

# Hydrogeology of Wales: Introduction - issues

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**This page is part of a category of pages that provides an updated review of the occurrence of groundwater throughout Wales.**

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Wales faces broadly the same groundwater issues as the rest of the UK although its overall focus is different. The key management priority is currently the implementation of the European Community Water Framework Directive and satisfying the rigours of the European Community Nitrate Directive ([European Community, 1991](#)). The focus for both includes relatively minor aquifers including the fractured basement rocks of upland Wales. One of the key difficulties is uncertainty due to lack of data. The timeframe for the initial characterisation of groundwater bodies was such that new data could not be gathered and processed. An important goal, therefore, was that existing data be brought together and synthesised as a whole in order to support the characterisation process. A second aim was to identify methods by which data scarcity could be addressed, including rapid geological map revision, catchment modelling and intelligent use of interpolation.

Much of Wales is underlain by basement rocks of Lower Palaeozoic and older strata which were traditionally considered as only of marginal interest as an aquifer. The Water Framework Directive explicitly requires that all groundwaters be protected and these lesser aquifers have now come under the spotlight. Data are scarce for many areas and knowledge of recharge processes and interaction with surface water in most catchments is poorly understood. Investigation of upland catchment hydrogeology initiated by [Shand et al. \(2007\)](#) in the upper Severn valley, enables improved understanding of shallow groundwater systems in much of west and central Wales.

Much of the groundwater in Wales is vulnerable to surface pollution. Pressures from point source pollution include farmyards, sheep dips, septic tank systems, solid waste disposal, industry and mining. Diffuse sources due to agriculture include the application of inorganic fertilisers and landspreading of organic waste. Shallow fractured aquifers, karstic limestones and superficial granular deposits are subject to rapid groundwater transport and are at risk from the ingress of pollutants, both from the ground surface and from loosing stretches of rivers and streams. In the superficial deposits in west Wales nitrate concentrations can be as high as 40 mg/l (NO<sub>3</sub>-N), although the fractured Ordovician and Silurian strata in the same area are hardly affected at all with a median value of less than 6 mg/l (NO<sub>3</sub>-N). The European Community maximum admissible concentration for drinking water is 50 mg/l (NO<sub>3</sub>-N). Most of the established nitrate vulnerable zones in Wales are in south-east Wales and in the Dee catchment in north Wales.

Acid mine drainage has been a significant issue in south Wales following the withdrawal from coal mining that took place in the 1990s. Most of the mine water risings have now reduced in strength and corrosivity, whilst others are treated by discharging over limestone chips and through reed beds to provide discharges that are more acceptable to surface watercourses. Acid mine drainage has long been a problem from abandoned metal mines in some valleys in west Wales. However, all but a few of these have now reduced to tolerable concentrations.

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