

ABSTRACT NO: 361

The effects of regional groundwater in bogland restoration

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Peat bogs are traditionally considered to be relatively isolated hydrological systems with no direct linkage to a source aquifer. The isolation of a raised bog ecosystem from regional groundwater flow is primarily a consequence of its mode of development, where natural drainage is impeded by topography and geomorphology. Recent research on Clara Bog, Ireland, indicates a more complicated relationship between the bog and regional groundwater system. This interconnection has significant implications for restoration design.

Typical of most Irish raised bogs, peat overlies low permeability lacustrine clay, impeding downward movement of water. However, there are areas under the bog where this clay barrier is naturally absent, allowing the peat to rest directly on an underlying aquifer, a regional body of relatively permeable till subsoil. In the recent past the western tract of the bog has subsided significantly - up to 1.0 m in local areas. Consolidation of the peat substrate has altered hydrological conditions on the bog surface, thereby affecting its ecology. Coincident with bog subsidence has been a localised drop in regional groundwater table. External drainage has created an enhanced hydraulic connection between the high bog and regional groundwater flow, resulting in vertical drainage from basal peat in the high bog. Both peat consolidation and groundwater level decrease have occurred in areas where clay is absent. The inference is that maintenance of regional groundwater levels can be a critical support condition in the conservation of raised bog wetlands, and that restoration measures must be designed based on the bogs controlling hydrogeological processes.