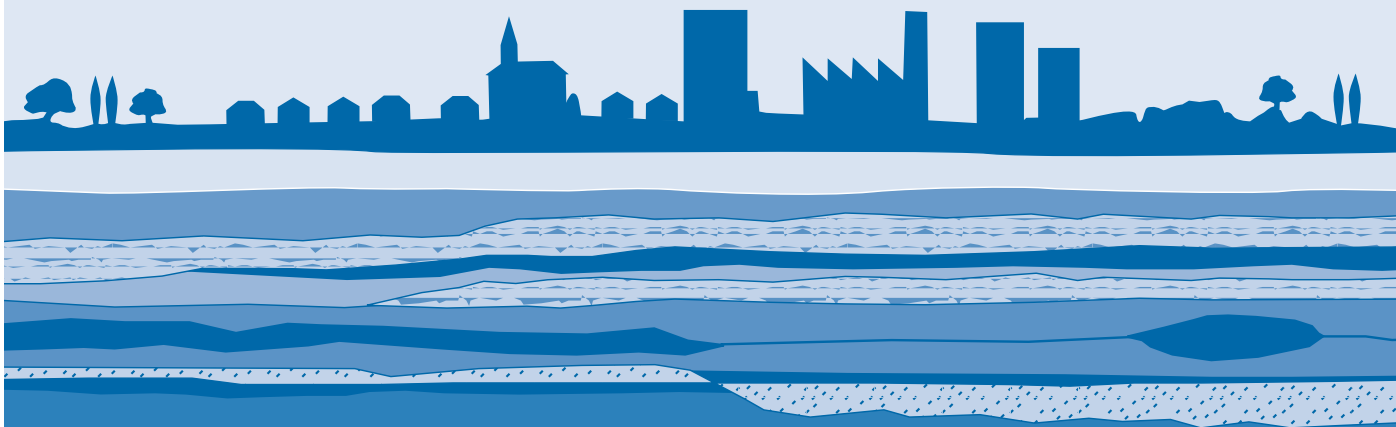


# underground, under threat



Groundwater protection: policy and practice  
Part 1 – overview

We are the Environment Agency. It's our job to look after your environment and make it **a better place** – for you, and for future generations.

Your environment is the air you breathe, the water you drink and the ground you walk on. Working with business, Government and society as a whole, we are making your environment cleaner and healthier.

The Environment Agency. Out there, making your environment **a better place**.

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## Foreword

The role of groundwater in providing us with good clean water has long been out of the public eye. But it is a vitally important resource, providing one third of the water we drink and feeding many rivers and wetlands. The 2006 drought has shown just how much we depend on groundwater, and the pressures that it is under.

At the Environment Agency we aim to raise the profile of groundwater and give priority to its protection and management. In this report, our first on the state of groundwater, we outline the uses of groundwater as a water resource and then go on to look at the risks to this resource from pollution and over exploitation. At the end of the report we discuss how we manage groundwater and the challenges that we face.

It is essential to plan now to secure the long-term health of groundwater for both the environment and public water supply. We will continue to look at groundwater as part of the bigger picture of water management, and we look forward to working in partnership with others to protect this asset for future generations.



A handwritten signature in blue ink that reads "Paul Leinster". The signature is written in a cursive, flowing style.

**Paul Leinster**  
Acting Chief Executive,  
Environment Agency

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## Part 1 – Overview

- Our overall position at the Environment Agency on the management and protection of groundwater
- An overview that identifies our goals

## Part 2 – Technical Framework

- A basic introduction to groundwater and its place in the water cycle
- Key principles and concepts
- Description of the threats from human activities

## Part 3 – Tools

- Introduction to the tools available for analysing and assessing the risks to groundwater
- A brief overview of the use and application of each tool and where to obtain it

## Part 4 – Position Statements

- Key groundwater legislation and how we interpret it
- Position Statements on activities that pose a risk to groundwater and how we plan to deal with them

# Groundwater Protection: Policy and Practice

## 1 Introduction

Groundwater is hidden from view, yet it is everywhere beneath our feet. It is a vital resource that plays many roles in our lives and environment:

- It provides water for rivers, wetlands and water supplies.
- It supplies tap water for 16 million people across England and Wales.
- It sustains the flow and ecology of our rivers, particularly in dry weather.
- It is important for both industry and agriculture.
- In some places, it may be the only practical source of fresh water.

