INDIANA GEOLOGICAL & WATER SURVEY
INDIANA UNIVERSITY

ILLUSTRATING GEOLOGY OF INDIANA WITH ESRI STORY MAPS

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1. ABSTRACT

Esri's Story Maps are a powerful yet easy way to illustrate geologic research. These interactive web applications that combine maps, data, links, photographs, videos, and narrative text are an excellent tool to create dynamic publications and highlight research. More importantly, the end user does not require expensive software or training in cartography and GIS. Easy access to geological data through Story Maps can engage, educate, and hopefully inspire viewers to further research and create their own Story Maps.

The Indiana Geological and Water Survey (IGWS) has been creating Story Maps for several years. The free online IGWS Map Gallery showcases several web applications, from Indiana geology and geological hazards to a local limestone building tour. Photographs, geological records, and maps previously available only on paper or as individual digital downloads are now easily accessed.

Our most recent addition is a series of Story Maps about Indiana's coal beds. The IGWS has collected physical and chemical data and mapped Indiana's coalbeds for many years. Some of these data were available through a variety of publications, but some were never published until now.

The Story Maps created for five of Indiana's Pennsylvanian coal seams are a comprehensive digital compilation of geological information that allows users to interactively explore coal data and maps. This information is important for regional coal-quality evaluations and can be used by industry, state and federal agencies, and the public.

Over the years, the IGWS has also accumulated data, maps, and photomicrographs of the organic matter from the Middle Devonian-Lower Mississippian New Albany Shale (NAS) formation in the Illinois Basin. Until now, much of this was not published or made publicly available; they are, however, a substantial resource for academic and industry researchers because the formation is a hydrocarbon source rock. The NAS Story Map digitally compiles this information, allowing easy and quick access.

We plan to continue creating Story Maps to illustrate Indiana geology. This tool can revolutionize our mission of providing geological information, and we can reach a much broader audience and increase the impact of our products and services.

Keywords: GIS, story map, interactive map, Indiana geology, Illinois Basin geology

2. PAST AND PRESENT

Map making has come a long way from maps carved in stone, clay tablets, and ivory or painted on papyrus. With the understanding that the Earth is a sphere, and the grasping the idea of scale and projection the maps evolved. These days maps are made using computers, aerial photographs, electronic distance-measuring instruments, navigation systems, and remote sensing. The Internet made it easily accessible to all of us.

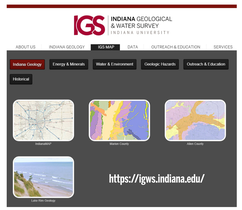
Modern GIS technologies allow us to capture, store, manipulate, analyze ,and manage spatial data, and can be found in many location-enabled services that rely on analysis and visualization.

Interactive web applications, like Story Maps, are an excellent tool to create dynamic publications by combining maps, narrative text, images, and videos.

A geologic map of what were then called the Northwestern States. Created by David Dale Owen it appeared in 1846 in the Quarterly Journal of the Geological Society of London.

Old maps showing the geology of Indiana.

3. STORY MAPS AVAILABLE FROM THE INDIANA GEOLOGICAL AND WATER SURVEY



The mission of the Indiana Geological and Water Survey is to provide geologic information and counsel that contribute to the wise stewardship of the energy, mineral, and water resources of the state.

As part of this mission thousands of geological samples and data were collected and archived since 1837. The geological information was disseminated in many forms including published maps, reports, databases and educational outreach programs. Many of these data, maps, and reports can be accessed via the IGWS website free of charge.

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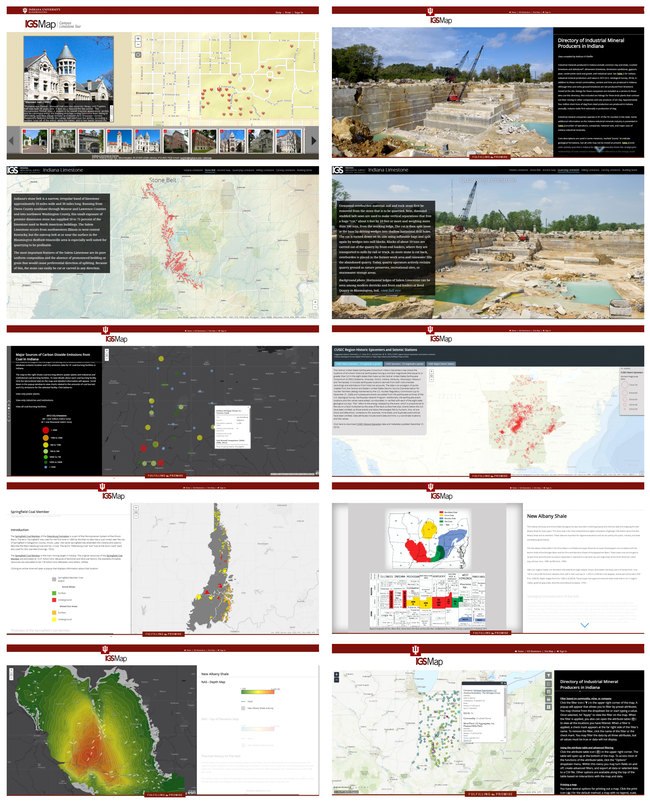
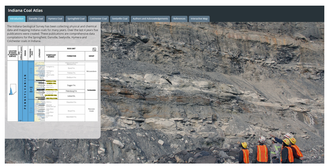


