

THE PRECIOUS RESOURCE
SERVICES
A BRIEF GUIDE TO
MANAGING OUR WATER RESOURCES



National Rivers Authority

Guardians of
the Water Environment

WATER IS NATURE'S MOST PRECIOUS RESOURCE.

Water is nature's most precious resource

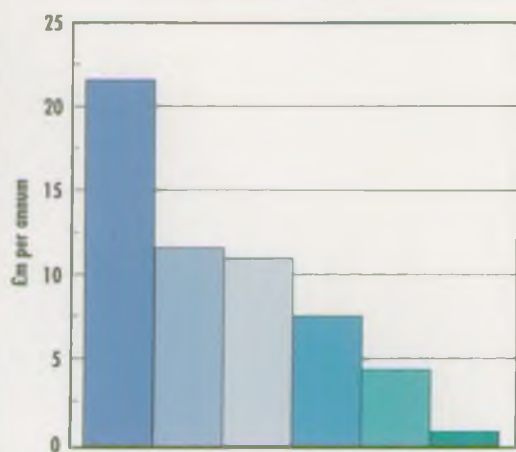
The NRA is responsible for guarding this valuable asset not just for us to enjoy now, but for generations to come.

Water is vital for life. It is used in the home and is essential for our health and hygiene. It is used by industry to create wealth for the country, by farmers to grow food and to support the wildlife and the beauty of our rivers and streams.

Yet water is often taken for granted. When it rains, do you ever wonder what happens to all that water? Some of it reaches streams, rivers or lakes, but much becomes groundwater, soaking away underground into water-bearing rocks called aquifers.



Revenue Expenditure on Key Water Resources Activities in 1994/95



- The management of these vital water resources is the job of the NRA. It involves:
- assessing water resources through the Hydrometric Survey of England and Wales;
 - planning for future needs;
 - controlling the amount of water taken from rivers and groundwater;
 - managing the operation of water transfer schemes;
 - resource protection;
 - planning liaison with Local Authorities;
 - alleviation of low flows;
 - drought management;
 - research and development.

The annual expenditure of the NRA on its water resources activities is about £80M and involves around 700 staff located in offices in all parts of England and Wales. This guide gives a brief introduction to its main fields of operation.

Activity	£m
Operational Management	21.5
Hydrometry	11.8
Resource Protection	11.3
Licensing	7.5
Resource Planning	4.6
R&D	0.7

ENVIRONMENT AGENCY



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HYDROMETRIC SURVEY

The NRA's Hydrometric Survey of England and Wales measures the availability of surface and groundwater resources. These measurements are essential to the day to day and long term management of the water cycle - "if you can't measure it, you can't manage it".

Each year it involves:

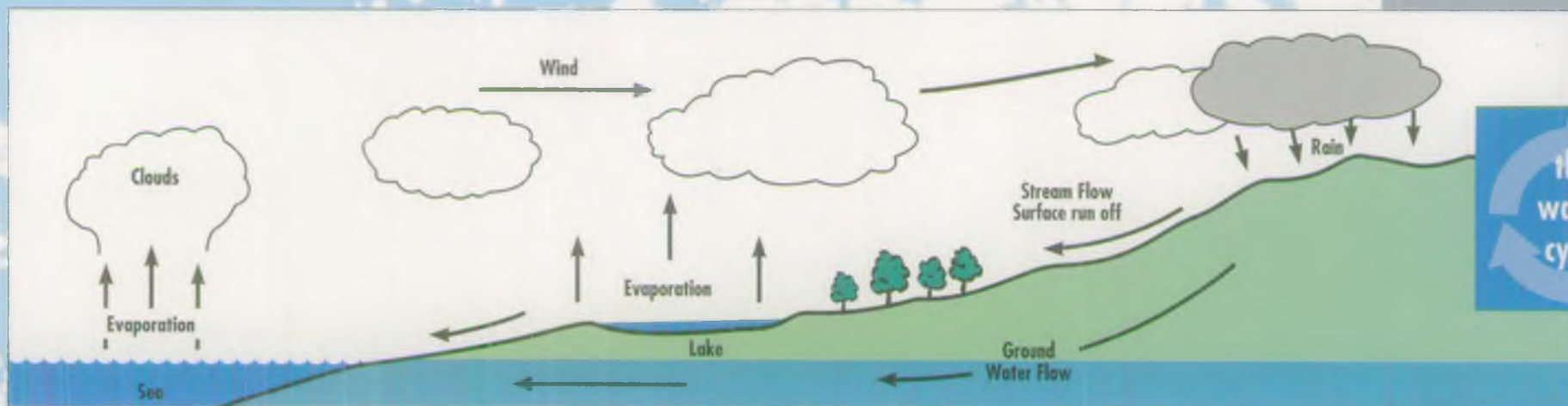
- 25,000 separate river flow measurements
- 55,000 groundwater level measurements
- 1200 continuous river flow measurement sites
- 900 raingauge sites

