RIVER-AQUIFER INTERACTIONS IN GLACIAL AND ALLUVIUM-FILLED RIVER-VALLEY SYSTEMS: AN EXAMPLE FROM MILFORD, NEW HAMPSHIRE

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Ground water is hydraulically well connected to rivers that flow on coarse-grained, unconsolidated, glacial and alluvial deposits. The patterns of ground-water flow and flux through these systems commonly are highly dependent on river-aquifer interactions.

The Milford-Souhegan aquifer is characteristic of many glacial and alluvial-valley aquifers. Hydraulic heads, flow directions, and recharge in the aquifer are largely controlled by river stage. The Milford-Souhegan aquifer receives about 25 percent of its annual recharge from (1) upland tributaries that recharge the aquifer at edges of the valley, and (2) reaches along the Souhegan river that lose water as a result of the shape of the valley, permeabilities of the aquifer, and ground-water withdrawals from wells adjacent to the Souhegan.

A comprehensive data-collection program is ongoing at Milford to investigate river-aquifer interactions. Data-collection includes (1) streamflow measurements at more than 50 sites (1988-95), (2) computation of hydraulic gradients between river and aquifer at nine locations (1994-95), and (3) collection of specific conductance and temperature data at five river and ground-water sites (1994-95). Several surveys were made of (1) heads in the riverbed sediments, (2) seepage fluxes, and (3) river-water temperatures. Anecdotal information based on distribution of contaminant plumes in the aquifer have also helped identify patterns of recharge and discharge. Collectively, this information helped to formulate concepts of spatial and temporal patterns of ground-water recharge and discharge that are affected by the Souhegan and its tributaries.