

Hydrogeology of Wales: Management and regulation of groundwater - need for management

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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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Those aquifers which are exploited for public water supply, industry, power generation and agriculture need careful management to ensure that supplies are able to cope with any future increases in demand and are resilient to a changing climate.

Whilst many other aquifers in Wales are not heavily exploited, they are used for private supply and management of them is also required. Furthermore, groundwater base flow to rivers and streams and support to some wetlands needs to be safeguarded. Groundwater-dependant terrestrial ecosystems are important habitats. There are around 350 known groundwater-dependant ecosystems in Wales, mainly comprising groundwater-fed wetlands such as fens and bogs but also include sites such as the Pant-y-Llyn turlough and cave systems such as Ogof Ffynnon Ddu.

Groundwater is easily polluted and can be difficult and expensive to remediate therefore management of discharges or other activities which can cause pollution is essential. Several of the Carboniferous Limestone aquifer sources have been abandoned for public water supply due to their particular vulnerability to pollution.

The *Water Act, 2003* was implemented to streamline abstraction licensing, with greater focus on water conservation and protection of the water environment. Some activities which were previously exempt from licensing, such as mine and quarry dewatering and trickle irrigation, now need a licence, and the historic groundwater licence-exempt areas were planned to be removed - a process that has yet to begin.

European legislation has also had a significant impact on the protection and management of groundwater, the most significant of which has been the Groundwater and Groundwater 'Daughter' directives, the Habitats Directive and the Water Framework Directive.

Between 2001 and 2008 the Environment Agency also developed Catchment Abstraction Management Strategies (CAMS) to promote groundwater and surface water resource management. These consider recharge, the water requirements of the environment, including groundwater base flow to support flow in rivers, and the amount of water licensed for abstraction. They enable areas of water availability for future licensing and areas which are already overlicensed to be highlighted. However, they only cover areas designated as *principal aquifers* (see [Groundwater pollution](#)) and catchments in *secondary aquifers* which have a large number of groundwater abstractions, e.g. the Old Red Sandstone in the Wye catchment.

The CAMS process designated only two catchments in Wales as 'no water available' or 'overlicensed' for groundwater abstraction: the Carboniferous Limestone aquifer in south Pembrokeshire and the Permo-Triassic sandstones in the lower Dee valley. A difficulty in identifying and quantifying

groundwater abstraction pressures in Wales is the presence of the groundwater licence-exempt areas where the number and volume of abstractions is not known. Pressures which do exist may be acute locally, but are unlikely to have widespread implications.

Groundwater is used to augment flows in the River Clwyd in north Wales, to mitigate the impact from an adjacent large public water supply abstraction (see [Vale of Clwyd](#)). This abstraction from the Sherwood Sandstone south of St Asaph has minimal impact on the river during winter months, but during the summer increased demand for water from seasonal holidaymakers along the north Wales coast, coupled with naturally lower river flows may cause derogation. The augmentation scheme, the only one in Wales, was implemented by the Welsh Water Authority in 1977 at a cost of £580 000. It is designed to augment flow and ensure no reduction in the natural river flow downstream of the abstraction. This is achieved by releasing groundwater from several augmentation boreholes into the River Clwyd higher up the catchment. These boreholes take advantage of the natural artesian conditions which exist in the area due to the thickness of low permeability superficial deposits confining the sandstone bedrock aquifer. The scheme operates when river flow immediately upstream of the public abstraction drops below $147\ 000\ \text{m}^3\text{d}^{-1}$. At this point the abstraction must then be compensated by an equal augmentation discharge from the boreholes.

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