River flow or 'discharge' is measured using different techniques:

- Hydraulic structures - using the depth of water over physical structures or weirs in the river;
- Ultra-sonic gauges - using the time it takes for a 'beam of sound' to cross the river;
- Electro-magnetic gauges - using electro-magnetic fields to measure discharge.



Data from these hydrometric sites is captured using digital data loggers and accessed remotely using the latest computer technology and telemetry links via the public telephone network. Field visits are essential to ensure quality control. The NRA uses these data for all its operational and planning activities. Databases are maintained for Research and Development and to meet the needs of Government departments, the British Geological Survey, the Meteorological Office, other institutions and general enquiries from commercial organisations and the public.



WATER RESOURCES PLANNING

The NRA is responsible for assessing and planning the requirement for water resources at local, regional and national levels and for allocating resources under licence to water companies, industry and others who invest in their own developments. With the demand for water having increased at about 1.5% per annum for the last 30 years, and resources becoming increasingly scarce, it is essential that new developments are carefully planned and existing resources conserved by managing demand wherever possible.

Currently, there is a surplus of resources for public water supply. However, in future, given the possible range of increases in demand, supply deficits could occur if leakage from water supply pipes is not controlled. Selective domestic metering and other water conservation measures could also put off or delay the need for major developments such as new reservoirs or inter-basin transfers.

CONTROL OF WATER ABSTRACTION

All significant abstractions from rivers and groundwater are controlled by licences which specify how much water may be taken.

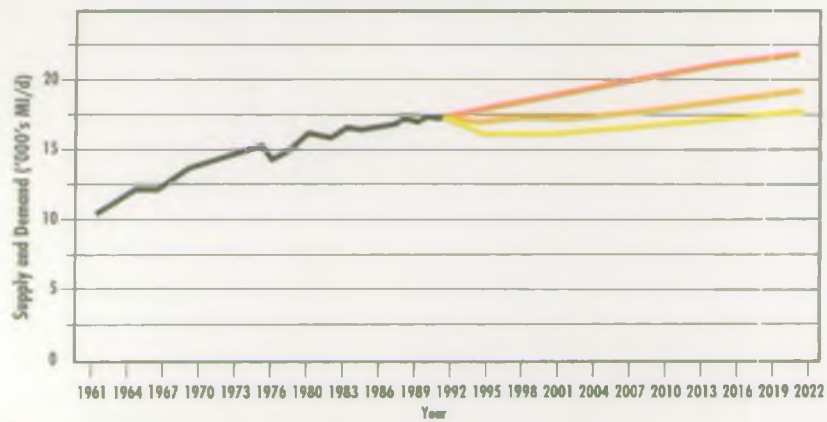
Why are licences necessary?

As pressure on water resources in England and Wales increases, the NRA needs to have a system in place which makes sure that water resources are safeguarded and that abstraction does not disrupt or cause long-lasting changes to the environment. Without this constraint, uncontrolled abstraction would lead to shortages in water supply, increased river pollution (by reducing dilution of pollutants), damage to fisheries and wildlife habitats and, ultimately, to the loss of rivers for our recreation and enjoyment. By licensing, it is possible to control the level of abstraction to protect both water supply and the environment.

