

## **Groundwater–surface water interactions at a fen margin: hydrological controls on the micro-habitat of an indicator snail species *Vertigo geyeri***

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**Abstract** Pollardstown fen is an important groundwater-dependent ecosystem in eastern Ireland. One of the ecological features of the fen is the rare snail species *Vertigo geyeri*, which is protected under the European Union Habitats Directive. A major study in the period 2002–2005 focused on establishing the micro-meteorological and micro-hydrological requirements for this indicator snail species at Pollardstown fen. It was shown that high relative humidity (above 80%) and close proximity to a phreatic water surface (approximately 0.1 m below ground surface) are important for maintaining snail populations. A study of the groundwater inflows to the fen, involving measurements of vertical and lateral hydraulic gradients, coupled with an evaluation of soil thermodynamics and meteorological observations, suggested that the hydrological regime of the fen is sensitive to both the groundwater inflow rate and the transpiration process of the wetland vegetation. Local topography and geomorphology are important considerations when deciding on the extent of potential snail conservation areas, as the long-term viability of conservation sites is likely to be greater in areas with gentle slopes that allow seepages to emerge at lower levels, if such seepages are reduced or lost at higher elevations.

**Key words** fen; wetland; eco-hydrology; hydro-ecology; *Vertigo geyeri*; bioindicators