The Environment Agency is the statutory body responsible for the protection and management of groundwater resources in England & Wales.

We have set out a framework for our regulation and management of this precious resource in a set of documents, collectively known as *Groundwater Protection: Policy and Practice* (GP3). In these we describe our aims and objectives for groundwater, our technical approach to its management and protection, the tools we use to do our work and our policies and approach to the application of legislation. The documents also provide a route map to other policies, strategies, procedures and technical resources related to groundwater. More detail is given at the end of this Overview.

Each part of the GP3 is focused on a different audience. As well as providing a guide to GP3, this Overview (Part 1 of the GP3) sets out our Core Policy and describes our aims and objectives for groundwater for policy makers, planners and the public at large.

The Technical Framework (Part 2) introduces basic groundwater concepts, and the principles of management, monitoring and risk assessment that we use in groundwater protection, primarily for a technically aware but non-specialist audience.

The Tools we describe in Part 3 are those used by hydrogeological specialists in the assessment and management of groundwater issues.

Our detailed policies for different sectors and activities are set out in Part 4. These will be of interest to operators, developers, planners and anyone whose activities have a direct impact on or are affected by, groundwater.

### Our aims for the GP3 are:

- **to provide a framework** for our statutory role – to ensure we use our powers in a consistent and transparent manner;
- **to encourage co-operation** between ourselves and other bodies with statutory responsibilities for the protection of groundwater. These include national and local government, water companies, Natural England and the Countryside Council for Wales;
- **to promote** our policies, so that land-users and potential developers may anticipate how we are likely to respond to a proposal or activity;
- **to influence** the decisions of other organisations on issues we are concerned about but which we do not regulate;
- **to ensure** that groundwater protection and management are consistent with our Vision for the environment and a sustainable future;
- **to provide** vital information and background on groundwater protection in England and Wales.

## 2 Core policy and aims for groundwater protection

### The Environment Agency's core groundwater policy is:

To protect and manage groundwater resources for present and future generations in ways that are appropriate for the risks that we identify.

This policy is in support of the Environment Agency's overall vision for 'a healthy, rich and diverse environment in England and Wales, for present and future generations'.

#### To achieve this we aim:

- to ensure we meet the needs of the environment and people;
- to manage surface water and groundwater as an integrated whole;
- to use robust measures to prevent the pollution of groundwater;
- to achieve the environmental objectives of the Water Framework Directive;
- to make information on groundwater available and raise the general awareness of groundwater issues;
- to undertake research, so that we have a better understanding of groundwater processes;
- to make sure our policies for managing groundwater support our work in the wider environment.

Prevention is better than cure. We aim to prevent damage to groundwater in the first place, rather than having to restore it later. In the long term, this is both more cost effective and better for the environment.

We wish to exert real influence on the problems and threats which groundwater faces. To do this, it is important that we, as an organisation, are flexible enough to respond to the actual situations in front of us. We must be able to work with others to achieve our aims. All this will help to keep the focus on results and on the nine themes which make up our Vision for the environment in general (see next page).

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## Groundwater and our Vision for the environment

Clean and sustainable groundwater resources will play a crucial role in achieving our Vision for the environment. Nine themes support this Vision:

- Better quality of life
- Improved and protected inland and coastal waters
- Enhanced environment for wildlife
- Reducing flood risk
- Restored, protected land
- Greener business world
- Sustainable use of natural resources
- Limiting climate change
- Cleaner air

### Some examples of the role that groundwater can play in these themes are:

- Groundwater provides a good supply of drinking water. It also helps to ensure reliable river flows and river water quality. It protects the habitats and environments that we all enjoy. In all these ways, groundwater supports our way of life.
- Groundwater is a renewable resource but over-use can have long-term impacts on water supplies and river flows. Reduction in demand and making use of surface water together with groundwater can provide sustainable water supplies in the long-term.
- Groundwater is recharged by rainfall passing through the soil. If land is in poor condition this can threaten the quality of groundwater. If groundwater becomes polluted it may affect both the quality of surface water and also ecosystems, potentially harming plants and animals. Protecting groundwater is a strong reason for protecting and restoring land.
- Protecting groundwater can reduce the need for energy-intensive purification treatment. With careful use groundwater is a sustainable resource that can help to heat and cool buildings. All of this can reduce our use of chemicals and energy and the greenhouse gases we produce.

