A GIS application to collect in-house geologic information for evaluating mine subsidence

James McDonald
Lawrence H. Wickstrom
Michael P. Angle
Ohio Department of Natural Resources
Division of Geological Survey
Outline

- Mapping of Abandoned Underground Mines (AUM) - Review
- New Geologic Datasets
- OMSIUA (MSI) Application
- Example site evaluation
Mapping AUM

- Mapping began in 1969
  - Planimetric maps 1:62,500 scale
- Mapping at 1:24,000 scale
  - Started in 1977
  - 7.5-minute quadrangles
  - GIS Data Creation – 1995
- Internet Map Service – 2004
AUM Maps (1:24,000)
New AUM Developments

- **Low Resolution mine maps**
  - Scanned at 72 dpi
  - Served out on the Internet Map Service – 2004
  - Georeferenced – 2009

- **High Resolution Mine Maps**
  - Scanning Completed – 400 dpi
  - Serving of maps on the Internet Map Service – July 2010
  - Beginning of georeferencing

- **GIS Maintenance**
  - Adding AUMs
  - Edits to Existing AUMs

- **MSI Application**
Low Resolution AUM Maps
High Resolution AUM Maps
New Geologic Datasets

- Bedrock Geology: 1:24,000 and 1:500,000 scales
- Bedrock Topography: 1:24,000 and 1:500,000 scales
- Bedrock Structure Contour Maps: 1:24,000 scale
- Other Datasets: Drift Thickness, Karst, Glacial Geology, Surficial Geology in 3D, etc.
- Scanning of Paper Documents and Publications
Bedrock Geology (1:24,000)
Bedrock Topography (1:24,000)
Structural Geology (1:24,000)
Ohio’s New 1:500,000-Scale Bedrock Geology Map & GIS
MSI Application

- Load All Geologic Information
  - Vector GIS Datasets
  - Load Historical Project Maps
  - Access All Scanned Documents
- Provide an User Interface to Query the AUM Database
- Copy All Scanned Documents and Reports
- Automate Map Production
MSI Application
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Example Site Evaluation
Example Site Evaluation
<table>
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<tr>
<th>Formation</th>
<th>Top</th>
<th>Bottom</th>
<th>Remarks</th>
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<th>Top</th>
<th>Bottom</th>
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### Example Site Evaluation

**File No. 2715**

**Division of Geological Survey**

**Core Record**

- **County:** Stark
- **Township:** Plain
- **Quadrangle:** North Canton
- **State Coordinates X:** 3,309,240
- **Zone North**
- **Species of Plant:** Browning St., North Canton
- **Property Owner:** Fisher
- **Core Hole Designation:** Browning St. No. 2
- **Purpose of Core:** Stratigraphic test, mine subsidence
- **Fisher:** B. Nicklaus & D. Collins
- **Drilling Code:** ODNR, Division of Reclamation
- **Drilled For:** ODNR, Division of Reclamation
- **Surface Elevation 1157:** Datum for Elev: Mean Sea Level
- **Date Started:** 10-19-88
- **Date Completed:** 10-19-88
- **Logged By:** G. Larson
- **No. of Core Rations:** 1
- **Total Depth:** 30.50
- **Core Disposition:** ODNR, Division of Reclamation

<table>
<thead>
<tr>
<th>TOP PT.</th>
<th>BOTTOM PT.</th>
<th>THICKNESS PT.</th>
<th>DESCRIPTION</th>
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<tr>
<td>0.00</td>
<td>19.50</td>
<td>19.50</td>
<td>Overburden</td>
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<tr>
<td>10.50</td>
<td>36.50</td>
<td>7.00</td>
<td>Limestone, medium-light-gray to medium-gray; sparse; bioturbation becomes argillaceous downwards from 20.50 to 20.00 ft. Vertical fractures from 20.50 to 20.76 ft. Healed fractures; marls; fossils; large disseminated pyritic and pyritic fragments common; core badly broken, not fully recovered.</td>
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<tr>
<td>26.50</td>
<td>30.70</td>
<td>4.20</td>
<td>Void, coal mine suspected.</td>
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<tr>
<td>30.70</td>
<td>31.10</td>
<td>0.40</td>
<td>Coal, dull; poorly sorted; abundant fusain bands; slabs banded with duna. Core badly broken.</td>
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<tr>
<td>31.10</td>
<td>32.00</td>
<td>0.90</td>
<td>Siltstone, medium-gray to medium-dark-gray; stony to silty, micaceous, hard, rooted; rapid gradational lower contact.</td>
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<tr>
<td>32.00</td>
<td>34.50</td>
<td>2.50</td>
<td>Sandstone, very-light-gray to light-gray; fine to medium-grained, micaceous, coal spars; carbonaceous; vertical fractures from 33.70 to 34.00 ft.; rooted, rooting decreases downward.</td>
</tr>
</tbody>
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The Division of Geological Survey makes no claims or guarantees regarding the completeness or accuracy of this information.
Summary

- Brings Together All Geological Information
- Speeds Evaluation Process
- Used for Preliminary Mine Subsidence Insurance Evaluations
- Potential for Transportation Planning and Remediation