
7-12 - PRELIMINARY GEOLOGIC MAPS OF ALPENA COUNTY, MICHIGAN



Sunday, 21 April 2024



1:30 PM - 5:30 PM



Grand Ballroom, Oasis CC (Oasis Hotel & CC)

Booth No. 17

Abstract

The purpose of this project is to produce multiple geologic maps of the Devonian-Mississippian strata in Alpena County, Michigan with a focus on delineating the members of the Antrim Shale. The resulting maps will be useful for resource assessment (aggregate and natural gas) and natural hazard assessment (sinkholes).

Oil/gas and water well logs were analyzed for formation tops and bedrock elevation in order to construct four maps using ArcGIS Pro: bedrock, drift thickness, bedrock topography, and cross-sections.

The well distribution provided an interesting difficulty in constraining the geology of Alpena County. The southern half of the county has an extensive subsurface dataset from Antrim gas wells which provided excellent constraints on bedrock elevations and formation tops. The northern half of the county by contrast has a paucity of hydrocarbon wells. Water wells provided constraints on the bedrock surface but the lack of detailed lithologic descriptions made interpreting the bedrock formations in this portion of the county challenging.

Bedrock units form arcuate belts from northwest to southeast in Alpena County and range from the Lower Mississippian units in the far southwest (Bedford-Berea, Sunbury, and Coldwater formations) to Devonian units across the majority of the county (Traverse Group, "Squaw Bay Formation", Antrim Shale, Ellsworth Shale). Pleistocene incision has carved significant paleovalleys on this bedrock surface, with valleys trending NE-SW in Alpena County. Glacial drift thickens to the south and southwest in Alpena County.

The refined Alpena bedrock maps provide the community with a better assessment of where natural resources are present and the susceptibility of natural hazards in the area. Alpena historically has been a site of quarrying (limestone, shale) operations and hydrocarbon exploration. Carbonate-dominated intervals in the Traverse Group are susceptible to karsting and sinkholes are present in northeastern Alpena County. Understanding the risk of karsting assists in mitigating groundwater contamination risks from septic tanks and other sources of contamination.

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