Lake Erie Geology and Landforms: Overview, Issues and Forecasts.

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The bedrock formations in the Lake Erie region contain important industrial and energy minerals, including limestone, sandstone, clay shale, gypsum, halite (rock salt), natural gas, and oil, whereas the unconsolidated glacial and lacustrine beds yield clay, peat, sand, gravel, groundwater, and fertile soils. However because most of the bedrock in the Lake Erie basin is blanketed by these glacial deposits, the lithology and structure of the underlying rock has not been determined. Also, the extraction and processing of economic mineral deposits often involves land use conflicts. Another important issue is coping with geological hazards including, earthquakes as resultant soil liquefaction (magnitude 6 tremor near Ashtabula in 1998), sinkholes and caves associated with karst (limestone) terrains, abandoned mine subsidence, shoreline erosion and bluff recession, radon and other toxic gases, landslides and mass wasting, springs and groundwater seeps, lake/tributary flooding and storm surges, and swelling soils. The water level history of Lake Erie and related crustal rebound processes are imperfectly understood which has lead to confusion and conflicting predictions of lake level trends. Finally, the integral relationship between geology and sustainable biotic habitats is often not given appropriate consideration when construction projects are proposed. Several of the states surrounding the Lake Erie drainage basin are embarking on a long-range mapping program designed to produce three-dimensional, computer-based maps of the lake basin. These will include geologic materials from soil to bedrock, resources from water to construction aggregates, processes from erosion to earthquakes, and systems from natural to managed watersheds. Surficial geologic maps of this type will facilitate emerging concepts such as "smart growth," "sustainable development," "brownfield redevelopment," and "greenfield preservation." To deal with the complexities of the coastal region, shoreline classification systems based on geological origin and contemporary processes will need to be developed. Students in the geological sciences will need to be encouraged to undertake detailed mapping projects, utilizing emerging technologies, and be given academic rewards for selecting this line of research.