Water Use in the Home



NRA Demand Scenarios



- Historic supply
- Low demand scenario
- Medium demand scenario
- High demand scenario

There are currently around 50,000 licences in force with approximately 2,000 more applications each year. Many of the applications require complex assessments of resource availability and the environmental impact of the proposal. In order to protect the environment new licences granted for abstractions from rivers and streams will normally require the abstraction to stop before river flows become too low or only allow abstraction in winter when resources are more plentiful.

Drilling boreholes and pump testing for groundwater also require the consent of the NRA. This is to control the environmental impact of these operations and to protect other water supplies from uncontrolled reductions in groundwater levels. Enforcement of licences and consents is also the responsibility of the NRA, including the prosecution of offenders where necessary. income from licences is used to finance water resources activities.

OPERATION OF RIVER SUPPORT SCHEMES

The NRA is responsible for the management of the UK's largest raw water transfer schemes which make extra resources available for abstraction by water companies, industry and agriculture. These schemes involve major engineering works and use rivers as natural pipelines to take water closer to centres of population. The raw water is treated by water companies and supplies millions of customers with potable water. The cost of these operations is some £20M per annum, the costs of which are recovered from abstractors. The proper management of these schemes is essential to maintain river water supplies and the health of our rivers during periods of drought.



MAJOR WATER TRANSFER SCHEMES.

RESOURCE PROTECTION

The protection of groundwater is essential for maintaining and developing a sustainable water resources strategy. Groundwater stored in aquifers is the principal source of water supply in many parts of England and Wales where, pumped from wells and boreholes or collected from springs, it provides over a third of public supplies. In some areas, it is the only local source of water both now and for the future.

Groundwater is particularly at risk from accidental pollution and diffuse pollution from nitrates and pesticides which can build up over many years. If groundwater becomes polluted, it is very difficult and expensive to remedy, so it is much better to prevent or reduce the risk of groundwater contamination in the first place.

Some groundwaters are more vulnerable to pollution than others, depending on their rock types and the soils

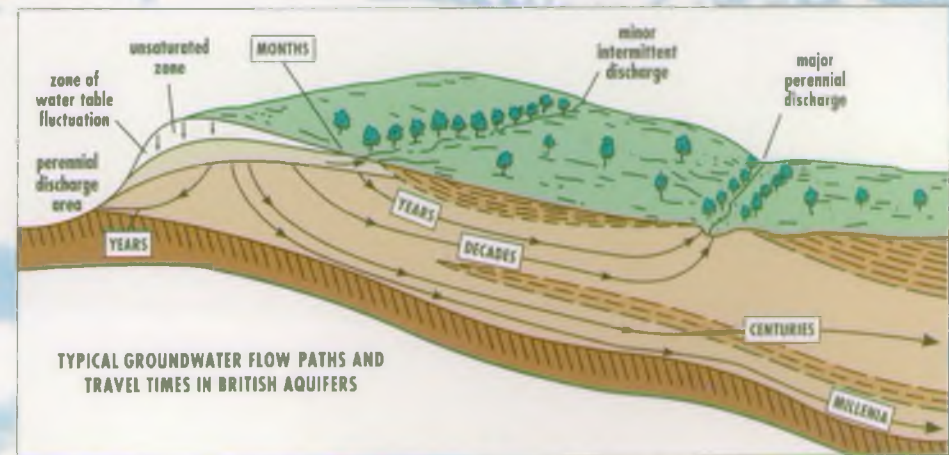
which overlie them. The NRA prepares Vulnerability Maps to help planners, developers, regulatory bodies and others to ensure that development or activity conforms to the NRA's Policy and Practice for the Protection of Groundwater. The NRA also uses its powers to protect surface rivers and streams from pollution to protect important habitats and sources for water supply.

PLANNING LIAISON

Local Authorities consult the NRA on development plans. The NRA encourages these Authorities to include NRA policies in their plans and will comment on specific proposals which affect the water environment.



GROUNDWATER
VULNERABILITY
CLASSIFICATION.