## 3 Why we need the GP3

### 3.1 Our role

To carry out our statutory responsibilities and meet our aims we have to explain clearly how we believe groundwater should be managed and protected. To put this into practice we need to work with others, such as developers, planners, other agencies and those working in industry and agriculture. The GP3 provides a framework for this.

As part of our regulatory role we issue permits and have enforcement powers. Their main purpose is to prevent harm to groundwater or groundwater uses. Wherever possible, our decisions and actions relate directly to the likely risks, costs and benefits. We aim to be a modern regulator and as such we must show that our work and regulation is appropriate to the risks involved.

Our policies are focused on where we need to clarify regulatory requirements or explain how we use our discretionary powers. The policies also describe how we wish to work with others to achieve our aims for the environment where legislation is not in place or direct regulation is not appropriate.

The legislation on groundwater management and protection is summarised in Part 4 of the GP3. However, GP3 is not intended to be a definitive or detailed guide to such requirements and it is not a legally binding document.

In outlining our approach to groundwater protection, we offer guidance on how to respond to risk in most circumstances rather than a single way of doing things. You may need to adapt the principles in the GP3 to local conditions, and take into account the needs of the wider environment. We seek a consistent approach to groundwater management and protection, but recognise the need for flexibility to respond to local conditions. Any deviations from our advice, which should be the exception rather than the rule, should be clearly explained.

### 3.2 Continuing pressures

People are generally more aware of the ways in which many everyday activities can threaten groundwater. There have been some improvements in the management of resources and some types of groundwater pollution are less common. However, we still see many signs that the quality of groundwater is deteriorating, and the pressure on groundwater resources continues to increase. Much of this is due to the intensive use of land for industry, agriculture and urban development, over large parts of England and Wales. Also, the impacts of past activities on groundwater systems often last a long time. Long-term management and protection policies are essential if we are to preserve our groundwater resources for future generations.

The first groundwater policy document<sup>1</sup> published in 1992 was produced in response to concerns about the deterioration in the quality of groundwater. At the time there was only limited legislation to control the many activities that threaten groundwater. The document had a substantial influence on both regulators and stakeholders. It provided a focus for developments such as protection zones and vulnerability maps. The document had the key objective to provide a framework covering all types of threat to groundwater quality and quantity, whether large or small, from point or diffuse sources, by conservative or degradable pollutants.

There have been substantial changes in legislation since, culminating in the Water Framework Directive (2000/60EC) and the Water Act 2003. We also know a lot more about groundwater management and protection. In addition, the original policy had gaps, which we have now tried to fill. All these changes are reflected in the GP3.

<sup>1</sup> Environment Agency 1992 "Policy and Practice for the Protection of Groundwater (PPPG)"

## 4 Groundwater: an overview

### 4.1 The role of groundwater

Groundwater is a key part of the water cycle. It is also the UK's largest available source of fresh water.

In England and Wales as a whole, groundwater supplies around one third of our drinking water. However, this proportion varies regionally. Over lowland England, where the pressures on land use are greatest, half of all our supplies come from groundwater. This rises to more than 70% in the south-east. In rural areas, groundwater may be the only viable water source for isolated properties.

Groundwater also provides a large proportion of the water in our rivers. It sustains flows in dry weather. This base-flow is vital to maintain the quality of river water and the dependent flora and fauna. If groundwater is polluted, it can threaten river ecosystems.

River water can also flow into the ground, for example through swallow holes. It then becomes groundwater. If the river water is of poor quality this can pollute the groundwater. We sometimes see the effects of this in groundwater abstracted far from the original river. This underlines the need to manage surface water and groundwater in an integrated way. We should not forget that they are part of the same water cycle.

## The unseen reservoir

The volume of stored groundwater is enormous. The sandstone aquifer under the Vale of York and the Chalk aquifer in Hampshire each cover nearly the same area as Greater London. Each stores at least 5,000 billion litres. In comparison Europe's largest man made lake, Kielder reservoir in Northumberland, stores 200 billion litres.

