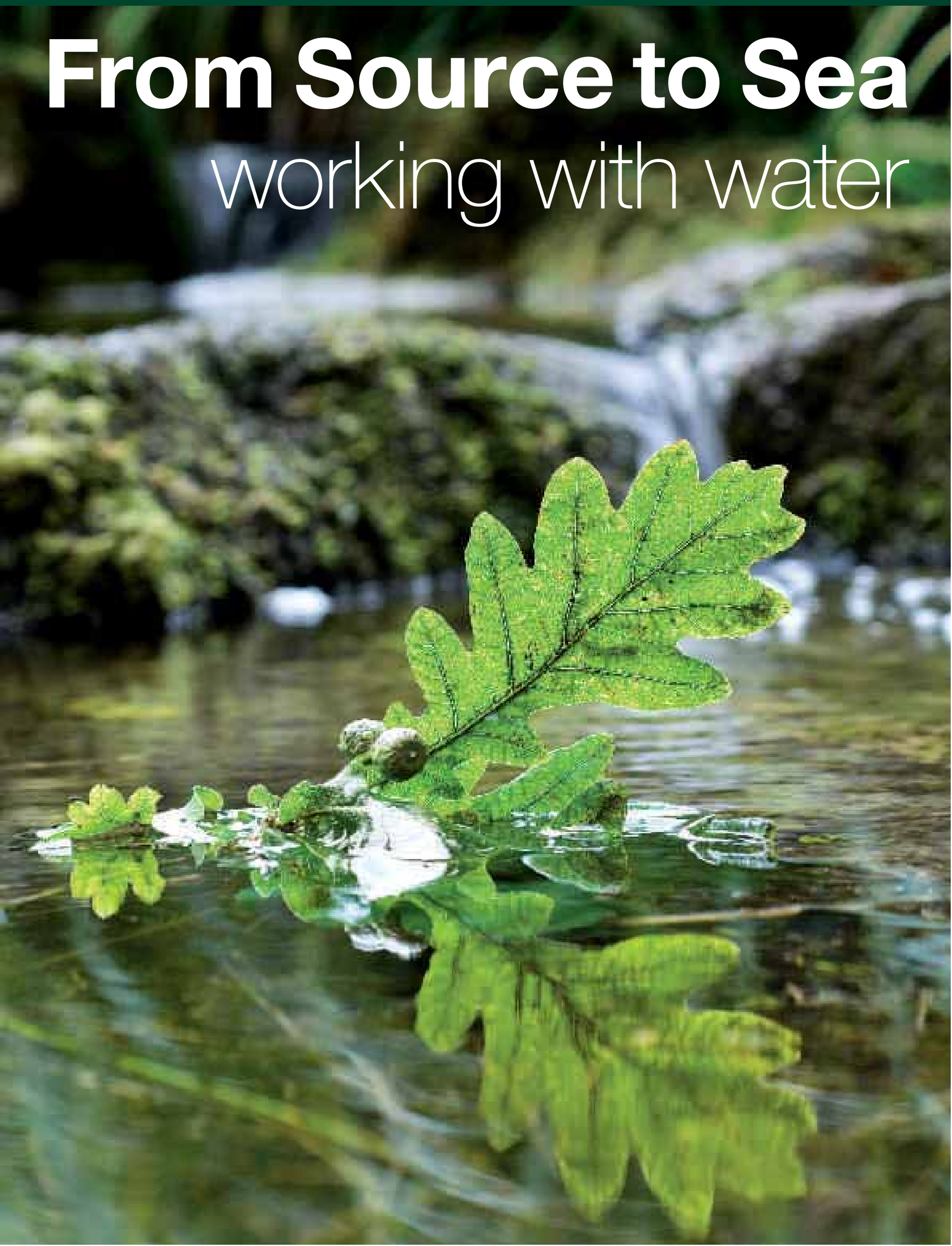
THE NATIONAL TRUST

From Source to Sea

working with water



Why water matters

Water is essential for life. We use it every day in every aspect of our lives, whether at home or at work, in the town or countryside. We drink it, wash in it, cook with it, and go on holiday to play in it. We also depend on water to produce our food, heat our homes, and run our industries. We simply can't survive without water

Wildlife is dependent upon water too. The natural richness of our environment can only be maintained if there is enough clean water in our catchments. Water plays a crucial role in shaping the iconic landscapes that have inspired some of our greatest art and literature, from Wordsworth's Lakeland poems to Constable's painting *The Hay Wain*.

Yet the health of our water environment is under threat. Rivers and wetlands are drying up in some areas, whilst others are threatened by floods. The quality of many of our rivers, lakes and reservoirs and our groundwater is poor, affected by past as well as current pollution.

Climate change is placing further pressure on our already stressed water environment. We are already seeing increased risks from drought and flooding and are experiencing the sometimes devastating effects these can have on people, wildlife, homes and businesses. We need to act now to reduce these impacts and, where they cannot be avoided, adapt to them.

Water is essential to the National Trust in our role in caring for and promoting the importance of nature and heritage. Every one of our sites depends upon, and interacts with, water in some way. We rely on a consistent supply of good quality water to carry out our work to conserve wildlife and landscape, and to maintain our parks and gardens. Water is also important for our historic properties, many of which have designed landscapes, moats and other water features that add to their setting and significance. Water provides essential opportunities for healthy recreation at Trust properties, from fishing and canoeing to inspirational walks beside our rivers and lakes.

An amazing 43% of the land in England and Wales drains to the boundary of land owned by the National Trust. So it's clear we have a responsibility to help maintain and improve the water environment.

