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2024 Birdsall-Dreiss Distinguished Lecture – Part 3

Groundwater and native orchids: Is there a link (and why might anyone care)?

Friday, May 17th 2024, 09:45 am, Building 50.41, Room 045/046

Institute of Applied Geosciences: Hydrogeology, Engineering Geology, Geochemistry and Economic Geology, Structural Geology, Technical Petrophysics

There are over 200 species of native orchids (*Orchidaceae*) found throughout North America. Many years of field observations of the type and abundance of orchid populations have revealed a striking (albeit qualitative) link to groundwater flow systems. There appears to be a correlation between orchid species and the ecosystem position within the “Unit Basin” of regional groundwater flow. A fourfold “classification” scheme for the native orchids of Alberta was proposed: those found in discharge, recharge, and midline areas, and a group that shows no general preference.

To test the hypothesis that position in the groundwater flow system controls at least part of the distribution of (certain) orchid species, soil moisture conditions and topography were measured at flowering sites for three closely-related species of *Spiranthes* in Nova Scotia, Canada. Results showed a threefold distribution with species found in dry, intermediate to dry, and wet slope bottoms. At one site where all three species were found, there was a clear spatial demarcation based on soil moisture and topography. These three species would be located in the recharge, midline, and discharge areas, respectively.

Recognition of a linkage between the groundwater regime and native orchids is significant for a number of reasons. First, for locating orchid populations, it is often useful to make use of the relationship between topography and flow systems: if one can predict from the topography the position in the groundwater flow regime, it can be very helpful in locating previously unknown populations of plants. Second, for understanding habitat function, knowledge of the hydrogeology and hydrology of the ecosystem is of prime importance. Third, for habitat protection and/or restoration, it is critically important to understand the source of the groundwater flow system to ensure adequate protection of the entire flow system supporting the orchid population. For example, orchid populations near a spring might be protected at the actual point of groundwater discharge, but the recharge area feeding the spring often remains unprotected and open to disturbance. Thus, a knowledge of the linkage between groundwater flow systems and native orchids is important.