### 4.2 Threats to groundwater

Groundwater is easily polluted. Sometimes this is the result of the deliberate use or disposal of polluting substances. However, many of our daily activities are also potential threats. Leaks, spills and poor maintenance can all release significant volumes of chemicals. These may be difficult to see until some use of groundwater is affected. All these pollutants threaten the quality of groundwater, and therefore our water supplies, rivers and wetlands.

Groundwater resource is the amount of water available for people and the environment. If you abstract too much groundwater, it may not be replenished by rainfall. This can cause springs and shallow wells to dry up. The flow in rivers may also diminish or cease. Saline or poor quality water can be drawn in from the sea or from deeper in the aquifer. Mining, quarrying, and civil engineering can also increase the risks to groundwater, by removing aquifer material or the overlying protective cover of soil and rock. This can cause changes in groundwater flow and increase the risk from pollution and flooding.

Both point and diffuse sources of pollution affect groundwater quality (see box adjacent). Pollution from point sources is normally relatively localised, and from separate and identifiable sources. Once detected, point source pollution can usually be dealt with using established regulatory controls, such as permits or notices. We will continue to use these controls but also grow our role in promoting good practice that prevents pollution in the first place.

In contrast, diffuse pollution results from activities where it is often difficult to identify an immediate cause and effect. However, the pollution often affects a large volume of groundwater. Diffuse pollution is now the most widespread and increasing form of groundwater pollution in England and Wales.

Worse still, it is more difficult to put right. Our priority must be prevention and control. We will work with others to encourage changes in land use practices, but to do this we will need changes in the law and in what is considered acceptable. It will need us all to play our part in groundwater protection.

### Some activities that put groundwater at risk

- Discharge of waste and wastewater onto or into the ground.
- Use of chemicals such as fertilisers and pesticides.
- Spreading of slurry, manure, and abattoir wastes.
- Civil engineering, mining, urban development and quarrying.
- Over-abstraction.

### Point and diffuse sources

Point source pollution mostly comes from spills, leaks and discharges at a single point or over a small area.

Diffuse pollution is from scattered or widespread sources. These include fertiliser and pesticide application, atmospheric deposition (rain and dust) and mining.

The distinction between diffuse and point source pollution is not always clear-cut. Sometimes it depends on the scale of the problem. For example, multiple leaks from the sewer system can result in diffuse pollution on a city-wide scale. However, a leaking sewer beneath a single street creates point source pollution.

### 4.3 Long-term trends

The demand for water from industry has fallen. In some areas this has reduced the pressure on resources so that groundwater levels have risen. This is most common in some urban and former mining areas. More groundwater is good news, but rising levels can sometimes damage water quality and interfere with buried structures. We will work with other organisations, such as the Coal Authority and water companies, to find workable and sustainable solutions to these potential problems.

In contrast, we are now using more water for domestic use than ever before. The steady rise in the number of households has been mirrored by increasing consumption per person. There is growing pressure on groundwater for public water supply, particularly in the south-east of England where groundwater resources are already heavily developed.

Increasing urban development also threatens groundwater resources, by diverting rainfall straight into drainage systems which lead directly to rivers or the sea. This can exacerbate flooding problems as it increases the rate at which water enters our river systems.

Climate change is a less predictable threat: it brings increased risk of both droughts and floods. The intensities and amounts of rainfall are becoming more unpredictable. To avoid shortages, water companies may need additional storage – more use of the natural storage potential of groundwater is likely. We will also refine the already sophisticated systems for managing water resources. This will maximise the amount of water available from both groundwater and surface water (rivers and reservoirs). Techniques, such as Aquifer Storage and Recovery (ASR), may help.

Prolonged heavy rainfall can lead to rises in groundwater levels causing groundwater flooding. In many areas there are continuing signs of a decline in groundwater quality. Though point sources are still a concern, this decline is largely due to diffuse pollution. These pollutants, such as nitrate, are often linked to agricultural activity. They are widespread and their presence in groundwater has increased over many years. If action is not taken, it will be difficult to achieve the environmental objectives of the Water Framework Directive and the costs of water supply will increase yet further.