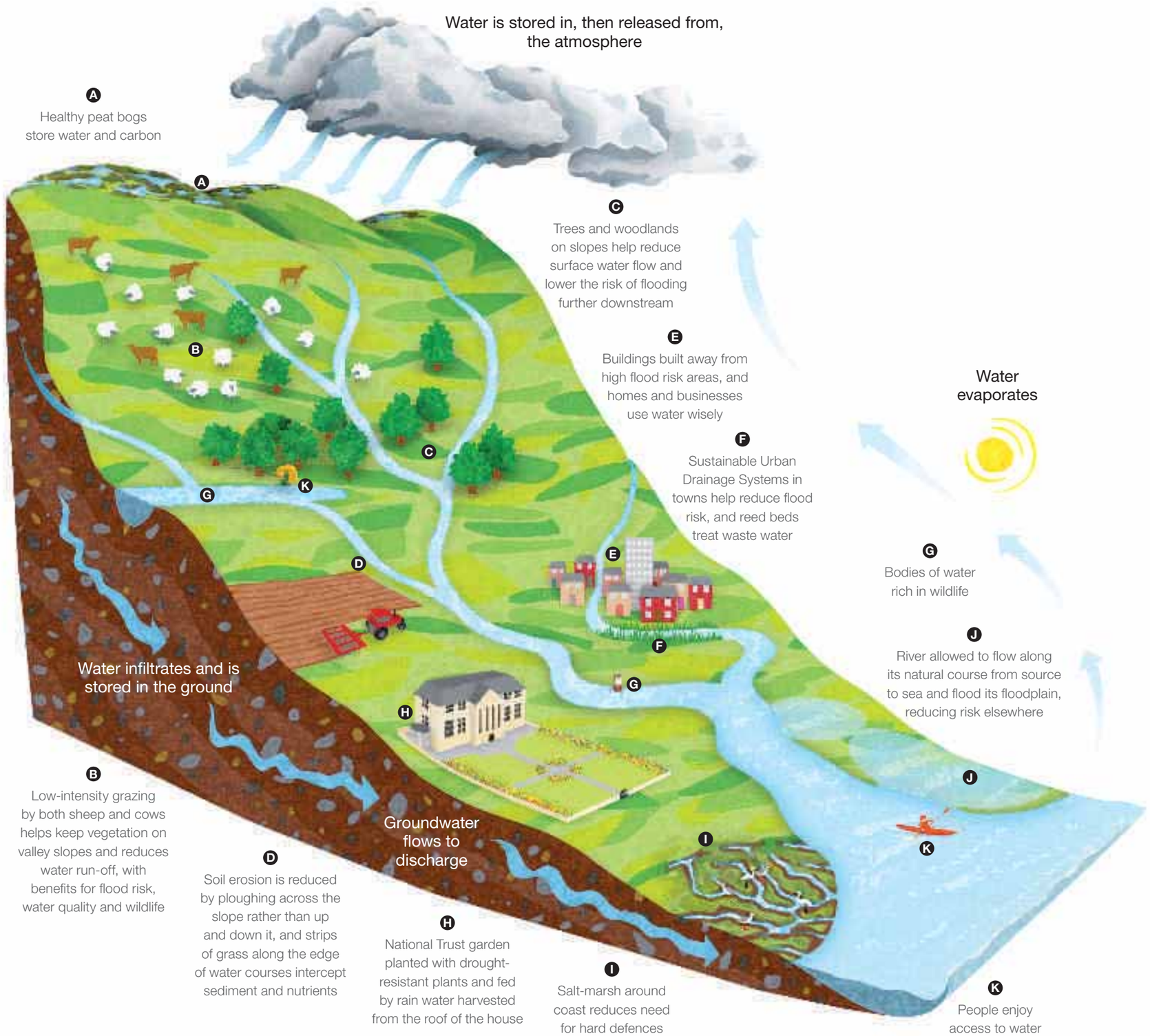
Like the rest of society, the Trust has taken water too much for granted and we have ignored too many water availability and quality issues for too long. It often takes a major incident to capture people's attention – like the floods of 2007, or the exceptionally dry spells of 2005 and much of 2006. It is time we all started to treat water with the respect it deserves.

The National Trust is taking its responsibilities seriously, looking at how we can both reduce our use of water and minimise the damage our activities cause to the water environment. We are working to protect water catchments upstream of our properties and also to minimise the damage our activities cause downstream. We are keen to improve the water environment where we can.

This report describes our developing approach, managing water as it flows from source to sea, and draws out some wider implications for us all.

Front cover photograph: Jason Ingram This page: Mr Eckhart / iStock

WORKING WITH THE WATER CYCLE



Working with natural processes

Society both depends upon and affects every stage of the water cycle. The way that land and water is managed in one place can have a much wider impact elsewhere

Unfortunately, society has inherited a legacy of land and water management that has damaged and disrupted the natural water cycle, putting water quality at risk, increasing problems of flooding and drought, and damaging wildlife and landscapes:

- We have drained wetlands for agriculture and development, and changed the flow of many water courses
- We drain water off roofs, paths, streets and land as quickly as possible, increasing the risk of flooding to people and property downstream
- We take huge quantities of water from the environment, much of which we then waste, damaging wildlife and habitats in the process and wasting energy required for water treatment
- We allow pollutants from household waste, sewage, industry, farming and roads to enter our waters, which we then have to treat to make them safe to drink
- We have introduced new, non-native species which have become invasive, threatening our native freshwater wildlife and disrupting natural systems.

A new approach is needed which works with natural processes to achieve a sustainable future for our precious water resources. It is essential to plan the use of water on a catchment scale, minimising environmental damage and ensuring the efficient and fair use of our limited water.

On a number of estates, the National Trust has adopted an integrated approach to catchment management, looking at the role of land use in addressing issues of pollution, flooding and drought, producing a range of benefits for wildlife and for people (see examples overleaf).

Management which is good for the water environment will provide a range of other benefits for society and the economy. For example, creating an area of wetland can both reduce the risk of flooding and drought by storing water, as well as storing carbon in its soil, and provide an important habitat for wildlife and green space for people to visit and enjoy.

CASE STUDY

Protecting Northern Ireland's water at source

If ever there was a place to visualise the expression 'from source to sea' it is on Divis and the Black Mountain in Northern Ireland (pictured right)

The headwaters of four different rivers rise on these mountains, which command an excellent view over Belfast Lough and the Irish Sea. On a clear day, you can also see Lough Neagh, the largest freshwater lake in the British Isles, and the source of much of the public water supply in Northern Ireland. The Crumlin River and Clady Water (a tributary of the Sixmile Water) rise from Divis and flow into Lough Neagh. The Forth River flows from the eastern side of Divis and eventually makes it way into Belfast Lough. The Collin Glen River rises on Black Mountain and flows south to join the River Lagan before making its way through Belfast into the Lough. Maintaining the water quality of these headwater streams, which are so important to the water environment across Northern Ireland, is a key objective of our management plan for Divis and the Black Mountain.