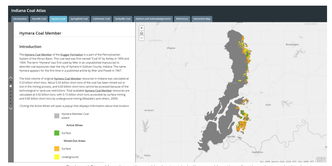
3. STORY MAPS OF INDIANA COALS

The Indiana Geological and Water Survey collects coal data, maintains coal quality and stratigraphy databases, and maps Indiana coal beds for many years. The Indiana Geological Survey's Coal Stratigraphic Database (cooperative project with the U.S. Geological Survey to maintain the National Coal Resources Data System) provides location and stratigraphic information for 19,621 public point-source coal and 205,488 stratigraphic layers. The Indiana Coal Quality Database provides location and quality information for 3,190 public, point-source coal data in southwestern Indiana.

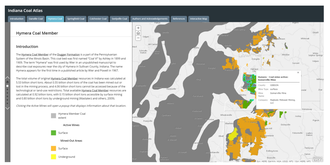
Both databases were used to create the most comprehensive maps of Indiana coalbeds. The Indiana Coal Atlas Story Maps created for five of Indiana's Pennsylvanian coal seams are available on IGWS website free of charge and allow users to interactively explore coal data and maps. This information is important for regional coal-quality evaluations and can be used by industry, state and federal agencies, and the public.

Surface coal mine in Indiana

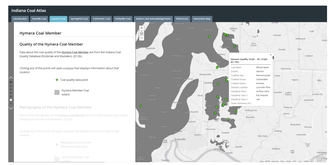




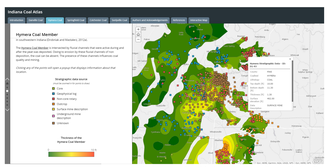
Each coal Story Map shows the coal bed extent in Indiana and location of active mines and mined-out areas.



By clicking on active mine a pop up displays more information about that location.



Clicking on any of the points displays more information about that location.



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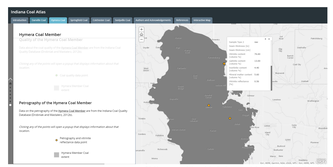

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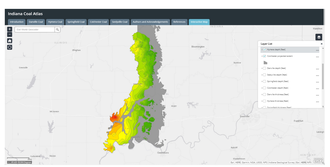
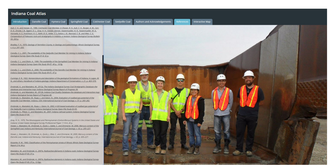


The interactive map allows user to turn any of the layers on and off .



A comprehensive list of references is added to each Story Map.

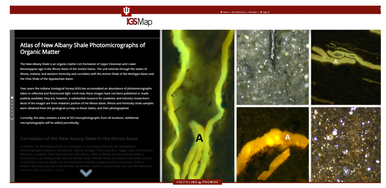
4. ATLAS OF THE NEW ALBANY SHALE PHOTOMICROGRAPHS OF ORGANIC MATTER

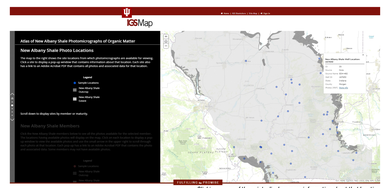
The New Albany Shale is an organic-matter-rich formation of Upper Devonian and Lower Mississippian age in the Illinois Basin of the United States. The unit extends through the states of Illinois, Indiana, and western Kentucky and correlates with the Antrim Shale of the Michigan Basin and the Ohio Shale of the Appalachian Basin.

Over years the Indiana Geological and Water Survey has accumulated an abundance of photomicrographs taken in reflected and fluorescent light. Until now, these images have not been published or made publicly available; they are, however, a substantial resource for academic and industry researchers. Most of the images are from Indiana's portion of the Illinois Basin. Illinois and Kentucky shale samples were obtained from the geological surveys in those states, and then photographed.

Currently, the atlas contains a total of 923 photomicrographs from 40 locations. Additional photomicrographs will be added periodically. Samples can be quarried by a member or maturity.

Clicking on each location displays a pop-up window to view the available photos, small arrows in the upper right corner allow scrolling through each photo at that location. Each pop-up also has a link to an Adobe Acrobat PDF that contains the photos





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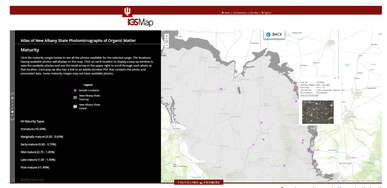
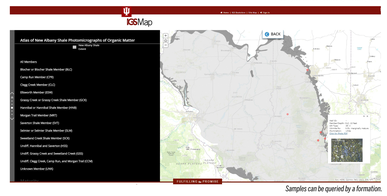


Samples can be queried by maturity level.



Samples can be queried by a formation.

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