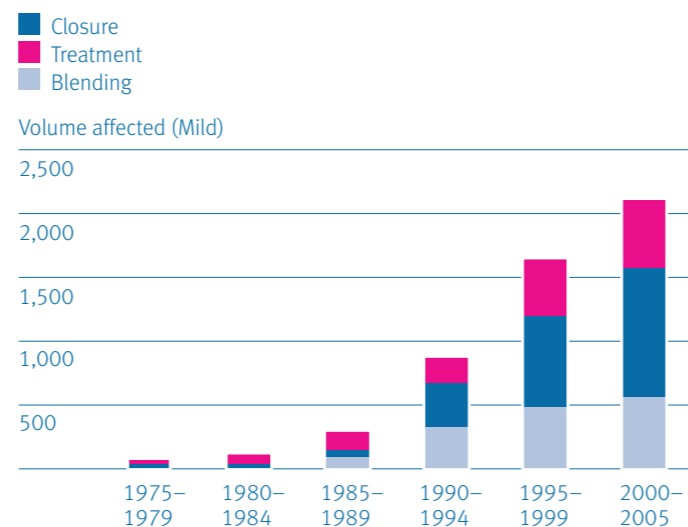
The costs associated with deteriorating groundwater quality from both point and diffuse sources are already substantial and are increasing (see Figure 1 and box overleaf).

## Cost of groundwater pollution

Most of the wells supplying water for public use produce between five and 50 million litres of water per day. To replace a well will cost on average £1.30 per litre of water abstracted (assuming it is possible to find water of acceptable quality).

At one site a water company has spent £13 million to provide low nitrate water to blend with high nitrate water contaminated by diffuse pollution. The investigation and cleaning up of a typical site polluted by solvents can cost between £500,000 and £2,000,000.

**Figure 1**  
Summary of the volumes of groundwater used for public water supply that have been affected by water quality deterioration and tightening standards



Bars show the increased volumes of water that need treatment or have to be blended to meet drinking water standards. They also show those sources where closure was the best option.

Source: UKWIR 'Implications Of Changing Groundwater Quality For Water Resources and the UK Water Industry. Phase 3: Financial and Economic Impacts of Groundwater Pollution'

# 5 Groundwater protection

## 5.1 The distinctive character of groundwater

Groundwater differs from surface water in a number of important ways. Rivers, streams and lakes occur as separate bodies of water; groundwater is widely distributed. It flows in the cracks and pores in rock, and it is found practically everywhere beneath our feet. However, the rate of groundwater flow is usually very slow in comparison with that of surface waters. There are also much larger differences in the natural quality of groundwater. This reflects its long time in the ground and its interactions with the rocks within which it flows.

Investigating and managing groundwater can also be much more difficult. It is not always easy to find a convenient location where the yield and quality of groundwater are good. However, although there are some obstacles to using groundwater, the storage potential of aquifers and the overall groundwater resource are much larger than those of our surface reservoirs.

The overlying cover of soil and rock often protects groundwater from the pollution caused by many human activities. However, the same characteristics that contribute to its storage potential also mean that any pollution that does get through this protective cover stays in the groundwater for a long time – groundwater is said to have a long ‘memory’ of past events. Nature can help to clean up the water but the processes are slow. In surface waters, the relatively fast flows remove or dilute pollutants, and light, oxygen and nutrients support biodegradation. These features are much reduced in groundwater systems.

Because it is difficult to access the groundwater environment, it is relatively expensive to clean it up. Often it is only possible and cost-effective to clean up pollution that is concentrated and/or localised.

These natural characteristics force us to take a very long-term view of the threats to groundwater and of the costs of protecting it.

## 5.2 The risk-based approach

The Environment Agency uses a risk-based approach. This means that we balance the threat to the environment with the benefits from the proposed activity or development. All activities involve some risk: the risk assessment informs our decisions on accepting, managing or minimising those risks. The objectives, interests and responsibilities of interested parties may be varied and contradictory. However, we will always listen to your concerns.

We use a risk-based approach for two reasons. The first is the complexity of the interacting physical, chemical and biological processes in the sub-surface. The second reason is the difficulty in observing these processes directly. Often our data will not give us the full picture – yet we still have to make a decision, judging as best we can the risks involved. Conceptual models are often essential. These are based on scientific principles and use available data and a professional assessment of the local circumstances. Developers or operators may need to seek professional assistance with their proposals: decisions based on a poor understanding or analysis of the groundwater environment can lead to costly mistakes with long-lasting impacts. In assessing your proposals, we will use a similar professional approach and expertise.