Chris Hill / NT

CASE STUDY

Restoring the still waters of Bassenthwaite Lake

Gary Forsyth / IStock

The Trust is a key partner in the Bassenthwaite Lake Restoration Programme in the Lake District. The Bassenthwaite catchment (pictured above) is home to an amazing variety of wildlife, including its famous ospreys and the UK's rarest fish, the vendace

Like many lakes, Bassenthwaite Lake may look healthy but threats of pollution, siltation and invasive non-native species are affecting this internationally important site. A private, public and voluntary partnership has created a vision to steer future action, recognising that lake protection and improvement can only come from a whole catchment approach. Work being undertaken includes:

- Working with farmers to reduce agricultural pollution through a Catchment Sensitive Farming programme
- Improved waste water treatment to reduce the amount of phosphate entering the lake
- Reducing grazing on the high fells and increasing the area of woodland to prevent soil erosion and reduce the amount of sediment entering the lake
- Re-establishing natural rivers and floodplains to store water and reduce high river flows (which cause riverbank erosion)
- Working with landowners and an extensive local volunteer network to remove invasive non-native plants
- Raising public awareness of the problems of invasive species, and how to prevent their spread
- Engaging with local communities, giving them ownership and the ability to become practically involved in the project.

Although it may take 40–50 years for the health of the lake to be restored, there have already been improvements to river corridors and water quality, and a reduction in invasive species. This model approach has generated significant interest from European partners, and provides an exemplar for the delivery of the Water Framework Directive. The Bassenthwaite project is being followed by a similar programme for the Windermere catchment, covering seven major lakes and tarns.

CASE STUDY

The multiple benefits of sustainable land management

Andrew Haslam / NTPL

At Kedleston Hall (above) the Trust is working with farmers throughout the catchment to reduce pollution at source, with benefits for flood protection, water quality and wildlife

The Trust's Kedleston Hall Estate within the Mercaston and Markeaton Brooks catchment, near Derby, has an 18th-century designed landscape, with a series of lakes created by the damming of Cutlers Brook. Further downstream Derby City Council has a number of settling ponds and lakes which play a vital role in the city's flood management system.

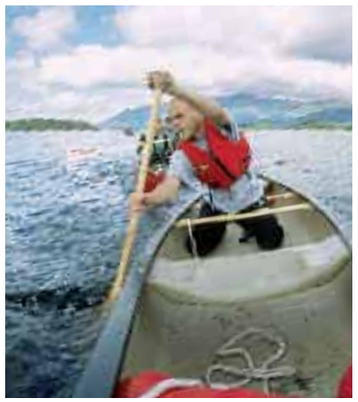
Intensive arable farming upstream has lead to soil erosion, fertiliser run-off and sediment washing into the lakes. This diffuse pollution causes poor water quality in the lakes and damages their wildlife and landscape value. The rising levels of silt also affect the flood storage function of the settling ponds, significantly reducing Derby's flood storage capacity and increasing flood risk.

The Trust and its partners are working to tackle the problems at source. Free advice and training alongside agri-environment funding have helped farmers change practices to reduce soil erosion and fertiliser run-off, and develop areas of permanent pasture as a buffer to pollution and silt. Future plans include the creation of wet woodland beside the watercourses to trap silt and remove nutrients.

The goal is for land managers within the catchment to be paid for providing a public service to the people of Derby, that not only improves flood protection and water quality, but also safeguards wildlife and the environment.

Water for wildlife and people

The National Trust manages more than 250,000 hectares of land across England, Wales and Northern Ireland for the benefit of the nation. Staff, volunteers and tenants are engaged daily in providing access to open spaces for people's enjoyment, providing habitats for wildlife and in improving our environment



Leo Mason / NTPL

Canoeing on Derwentwater in the Lake District

Facing page: The water vole is the UK's fastest declining mammal. The Trust is working to provide habitat for this rare and much-loved species

WATER FOR WILDLIFE

Conserving nature, for the benefit of everyone, is at the heart of the National Trust's work. We are the largest non-government landowner in the UK and the scale of our responsibility for the natural history and landscapes of England, Wales and Northern Ireland is unrivalled.

We have a particularly important role to play in the conservation of freshwater habitats. A quarter of our sites have internationally important areas for wildlife that depend on water. These include many of the Lake District's lakes and tarns, and many ponds, streams and rivers. We often own the springs and headwaters of catchments – the most sensitive and vulnerable parts of river systems. Sections of slow-flowing rivers, including their estuaries, are also notable, from the Derwent in Cumbria, and Ouse in North Yorkshire, to the chalk rivers of the Test and the Wandle in the south, and the drowned valleys of the Fowey, Fal and Helford in Cornwall.

We are also responsible for a range of rare species which either live in or around freshwater. These include otters, water voles, wetland birds, amphibians like the great crested newt, fish such as the vendace and char in the Lake District, a wide range of invertebrates and plants such as stoneworts.

WATER FOR PEOPLE

The National Trust has pioneered open access to the countryside and coast, and our latest estimates indicate that more than 100 million visits are made to our open spaces each year.

The Trust promotes access to our waters for recreation wherever possible, whether it is through fishing, canoeing, sailing or enjoying an inspiring walk beside one of the streams, rivers and lakes on our properties. A healthy and clean water environment is essential to allow the public to enjoy these experiences, and the Trust is committed to protecting the quality of our water-based recreation.

The following case studies illustrate the range of activities with which the National Trust is involved that are improving the health of the water environment, with benefits for both people and wildlife.

Andrew Parkinson / Nature PL / NTPL

CASE STUDY

Managing change in internationally important lakes

Bosherston Lakes, on the Trust's Stackpole Estate in Pembrokeshire (pictured right), are famous for their water lilies – but the lakes are at threat from rising sea levels

Lisa Whitfield / CeltiC Images

Besides water lilies, Bosherston Lakes also include green beds of rare aquatic plants called stonewort. Stoneworts like very pure fresh water and are part of the reason the lakes were designated as an internationally important wildlife site. They are also important for otters, dragonflies, birds and bats.

However, the lakes are losing water through natural cracks in the underlying limestone, and are being polluted by sediment and nutrients washing off surrounding farmland. The lakes are also very close to sea level, and spring tides can be higher than levels in the lakes.