TYPICAL GROUNDWATER FLOW PATHS AND
TRAVEL TIMES IN BRITISH AQUIFERS

ALLEVIATION OF LOW FLOWS

Low flows can occur naturally because of drought, but they can also occur because licences granted in the past authorised what today would be considered excessive abstraction. Resolving the problem of over-abstraction is a high priority. The NRA has a long term objective to deal with these problems wherever possible by the year 2006. The NRA is working with water companies and others to bring about improvements. The programme is delivering real environmental benefits to many rivers such as the Darent and Misbourne and to important wetland sites such as Redgrave and Lopham Fen SSSI. (Site of Special Scientific Interest).

DROUGHT MANAGEMENT

During a drought everyone must conserve and use water wisely. It is essential that rivers and wetlands are protected from permanent damage and that the needs of the public, industry and agriculture are properly balanced. The NRA can help to manage a drought in various ways such as through the operation of river support schemes and policies to encourage the storage of winter water for summer use. The NRA is also consulted by water companies on applications to obtain additional water during periods of drought and may give its support if the proposals include adequate measures to minimise the impact on the water environment and steps have already been taken to restrict non-essential uses.

The NRA can also restrict the abstraction of water from natural sources for spray irrigation purposes where this is necessary to conserve supplies and to protect the environment. Local consultation is necessary before these steps are taken to minimise the important effects on farm operations.

RESEARCH AND DEVELOPMENT

The water resources work of the NRA is supported by a programme of research and development with an annual budget of around £800k. The research is commissioned from external organisations and includes research and development into:

- Hydrometry
- Flow Regimes
- Water Resources Management
- Groundwater Resources
- Demand Management

The aim of the research and development is to reduce the uncertainty in the management and allocation of our vital resources by keeping the NRA at the forefront of science and technology.



The NRA is the organisation responsible for managing and protecting the water environment in England and Wales.

The Authority was established in 1989 and currently employs around 7500 staff based in offices throughout England and Wales. The duties of the NRA relate to Water Resources, Water Quality, Flood Defence, Fisheries, Recreation, Conservation and Navigation. Further information can be obtained from any of the offices at the addresses shown below.

HEAD OFFICE

Rivers House
Waterside Drive
Aztec West
Almondsbury
Bristol
BS12 4UD
Tel: 01454 624 400
Fax: 01454 624 409

ANGLIAN

Kingfisher House
Goldhay Way
Orton Goldhay
Peterborough PE2 5ZR
Tel: 01733 371 811
Fax: 01733 231 840

NORTHUMBRIA & YORKSHIRE

Rivers House
21 Park Square South
Leeds LS1 2QG
Tel: 0113 244 0191
Fax: 0113 246 1889

NORTH WEST

Richard Fairclough House
Knutsford Road
Warrington WA4 1HG
Tel: 01925 653 999
Fax: 01925 415 961

SEVERN-TRENT

Sapphire East
550 Streetsbrook Road
Solihull B91 1QT
Tel: 0121 711 2324
Fax: 0121 711 5824

SOUTHERN

Guildbourne House
Chatsworth Road
Worthing
West Sussex BN11 1LD
Tel: 01903 820 692
Fax: 01903 821 832

SOUTH WESTERN

Manley House
Kestrel Way
Exeter EX2 7LQ
Tel: 01392 444 000
Fax: 01392 444 238

THAMES

Kings Meadow House
Kings Meadow Road
Reading RG1 8DQ
Tel: 01734 533000
Fax: 01734 503388

WELSH

Rivers House/Plas-yr-Afon
St Mellons Business Park
St Mellons
Cardiff CF3 6LT
Tel: 01222 779088
Fax: 01222 799555



Awarded for excellence



The NRA is committed to the principles of stewardship and sustainability. In addition to pursuing its statutory responsibilities as Guardians of the Water Environment, the NRA will aim to establish and demonstrate wise environmental practice throughout all its functions.

NRA Thames 143



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HEAD OFFICE

Rio House, Waterside Drive,
Aztec West, Almondsbury,
Bristol BS32 4UD