The Technical Framework section of the GP3 provides more details of the processes for risk assessment and conceptual modelling.

### 5.3 Existing management

We assess groundwater resources on a regular basis and produce a national water resources strategy that forecasts the likely pressures on all water resources over the next 20 years and the ways we may be able to satisfy future demand.

At the catchment scale we use Catchment Abstraction Management Strategies (CAMS) to:

- give information to the public on available water resources and include them in the management process;
- provide a consistent approach to local water resources management, recognising both abstractors' needs and the needs of the environment.
- provide a framework for managing abstraction licences.

To get a clearer picture of what the future may have in store, we have also drawn on the Department of Trade and Industry foresight scenarios. These look at the impact of climate change together with changes in agriculture, industry and domestic use.

Groundwater quality is difficult to control – the potential sources of pollution are many and varied, reflecting land use. Preventing pollution (the “prevent or limit” approach) is by far the most sustainable and cost-effective way of maintaining good groundwater quality. This is supported by the requirements of EU legislation, such as the Groundwater, Nitrates and Pesticides Directives.

We operate a system of permits for intentional discharges and disposals to groundwater, and control other potentially polluting activities by measures such as Notices and Codes of Good Practice.

We identify Nitrate Vulnerable Zones where action plans are used to limit the amount of fertiliser, manure and slurry farmers can apply.

The marketing and use of substances such as pesticides and herbicides is subject to environmental assessment. As existing and new products are reviewed for their pollution risks, this is becoming an increasingly effective way of protecting groundwater.

Wherever possible, we use risk-based methods to control releases of pollutants. A combination of legislative controls and influencing measures has been and will be necessary to achieve our objectives.

The outcome of these measures has been varied to date and groundwater quality is still declining in some areas. The main areas of concern are diffuse pollution, particularly from nitrate, the accidental release of persistent organic chemicals from industrial uses and historically contaminated land, including mining.

### 5.4 Future challenges

Much has changed since we first published *Policy and Practice for the Protection of Groundwater*. There is now a greater awareness of groundwater issues, partly as a consequence of that document. We now have access to greater technical expertise and the legislative framework is more robust. There have been some successes from both legislation and voluntary schemes, for example, in reducing the concentrations of some pesticides in groundwater.

The Water Framework Directive provides us with an opportunity to take this further, and to tackle other issues such as diffuse pollution. However, legislation and regulation will not be enough on their own. We must raise awareness and change behaviour. This will take time and is not something that we can achieve on our own. The GP3 provides a framework for these longer-term initiatives as well as our regulatory work.

There are no quick fixes. Many of the threats to groundwater come from land use – moving to a more sustainable use of land is a difficult and long-term process. Changing the way industries, including agriculture, operate and how our urban areas develop will not happen overnight. There may be substantial time lags between implementing changes and seeing the benefits. Early, sustained action is essential if we are to protect these resources for the future. In the long term, prevention will be substantially cheaper than cure.

### 5.5 Groundwater monitoring

Monitoring is essential if we are to judge the effectiveness of our work. We need to improve our existing approach in order to comply with the Water Framework Directive. This will require us to monitor groundwater levels and quality across England and Wales in more detail than previously. You can find more information about our systems for monitoring groundwater in the Technical Framework.

### 5.6 Groundwater research

We have an active research and development programme. This supports both the GP3 and our daily work to manage and protect groundwater. Key areas of research include the development of a new system for assessing the vulnerability of groundwater to pollution, and studies to assess the significance of interactions between groundwater and surface water. We work with others to improve and develop new tools for assessing risk and impact. Examples of such tools are mathematical models, which help in analysing and predicting the flow of groundwater and pollutants.



# 6 Groundwater in a wider context

## 6.1 Land-use planning

Some development and uses of land threaten the quality and availability of groundwater. This means that land-use planning policies and procedures play a significant role in protecting groundwater effectively.