Sea water can also enter through the porous limestone along the coastline. Sea level is predicted to rise by up to a metre this century. This will result in greater penetration of both the lakes and the aquifer by salt water, resulting in changes to plant and animal life.

The Trust is committed to retaining open fresh water for as long as possible, but this will not be feasible in the long term. We will then work to adapt and work with natural processes. All this makes Bosherston a complicated site to manage, with part of our role being to explain what is happening to the many people who love the place.

CASE STUDY

Wetland restoration in south London

The National Trust has been working in partnership with the London Wildlife Trust and the Environment Agency to improve and create wetlands at Watermeads Nature Reserve, near Mitcham, south London

The aim of this project is to bring the site back to health and support a diverse range of wetland plants and wildlife, including the endangered water vole. This animal, once an extremely familiar sight along British waterways, is now the UK's fastest declining mammal due to the loss of suitable habitat and predation by the North American mink – an invasive species.

The improved condition of this natural environment will deliver wider environmental and social benefits, including the recreational and educational value to the local community. An additional benefit is an increase in the area for recreational fishing by the community-led fishing club at Morden Hall Park nearby. Local anglers work with the Trust to protect the local environment, policing agreed fishing areas and helping to control litter.

David Sellman / NTPL

Work to improve and create wetlands at Watermeads Nature Reserve is delivering benefits for people and wildlife at Morden Hall Park downstream

Paul Harris / NTPL

CASE STUDY

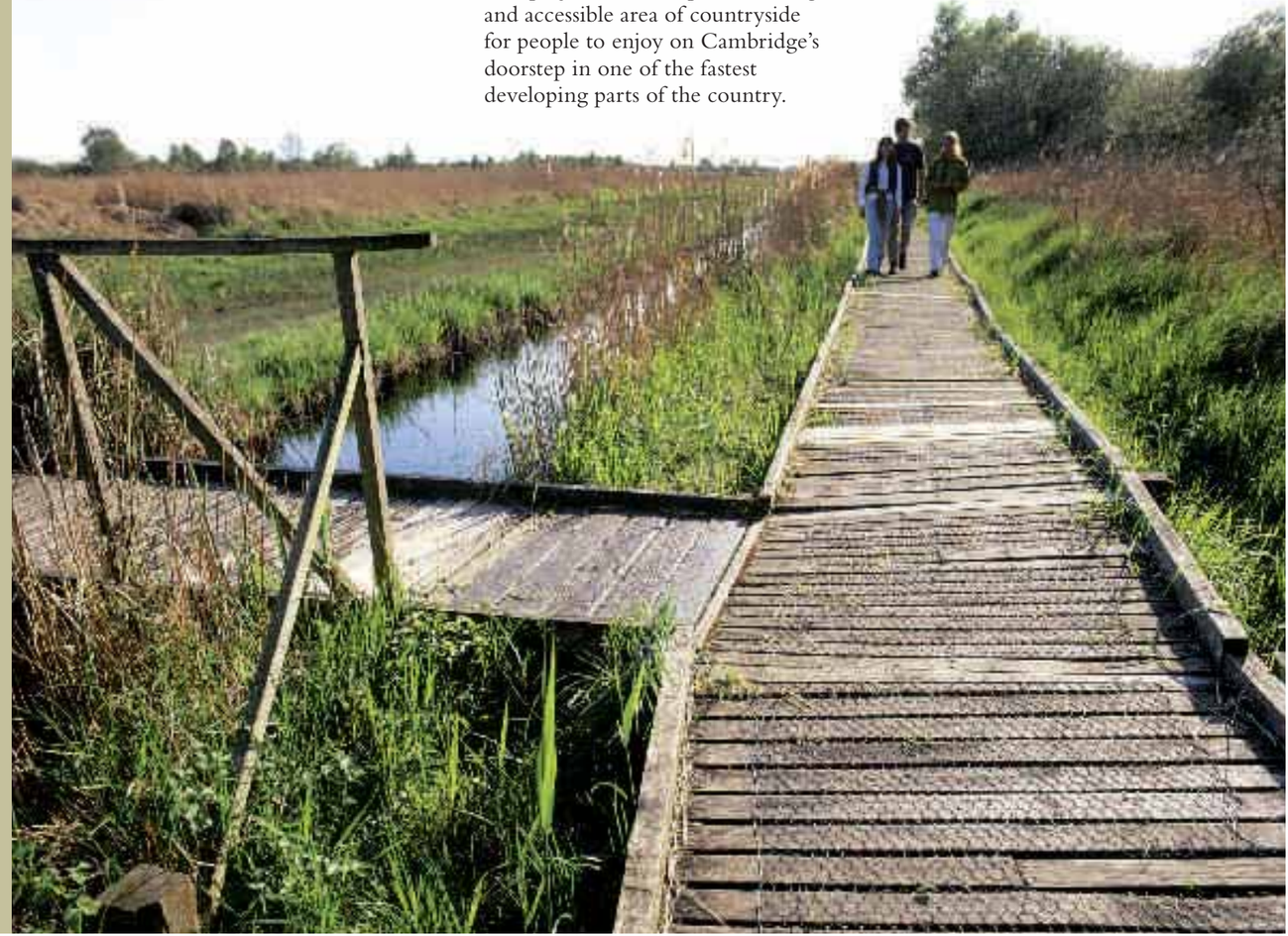
Wetland re-creation for people and wildlife

An ancient fenland landscape and internationally renowned wetland site, Wicken Fen (pictured below) is home to more than 7,800 species of plants, fungi and animals, making it one of the most species-rich nature reserves in Britain. A raised boardwalk makes this rare and unique wildlife haven accessible and enjoyable for everyone, all year round

Wicken Fen is particularly important because it is a surviving fragment of the once huge area of fen wetland that stretched from Cambridge to the Wash. Many of the species that live there are now very rare, but the Fen is too small to provide a sustainable home. The National Trust has therefore established the Wicken Fen Vision, our most ambitious landscape-scale habitat restoration scheme.

The Vision project aims to create a new nature reserve covering around 56 square kilometres (22 square miles) between Cambridge and Wicken Fen over the next 100 years. This will give the wildlife at Wicken Fen the space it needs to thrive and survive, as well as help compensate for loss of freshwater habitat through coastal squeeze on the East Anglian coast. The project will also provide a huge and accessible area of countryside for people to enjoy on Cambridge's doorstep in one of the fastest developing parts of the country.

