



The water balance as an approach to assessing groundwater dependency in raised bog wetlands

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The management of raised bogs, as active peat-forming ecosystems, requires an understanding of the relationships between regional hydrology and wetland ecohydrological processes. Marginal drainage, < 20 years, of Clara Bog, Ireland, has resulted in dramatic morphological changes. Differential peat consolidation has fragmented what was one topographic catchment area into four distinct catchment areas. Runoff has reduced by c. 40% from the original main catchment area and there has been a c. 25% decrease of suitably saturated areas supporting the growth of sphagnum moss species.

In undisturbed bog systems the recharge rate of water seeping through the bog body to the regional groundwater table is in the order of 40 mm/ year. The downward seepage rate in Clara is > 100 mm/ year. A reduction in pore water pressure, due to drainage of the regional groundwater table, has disturbed the structure of the peat substratum and induced water loss from peat storage, resulting in the ecohydrological modification of the bog surface. Numerical modelling of a simulated raised groundwater table reduces the leakage rate to between 30 and 50 mm/ year. The significance is that the hydraulic gradient of the regional groundwater table is an important environmental supporting condition in raised bog ecosystems, implying indirect groundwater dependence.