At the **national** level, Planning Policy is directed by a number of Planning Policy Statements (PPSs) in England, and Technical Advisory Notes (TANs) in Wales. When these are reviewed, we will base our comments on the policies contained here in the GP3.

At the **regional** level, in England each planning region is to have a Regional Spatial Strategy (RSS). In Wales there will be the Wales Spatial Plan (WSP). These will set out both the general principles for development and the likely restrictions. They will be part of the statutory development plan for an area and give us an important opportunity to influence strategic planning. The GP3, especially in Part 4, will be the basis for our submissions to the regional planning process.

Local Development Documents (LDDs) sit below the regional plans. These will replace local plans, unitary development plans and county structure plans. In general, local planning authorities will prepare the LDDs. However, County Councils will prepare LDDs for minerals and waste, both of which are particularly relevant to groundwater protection issues. We will seek to influence all LDDs as a way of helping to achieve our aims and objectives. We have included groundwater protection objectives into our own model planning policies. We want Local Planning Authorities to refer to these when they are drawing up their LDDs.

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## 6.2 Other strategies and policies

We have developed the GP3 within the context of water resources generally – readers should not use it in isolation. Examples of other closely related key documents are:

- **Securing the Future:** This is the government's new strategy for sustainable development and was published in conjunction with a Strategic Framework in March 2005. It builds on the 'sustainable development strategy' published in 1999. The strategy says that sustainable development is the simple idea of enabling all people to satisfy their basic needs and to enjoy a better quality of life without compromising the quality of life of future generations. In response to the 1999 strategy, we published our Environmental Vision and will support this with our updated corporate strategy 'Creating a better place'. The vision sets out our contribution to sustainable development. The GP3 supports this by promoting solutions that respond to specific risks but also consider the long-term impacts.
- **Directing the Flow:** This is a Government publication that sets priorities for future water policy. It builds on the Sustainable Development Strategy and highlights the need for better integration between policies for water and other areas. It identifies the need to make greater efforts to use water prudently, so that we maintain supplies, and also emphasises the need to tackle diffuse pollution. Groundwater is a key part of the water cycle and one aim of this Strategy is to integrate groundwater more effectively into environmental thinking.
- **The Water Resources Strategy:** We published this in March 2001. It is made up of a national summary document with seven separate English regional strategies and one strategy for Wales. It is part of a framework to ensure integrated planning for water resources. We developed it with water users in response to our statutory duty to secure the proper use of water resources in England and Wales. The strategy considers the needs of public water supply, agriculture, industry and the environment, and takes into account population growth and climate change. Groundwater is the largest source of fresh water: the GP3 supports its use and promotes new approaches to managing water resources.
- **Chemicals Strategy:** Our Chemicals Strategy focuses on chemicals that may directly affect the environment, or human health through environmental exposure. We need to target our efforts on the point in their life cycle where we can make the biggest difference. We do have to consider costs, but we recognise that our decisions also need to take into account the many environmental values, beliefs and behaviours in society. Our work will require us to have a better understanding of our environment and how chemicals affect it. We will also need effective monitoring to check our progress. The GP3 will help us by providing tools to identify chemicals that might affect groundwater. It will also help us to influence policy to control their use.

This list is by no means exhaustive. We set out how key groundwater issues relate to other strategies in Part 4 of the GP3: Legislation and policies.

# 7 GP3 Structure

The GP3 is a set of documents. The diagram below shows the overall structure. The format of the individual documents varies. Some are available in a printed format. All are available electronically on our website. Where you can, please download these documents and read them on screen – it saves paper.

## Part 1 – Overview

Sets out our position on managing and protecting both the quality and availability of groundwater. It also provides an overview of our approach and identifies our aims. You can download a copy from our website.

## Part 2 – Technical Framework

Provides a basic introduction to groundwater and its place in the water cycle. It describes the intrinsic value of groundwater and the threats from human activities. You can download Part 2 from our website.

## Part 3 – Tools

Introduces and lists the tools available for analysing and assessing the risks to groundwater. These include vulnerability maps and tools to assess risks from specific activities or sites, such as landfill or groundwater abstraction. It also gives a brief overview of the use and application of each tool and where to obtain it. You can download Part 3 from our website. You can find out more on our website. Printed and digital copies of some of the introductory texts on the tools are also available from our publications catalogue.