Since the Vision project started in 1999, and with the support of partners, the Trust has more than doubled the area of the nature reserve and there is land in various stages of restoration. The mosaic of habitats being developed will include wet and dry grassland, reed-beds, pools and woodland. The primary guiding principles will be to manage the land to enhance its nature conservation value, protect the depleting peat soils, secure sufficient water resources, and provide improved visitor access to the countryside.



Flood management

The 2007 floods, billed as the worst in modern British history, left more than a third of a million people without drinking water, nearly 50,000 people without power, thousands more homeless and caused more than £2 billion worth of damage

The National Trust was badly hit too, with many properties suffering the effects. For example, over 60 homes in the National Trust villages at Buscot and Coleshill in Oxfordshire flooded, some by over a metre of water. Overall costs to the Trust of the floods were estimated at £1.5 million

Flooding is predicted to become more frequent and more intense as a result of climate change, bringing home the need to adapt. Unless a new, more sustainable approach is adopted, flood risk management will require more and more expensive hard defences.

Some 120 Trust properties are in areas of very high risk of flash floods, bringing challenges to their conservation. But more sensitive management of our rivers and their catchments can actually help reduce the risk of flooding. The Trust is advocating making more space for water.

Every parcel of land can play a part in absorbing and storing water, slowing the speed at which it moves downstream and reducing the flood risk. A recent evidence-based review commissioned by the National Trust concluded that, for small river catchments (typical of 97% of England and Wales), land management has a significant impact upon run-off and can be used as part of an integrated approach to flood management and defence. Indeed, in his final report on the lessons learnt from the 2007 floods, Sir Michael Pitt stated:

'One flood defence measure which has proved to be increasingly successful is use of natural processes such as using farmland to hold water and creating washlands and wetlands.'

He has recommended that Defra, Natural England and the Environment Agency establish a programme to achieve greater working with natural processes.

In 2005 the National Trust published *Shifting Shores* which described how we are working with natural processes to manage flooding on the coast. The following case studies describe how the National Trust is managing land throughout catchments from source to sea to make space for water and reduce flood risk. They give pointers to what is needed elsewhere.

Facing page: staff help to build emergency flood defences as water from the overflowing lake rushes into the house, during the July 2007 flooding at The Vyne, Hampshire

John Hammond / NTPL

CASE STUDY

Space for water in a new housing development

At the Stamford Brook housing development (pictured right) **the Trust has worked to make space for water through the restoration of Sinderland Brook and the use of Sustainable Urban Drainage Systems (SUDS)**

Monty Rakusen

The water cycle within the urban environment is highly modified, particularly because of the impermeable surfaces of roads, roofs and paths, which prevent water soaking into the ground. Yet even in urban areas, land can play a role in capturing and storing water to reduce the risk of flooding.

For example, the National Trust has worked to make space for water within the Stamford Brook housing development, 700 homes built to the Trust's specifications in Altrincham, Cheshire. The project has turned the previously canalised and straightened Sinderland Brook back into a meandering stream with a natural floodplain. As a result, the risk of flooding to the new housing has been significantly reduced.

The Stamford Brook development also includes a Sustainable Urban Drainage System. Surface water run-off from roofs, parking courts and driveways drains into a series of temporary ponds that runs through the development in wildlife corridors. Water is stored safely in the ponds, from which it either percolates back into the ground or discharges into the restored river corridor. Unfortunately, SUDS are still the exception rather than the rule in new housing developments.

CASE STUDY

Making space for water in the uplands

Peter Katic / NT

Upper Wharfedale in the Yorkshire Dales National Park (pictured above)**, is a limestone landscape of flower-rich meadows, woodlands, blanket bog and farmland bounded by dry-stone walls**

The National Trust owns nine farms and two hamlets in Upper Wharfedale, all of which are at very high risk of flash flooding. This not only poses a risk to the homes and businesses in the dale, but also to communities downstream.

Guided by the Environment Agency and research by the University of Durham, the National Trust has been a partner in a project exploring sustainable water and land management techniques.

A range of measures, including blocking moorland drainage ditches, wetland creation, woodland planting and restoring a more natural river course, has helped make space for water in Upper Wharfedale, benefiting wildlife and water quality as well as reducing the risk of flooding.

CASE STUDY

Restoration of a lowland river

Richard Henderson / NT

The River Cole (pictured above) **runs through the Trust's Buscot and Coleshill Estate near Faringdon, in the Thames catchment**

Like many lowland rivers in the UK, people have extensively modified the Cole over the last 900 years for milling, land drainage and agriculture, damaging its wildlife and increasing flood risk.

In 1994, a project was set up to restore a stretch of the River Cole and allow it to flow more naturally. 2km of the river was diverted into newly excavated channels that are much smaller in size and depth. These were designed to follow what is believed to have been the original river course. The new channels include a variety of natural features, such as meanders, pools, cliffs, backwaters and reed-beds, which slow the flow of water and provide important habitats for wildlife.

Seasonal flooding of the natural floodplain has since increased from 'rarely' to an average of four to six times over the last two winters. As a result, flood peaks flowing down the valley are smaller and nutrient-rich silt now settles on the fields, not in the river. This benefits water quality, as well as reducing flood risk downstream.

CASE STUDY

Adapting buildings

We can increase our resilience to flooding by adapting our buildings

Jeff Cherrington / NT

A non-return cover on the drain of the National Trust shop in Boscastle, Cornwall, allows waste water out but stops flood waters getting in to the building

The Trust has been deeply involved with the regeneration of Boscastle, Cornwall, following the devastating flooding in 2004. We've worked to flood-proof buildings, using simple measures such as metre-high flood boards to cover entrances to buildings, raising internal floor levels, covering air bricks and installing non-return valves on drainage pipes.

We're also installing measures to make cleaning and repair easier should flooding occur. These include raising electrical sockets and meters, waterproof finishes on the outside of buildings to stop water getting in, and breathable finishes on internal walls, such as lime render to allow walls to dry out after inundation. We're also installing plasterboard horizontally rather than vertically so that we only have to re-plaster the bottom part of a wall after a flood.

