestone Tour

Besides being one of the most beautiful campuses in the United States, the Indiana University Bloomington campus abounds with connections to the state's geology and geologic history. Join IGS Geologist Brian Keith for [Limestone, Architecture, and Buildings Across Three Centuries at IU Bloomington](#) on Thursday, April 3 from 7-8:30 p.m and Sat., April 5 from 9-11 a.m. This class and walking tour is offered through IU Bloomington Continuing Studies and requires registration on their [website](#).



**Limestone carving on Maxwell Hall, IU Bloomington campus**



### Best Presentation Award

Tracy Branam, IGS geochemist, was recently awarded the Barton A. Thomas Memorial Award for best presentation by the 2013 World of Coal Ash Conference for his talk "Weathering and Leaching Characteristics of a Fixated Scrubber Sludge Cap at an Abandoned Mine Site in Pike County, Indiana."

Tracy is known for his interesting presentations and his ability to translate complex science for the layperson. He

has more than 20 years of experience as a research geochemist, focusing primarily on issues of abandoned coal mines, coal combustion residues (CCR), acid mine drainage treatment systems, and CCR leachate responses to various water types. Collaborating with other researchers, he has also studied water chemistry derived from mineral/water interactions for aquifer systems throughout Indiana.

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