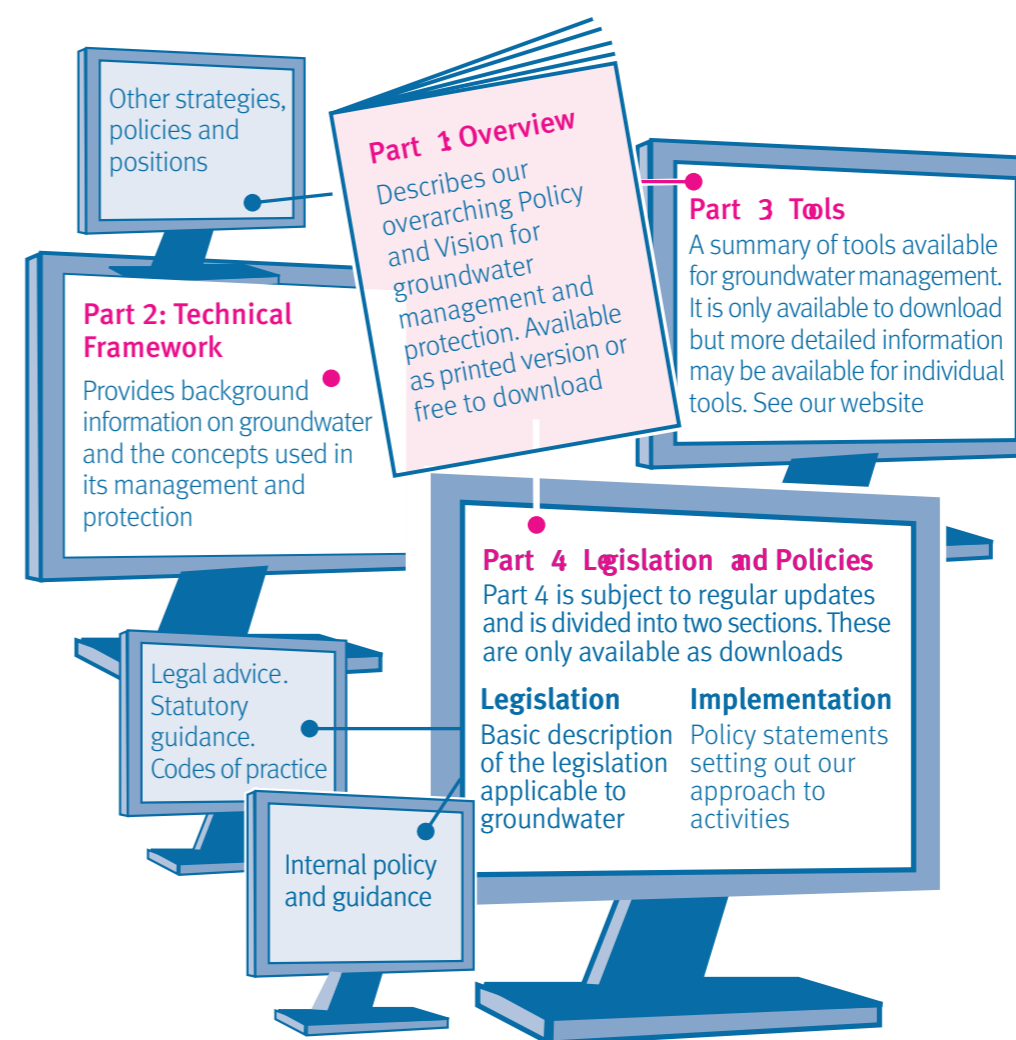
## Part 4 – Legislation and policies

Outlines the key legislation on groundwater, how we interpret it and how we seek to influence the activities of others. It is set out in sections according to the type of activity. Each section has one or more policy statements and outlines the risks to groundwater from the activity. There is some explanatory detail. Because legislation and policy is develops rapidly we will need to revise this document regularly. For this reason it is only available in electronic form on our website.

You are welcome to print copies of Part 4. However, before you make any decisions based on information in it, you must check our website to ensure you have the latest version. Changing legislation may mean that the approach to certain activities or developments will alter – so that a different assessment or specification is required.

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Figure 2  
'Groundwater Protection: Policy and Practice' document structure



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