Water shortage

Household demand for water has increased dramatically. At an average of 150 litres per person per day, we now use 50% more water than in 1980, although much of this is wasted. This is partly as a result of changes in lifestyle: inefficient appliances such as power showers, garden sprinklers and pressure washers are now commonplace

David Levenson / NTPL

Could summer drought spell the end of the iconic British lawn?

It's easy to think the UK has a plentiful supply of water, but in many areas rivers and wetlands are drying up. Southern and eastern England are officially classed as 'serious water stress zones' by the Environment Agency – the South East of England has less water available per head than Sudan. The growing number of households and the Government's plans to build three million new homes by 2020 will put further pressure on these zones. Water is scarce in parts of northern England, Wales and Northern Ireland too – large-scale drought occurs in the UK.

The National Trust can no longer assume a right to the water that is on, under or passes through our land, and increasingly the use of this resource has to be negotiated with others. Shortage of water has serious impacts for the special places of historic interest and natural beauty in our care. Fish, wetland birds and other wildlife that need ponds, rivers and streams struggle to survive when these dry up or run low. Sources of food and breeding sites are lost and fish die through lack of oxygen.

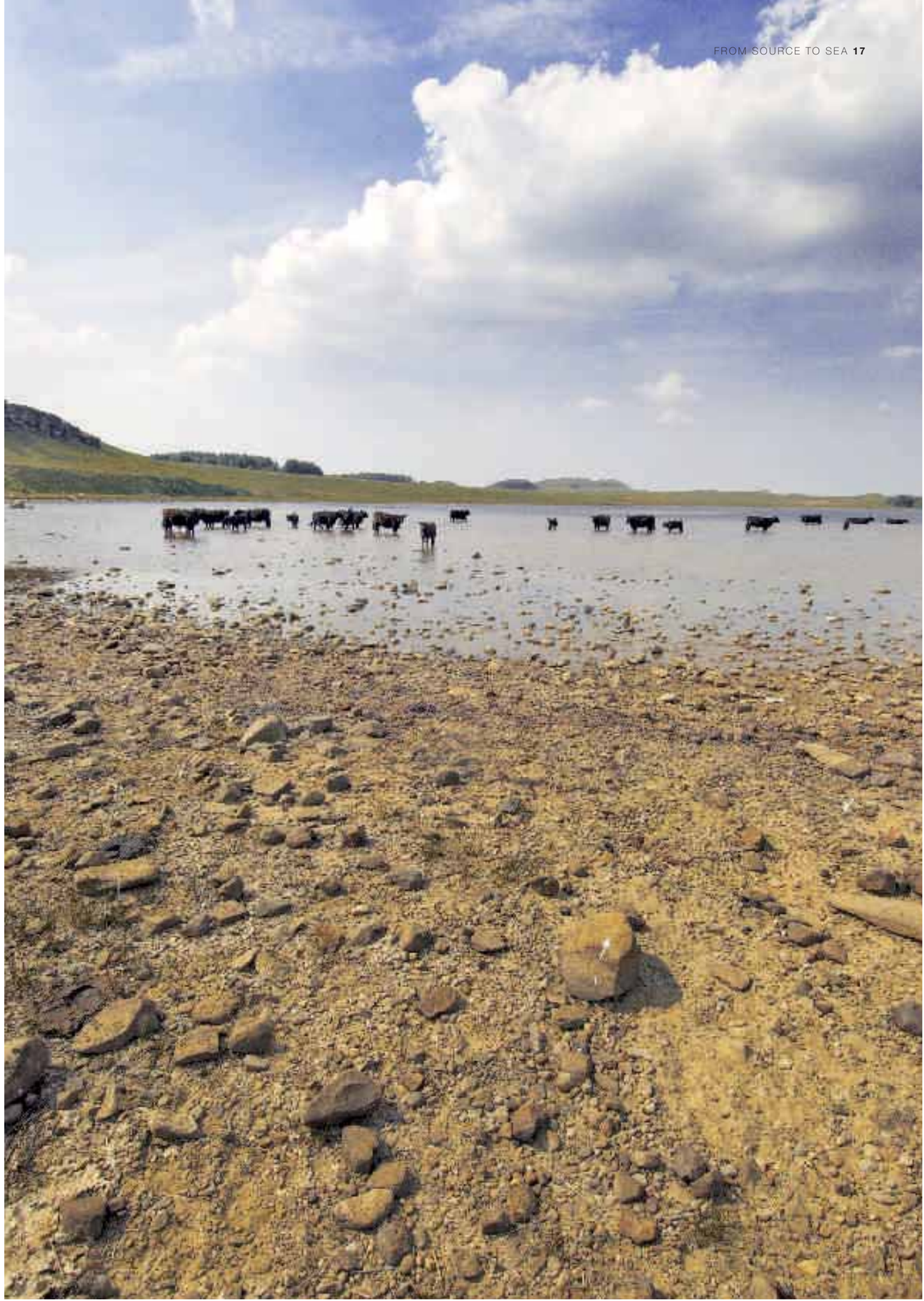
The National Trust has nearly 900 private water supplies, many of which are reliant on shallow surface sources that can dry up even in short periods of drought. Rob Jarman, the Trust's Head of Sustainability and Environmental Practices, advises:

'We need to be much more aware of the value of water resources and their vulnerability to over-use as well as to contamination. Many rural areas still depend on private water supplies where there is no mains option. In all areas, water-saving measures are already essential.'

Water and waste-water treatment costs the Trust £7 million per year (compared with £2.4 million spent on energy). Saving water is therefore good for business, as well as helping us to protect the special places which depend on this precious resource. The Trust is installing water meters in our buildings and aims to use the water consumption data to drive water saving across our estates. We're also working to inspire our members and supporters to waste less water in their own homes and gardens. The following case studies describe how we are working both to reduce our use of water and adapt to the increasing risk of drought.

Facing page: cows cooling in the little remaining water of Broomlee Lough, Northumberland during the drought of July 2006

Simon Fraser / NTPL



CASE STUDY

Water-friendly gardening

Summer borders flourish at Nymans in Sussex (pictured right), a model for water-friendly gardening

Instead of changing the planting schemes as the weather hots up, the garden is training plants to be drought-resistant. Once the plants are in the ground, they are inoculated with a special fungus and are then only watered a maximum of once a month between 6–8pm. This means the plants grow tight and lean, making them more water efficient. Nymans are also using naturally drought-resistant plants, such as the Salvia 'Hot Lips' which originates from Mexico and is adapted to low water conditions.

