

Assessing the value of groundwater

Science Summary SC040016/SS

This report presents a framework of analysis within which non-economists working in the field of groundwater policy, protection and clean-up can assess the value of different groundwater bodies in the UK. The report explains how the concept of economic value can be applied to groundwater and how information about economic value can be used in decision-making. Part of the research involved a review of existing literature from the UK, North America, Europe and Australia on valuing groundwater.

The starting point for such a framework is to pose the fundamental questions of economic analysis:

- What is the environmental resource?
- What benefits does it provide?
- For whom are these benefits provided?
- What are the potential changes of concern in the quality and quantity of the resource (e.g. the impact of contamination, abstraction or a new protection policy)?
- How do these changes affect the benefits provided by the resource?

The economic value of groundwater is influenced by a number of factors including:

- the physical characteristics of the water body;
- its current and future potential uses;
- alternative sources of the benefits it provides (i.e. the availability of suitable substitutes);
- its characteristics and the number of people affected.

This variety of factors means that separate cost-benefit analyses of each groundwater body are required.

The process of economic valuation assumes that individuals hold preferences for resources that are not traded in markets as well as for those that are. It looks for evidence of individuals' preferences for

environmental 'goods' using three main types of technique:

- market prices proxies – actual markets for the resource itself or for replacement resources;
- revealed preferences – other markets such as the housing market;
- stated preference – asking individuals directly what they would be prepared to forgo to protect the resource or accept as compensation for its degradation.

Various methods based on these techniques are used to measure value. In some cases it is possible to use a technique called benefit transfer to transfer value evidence found for a resource in one context to another context. Valuation of a resource usually relates to a specific change in its quality or quantity.

The key to assessing the value of groundwater is to:

- understand the factors affecting its value;
- identify the baseline (what would happen without a policy change or project) and the change from this baseline which the policy or project will create;
- select the most appropriate valuation methods.

Four case studies from groundwater bodies in Hampshire, Lincolnshire, Kent and Nottinghamshire illustrate the valuation framework and provide an initial indication that the economic value of a groundwater body is likely to be significant. Those groundwater bodies that provide a substantial contribution to surface water ecosystems, industry and agriculture are likely to be the most valuable. The case studies also highlight the complex nature of cost-benefit analysis for groundwater, and the serious gaps in data and in understanding physical impacts. The report recommends giving priority to acquiring information according to the likely magnitude of benefits.

Policy developments such as the Water Framework Directive are likely to increase the demand for a better

understanding of groundwater as an economic resource, as well as for quantitative evidence of its importance. The report will help the Environment Agency and others make more informed decisions when evaluating the costs and benefits of different investment and policy options that affect the quality and quantity of groundwater.

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