

Mapping the Michigan Natural Storage Gypsum Mine using a Geological Information System (GIS).

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There are almost 9.5 km of former mine workings at the Michigan Natural Storage (MNS) gypsum mine in Grand Rapids. Although no longer being mined, access is maintained for dry storage and is also available to school groups for tours. The mine is one of the few places in the Lower Peninsula where Mississippian age rocks can be observed in outcrop. A historic mine map, created by Williams & Works Civil Engineering & Survey in 1951, was obtained from MNS in order to create a GIS database for the mine. The map was scanned at 200 DPI and georeferenced to surface features such as road intersections. Detailed mapping using laser measurement devices confirmed the accuracy of the original map. Approximately 4 km (~ 42%) of the accessible tunnels were mapped, including 19 cave-ins, 437 meters of standing water and numerous geologic features. Preliminary mapping of cave-ins and flooded tunnels suggest a spatial relationship between Plaster Creek, saturated ceilings, and cave-in locations. Tunnels under the creek, along with many of the connecting tunnels, are flooded with water ranging from 10-60 cm depth. Flooded tunnels and cave-ins are spatially correlated; suggesting that saturation of upper stratigraphic units is causing the underlying layers to become less stable. Many features of geologic interest such as carbonized tree bark, coprolites, mud cracks, and ripple marks were also mapped to facilitate geology field trips and to provide a spatial database for further sedimentary environment analysis.