Ed Ikin / NT

Rainwater collection tanks at Nymans in Sussex harvest enough rainwater to last the whole summer

Rainwater has been harvested at Nymans since 1989, and the installation of a new collection tank in 2007 has doubled the capacity of water storage from 40,000 to 80,000 litres. Now, if it stops raining in April, the garden has enough water to last through the summer until September, when hopefully it will start to rain again.

Derek Croucher / NTPL

CASE STUDY

Reducing the National Trust's environmental footprint

The National Trust is committed to reducing our use of water across all our estates

At a range of sites including Sheringham Park in Norfolk, Chartwell in Kent, Craflwyn in Snowdonia, and at our central office, Heelis, in Swindon, for instance, we have installed water-efficient lavatories, airflush waterless urinals, aerated taps, low-volume showers and water-pressure reducers.

We've also helped to demonstrate that modern house building on a large scale can deliver big reductions in water consumption. The Stamford Brook housing development in Altrincham includes 4.5 litre toilets (the Building Regulation standard is six litres) brought to market especially for the development, among other water-saving measures.

Monty Rakusen

The Trust is working to reduce the use of water across all our estates, for example through installing water-efficient lavatories

CASE STUDY

Safeguarding our headwaters

In dry periods the slow release of water from the wetlands at the headwaters of our catchments is essential to maintain the flow in our streams

Land drainage causes streams to suffer low flows or dry up completely. The same techniques for restoring upland wetlands that can mitigate flood risk can also retain water in our uplands for periods of drought.

The Hughenden Stream on the Trust's Hughenden Estate near High Wycombe, Buckinghamshire, has suffered from low flows for a number of years due to the combined effects of abstraction by water companies and low winter rainfall. It had dried up completely until the heavy rains of 2007. The National Trust is now working with the Environment Agency, Chilterns Chalk Stream Project and others to restore the stream – an important habitat for a range of wildlife.

Neil Harris / NT

The Trust is working to restore Hughenden Stream, Buckinghamshire

Pollution

Over the last few decades, legislation has helped to reduce pollution, bringing significant improvements in water quality by addressing some of the most acute sources such as sewage-treatment works and sewer overflows. For example, the River Thames, which 50 years ago was so polluted it was declared biologically dead, now supports over 120 fish species. But…

Joe Cornish / NTPL

The Trust has trialled sheep showers on our upland estates to reduce the risk of pollution

…there is still much to be done:

- The source of over 40% of recorded pollution incidents is never identified
- More than 50% of public water requires treatment to control pollution from agriculture at an annual cost of over £200 million
- Due to improper connections, the waste water from 1.3 million properties (an estimated 5% of houses and 20% of industrial properties) goes straight into rivers rather than the sewage system.

The National Trust advocates improving water quality at source, through land management at a catchment scale. This approach reduces the need for expensive and energy-intensive water treatment, the financial cost of which is paid by homes and businesses through their water bills. It also delivers a range of other environmental and social benefits, including an improved habitat for wildlife, enhanced landscapes, and mitigation of climate change through carbon storage within soils.

The Trust has developed a model of 'whole farm planning', working with our tenant farmers to agree management objectives which both improve the environmental performance of farming and help them make a living in a sustainable way. We are now extending this approach into valley or catchment planning where possible. We have also trialled sheep showers instead of traditional dips on some of our upland estates, and we are always keen to support advances in husbandry that reduce pollution risk.

The following case studies describe how the Trust is working to reduce pollution through land management changes across our catchments from source to sea.

David Noton / NTPL

CASE STUDY

Restoration of an 18th-century landscape to meet 21st-century needs

Water pollution not only poses challenges for the conservation of the natural environment, it also affects the historic significance of our sites such as Croome Park

At Croome Park in Worcestershire the Trust has undertaken a bold and creative project to adapt a restored 18th-century landscape to meet the pressures of the 21st-century.

Croome was 'Capability' Brown's first designed landscape park, his 'first and best loved child'. One of the park's most distinguishing features is the 1¾-mile completely artificial river (reputedly the longest in England) flowing out of an artificial lake. When the Trust acquired Croome Park in 1996, the river was full of silt and wetland vegetation (which had become an important habitat for wildlife), and water quality was poor.

In order to restore the river to 'Capability' Brown's vision of a mirror-like surface, it was necessary both to dredge and clear vegetation, but also to improve the quality of the water flowing into it.

The Trust decided to create three new wetland sites, which would have a two-fold function: to mitigate the loss of wildlife habitat from the river, and to intercept silt and nutrients before they entered the restored water bodies. The wetlands have been scaled to mitigate run-off from the whole catchment, including arable land beyond the park boundaries, and from the M5 motorway. The result is a net increase in the area of wetland at Croome, not only providing habitat for species displaced by the dredging of the river, but also attracting new species, particularly waders and wildfowl.

CASE STUDY

Restoring the Upper Conwy for water and carbon

Ian Shaw / NTPL

On the Ysbyty Estate in north Wales (pictured above) the Trust is working to restore the source of the River Conwy – a large area of blanket bog

In the uplands, drainage, overgrazing and heather burning all increase the risk of erosion of fragile soils, especially peat. This can cause problems for water quality downstream.

On our Ysbyty Estate in North Wales, the Trust is working with the local community and a range of stakeholders to restore the Upper Conwy Catchment. The Migneint, an internationally important area of blanket bog, is the source of the River Conwy with its streams feeding into Llyn Conwy. This lake provides some of the area's drinking water.

The Migneint is also an important store of carbon, one of the largest in Wales. Preventing this nationally important carbon store from releasing its carbon is a vital step in reducing our greenhouse gas emissions.

Measures will be taken to restore the peat bog – aiming to make it wetter and reduce erosion, encouraging bog mosses to spread. This will make the Migneint more resilient to climate change. The project will also look at pollution risks and work with farmers to improve the environmental quality of their farms. It is hoped that the environmental benefits the farmers deliver can be used to promote and market their produce, bringing further benefits for the local community.

