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Curiosity's mission of Exploration at Gale Crater, Mars

The Curiosity rover discovered fine-grained sedimentary rocks, inferred to represent a system of ancient rivers, lakes, and groundwater networks at Yellowknife Bay, Gale Crater, Mars. This paleoenvironment would have been suited to support a Martian biosphere founded on chemolithoautotrophy. This aqueous environment was characterized by neutral pH, low salinity, and variable redox states of both iron and sulfur species. C, H, O, S, N, and P were measured directly as key biogenic elements, and by inference N and P are assumed to have been available. The environment likely had a minimum duration of hundreds to tens of thousands of years. These results highlight the biological viability of fluvial-lacustrine environments in the post-Noachian history of Mars.