

Water Note 3

Groundwater at Risk: Managing the water under us

Groundwater is hidden from sight, yet it is an essential part of the water cycle. Over 95% of the world's freshwater, excluding glaciers and ice caps, is found underground. Groundwater provides the steady, base flow of rivers and wetlands. Maintaining this flow and keeping it free from pollution is vital for surface water ecosystems.

Groundwater is also a crucial source of drinking water, supplying the water systems used by three out of four EU citizens. In a few countries, such as Denmark, groundwater extraction provides almost all drinking water, so its protection is vital. European economies also tap groundwater for industrial cooling and for agricultural irrigation.

The Water Framework Directive protects clean water across Europe. It highlights the importance of groundwater bodies: Member States must designate separate bodies and ensure that each one achieves "good status" by 2015. This mirrors the requirements for surface water bodies (see *Water note no. 2*).

Each groundwater body is a distinct volume of water. The box on the next page describes how separate groundwater bodies are delineated.



Quantity and quality

The Water Framework Directive defines good status of groundwater - the goal for 2015 - in terms of both quantity and chemical status.

To ensure a stable quantity of groundwater, the directive requires the long-term sustainable use of groundwater. Thus, extraction of water from a groundwater body must not exceed the rate at which freshwater replenishes it. If it does, the clean groundwater from that body will become depleted. This has particularly significant implications for coastal areas, where seawater can seep into freshwater aquifers and spoil precious freshwater resources.

Member States set the quality standards - or threshold values - nationally for chemicals in groundwater. They do so following the approach and methods laid out in the 2006 directive on groundwater, which takes into account the widespread differences in geology and other factors across Europe. To achieve good chemical status also means complying with EU-wide quality standards for nitrates and pesticides. This includes the Nitrates Directive, which requires measures to protect surface and groundwater from pollution due to nitrogen-based fertilisers used in agriculture.

The Water Framework Directive recognises the importance of the cycle linking groundwater and surface waters and it specifies that good status - in both quantity and chemical terms - of a groundwater body also means protecting the surface water bodies and terrestrial ecosystems that depend on its waters.

The Water Framework Directive establishes a legal framework to protect and restore clean water across Europe and ensure its long-term and sustainable use. (Its official title is *Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy*.)

The directive establishes an innovative approach for water management based on river basins, the natural geographical and hydrological units, and sets specific deadlines for Member States to protect aquatic ecosystems. The directive addresses inland surface waters, transitional waters, coastal waters and groundwater, and establishes innovative principles for water management, including public participation in planning and economic approaches, including the recovery of the cost of water services. Under Article 4(1) of the Directive, Member States should aim to achieve good status of all bodies of surface water and groundwater by 2015.

The first look

In the preliminary assessments presented in 2005, Member States reported that 30% of the EU's groundwater bodies are at risk of not achieving good status by 2015. The situation, however, varies considerably across Europe. A few Member States, including Belgium, the United Kingdom and the Czech Republic, estimated that about 60% of their groundwater bodies were at risk. Others, such as Austria, Estonia and Portugal, saw a much brighter picture with 80% or more of the bodies expected to maintain or achieve good status by 2015. (For further data, see DG Environment's website.)

The risk factors also vary greatly across Europe. In Mediterranean countries with low summer rainfall, extraction for drinking water and other purposes can deplete groundwater. In many parts of the EU, contamination from both industrial sites and agricultural chemical pollution threatens groundwater.

The largest share of the EU's groundwater bodies - 45% - requires additional data to be properly assessed. Member States are currently carrying out detailed monitoring of these bodies and those at risk to understand better the pressures they face (see *Water note no. 6* on monitoring activities).



Next steps

Member States will use the information obtained from this detailed monitoring to establish threshold values by 2008. They will also prepare management plans for their river basins by the end of 2009. These plans will provide the final designation of groundwater bodies and they will describe the measures Member States will take to reach "good status" for all the bodies of water on their territory - including groundwater bodies.

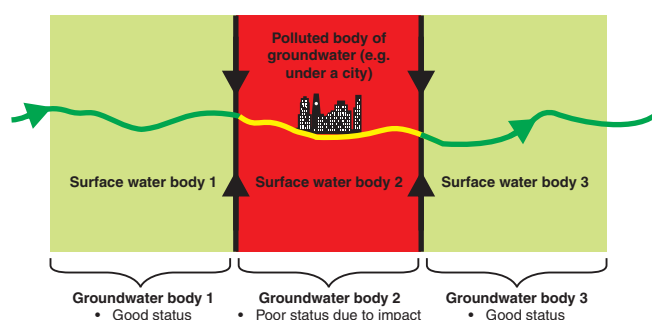
By carrying out these steps Member States are bringing to the fore the often "hidden" problems of groundwater and are taking action to protect this vital resource.

Designating groundwater bodies

Each groundwater body is a distinct volume of water in an aquifer where there are significant water flows or significant extraction of water. In order to delineate individual groundwater bodies, Member States use monitoring data and scientific knowledge to analyse underground geology. They also consider other key factors, such as human pressures on groundwater.

Designating separate bodies is an important step in managing and protecting groundwater. On this basis, Member States can focus their monitoring and measures on those groundwater bodies facing significant pressures and which are at risk of not reaching good status by 2015.

For example, when Member States identify groundwater bodies, a section of groundwater subject to significant pollution should be designated separately from neighbouring sections that do not. The figure below illustrates such a scenario. The groundwater under the central part of the land is contaminated by pollution seeping from a city. This middle section of groundwater should be designated as a separate body from surrounding areas, which face little contamination. This way, monitoring and measures can focus on the central groundwater body.



While the Water Framework Directive provides a common basis for designation, Member States apply it to local conditions, using their own methods. In their initial designation of groundwater bodies, Member States took somewhat different approaches. Poland and the Baltic States designated large bodies, with an average size over 1500 km². Other Member States designated smaller bodies, for example under 100 km² in average size in Netherlands and Sweden.

To learn more about the Water Framework Directive and water in Europe, see the **Water Information System for Europe (WISE)**: water.europa.eu. The European Commission's web pages on water protection, which are linked to WISE, provide further information, including a map showing the share of groundwater bodies not at risk in each Member State: see http://ec.europa.eu/environment/water/water-framework/facts_figures.