Joe Cornish / NTPL

CASE STUDY

Farming a future for water

Ed Nicholson /NT

The Trust is working with farm tenants at Killerton in Devon (pictured above) to find land management methods which both improve productivity and reduce the risk of pollution

The Trust's Killerton Estate near Exeter, Devon, covers over 2,500 hectares. Its 19 farms are on naturally productive soils and therefore have been farmed intensively. The estate includes substantial areas of flood-plains of the rivers Culm, Clyst and Crannybrook. Intensive farming next to this extensive network of waterways has led to degradation of both soil and water resources.

In 2000, the Trust began the Killerton Estate Integrated Management Project, which aimed to develop the estate as a lowland showcase for the National Trust's long-term vision for sustainable farming.

This was achieved by co-operative working with the farm tenants to find land management methods compatible with commercial farming which also protect and enhance the soil and water quality, wildlife, landscape and archaeology of the estate. Free advice and training helped tenants increase the productivity of their businesses whilst also reducing the pollution risk within this sensitive area.

CASE STUDY

Preventing toxic algae

Improvements to sewage works and local farming practices are helping to prevent toxic algal blooms on Loe Pool, Cornwall (pictured)

David Davies

Loe Pool suffering under toxic algae in 2001

Estuaries receive the combined run-off from across the catchment. An unhealthy catchment will lead to an unhealthy estuary, and many estuaries are known to be sinks for harmful pollutants.

Loe Pool within the former estuary of the River Cober is Cornwall's largest natural lake, separated from the sea by Loe Bar, a massive shingle bank. The pool, home to many birds, otters and brown trout, is a nationally important wildlife site. However, since the mid-1970s, warm weather has caused toxic algal blooms to develop due to excess nutrients entering the water, mostly from two sewage works but also from farming activities. The algal blooms turn the water green and deoxygenate the water, killing fish, plants and aquatic invertebrates.

The National Trust is a partner in the Loe Pool Forum, which was set up in 1996 to look at ways of reversing the pollution problems in the pool. Good progress has been made, most importantly due to improvements to the local sewage-treatment works at Helston. It is hoped that nearby RNAS Culdrose will be improving its sewage treatment following survey work. Action is also underway on Trust land around the pool and throughout the Cober catchment to reduce diffuse pollution from surrounding farms.

Lessons learnt

The challenges illustrated within this report are not unique to the National Trust – they apply in different ways to everyone. We're developing our approach to managing water, and have learnt lots of lessons along the way

Based on our experience, we're calling upon others to make a change too – to move away from treating water as an infinite commodity to be exploited, to treating it with the respect it deserves

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Left to right: Deejpilot / iStock; Planview / iStock

MANAGE WATER FROM SOURCE TO SEA

Water, wildlife, landscape and the impacts of climate change know no artificial boundaries. It is time to move away from fragmented land and water management to embrace a new approach that respects natural river catchments and their processes, and considers our impacts upon water along its entire path from source to sea.

MAKE SPACE FOR WATER

Every parcel of land, even in urban areas, can make a contribution to reducing the probability and consequence of flooding, with the uplands and floodplains playing vital roles in water capture and storage. By rewarding farmers and land managers for practices that help control the flow of water off land, we can help secure a more sustainable future, reducing flood risk with benefits for wildlife, landscape and cultural heritage too.

WASTE LESS WATER

We're doing what we can to reduce our use of water and to inspire our members and supporters to waste less water in their own homes and gardens. However, many people have no idea how much water they are using. We believe the Government should require the water industry rapidly to install water meters for all households and other water users across the UK and help their customers to use less water. Universal metering should be accompanied by tariff schemes that protect vulnerable customers while penalising waste.

TACKLE POLLUTION AT SOURCE

Pollutants get into our water from farming, from degraded soils, from drained upland peat bogs, from sewage overflows and treatment plants and other human activities. Dealing with them using traditional 'end of pipe' treatments is expensive, energy-intensive and unsustainable. We're calling for an approach that tackles pollution at source. Reducing pollution by changing the way land is managed offers a better deal for both water customers and the environment.

'WATER PROOF' OUR HOMES AND BUSINESSES

There is a need to 'water proof' new development. We are very concerned about the extent of recent and current building in flood-risk areas, and we want the Government to consider changes to the location of key infrastructure to protect people's livelihoods. Sustainable Urban Drainage Systems (SUDS) also have an important role to play and should be incentivised, with responsibilities for their maintenance made clear in policy and practice. Permeable paving and other surfaces also have an important role to play in reducing run-off and should become the norm.

We also believe the availability of water should be taken into account when planning new development. Water companies should not be obliged to provide new developments with water in areas of water stress if the increased demand will damage the environment.

Existing buildings in flood-risk zones should be made more resilient – simple measures can save millions of pounds in the long term by reducing the need for hard defences and making cleaning and repair easier should flooding strike.

The future

In order to deliver the priorities we have identified, a step-change is needed in the way in which we regulate, fund and implement water management in the UK. While there is a growing consensus about the way forward there is still far too little action or delivery

A culture change is needed too, as society re-learns how it needs to live with (and without) water

All: Max-Photo / iStock

We urge early delivery of these priorities and would welcome feedback on the approach we have outlined

INTEGRATE POLICY AND FUNDING

Current policies and public funding mechanisms go some way to improving the health of the water environment, but they are not joined up, and sometimes work against each other rather than delivering the synergy required. The separation of approaches to flood management, drinking water and the implications of the Water Framework Directive is just one example. This can be confusing for land managers and others who work with water.

Improving the management of the environment in this way will mean that any investment will buy the public far greater benefits than currently possible, making the most of every public pound spent within a catchment.

MOVE TOWARDS A ‘WATER SERVICE’ CULTURE

There is significant potential for measures to pay farmers and land managers for providing ‘water services’, such as storage of water on floodplains, wetland restoration and the use of buffer strips to reduce pollution. Such measures also have other benefits, including carbon storage, boosts to wildlife and landscape benefits, and are often cheaper than ‘end of pipe’ solutions.

There is also a need to reform the water industry, so that water companies become providers of a water service, rather than water being treated as a commodity. A Water Efficiency Commitment, placing an obligation upon water companies to incentivise water saving, would help us move towards a water service rather than a water supply culture.

ADVICE, SKILLS AND TRAINING

If farmers and land managers are to play an increasing role in the management of water resources, it is essential they are well informed in these areas. There is a need to help them gain the right knowledge, skills and experience to manage their land in a more sustainable way.

Our experience also suggests that there is a need to develop the breadth of skills of those within the Government and its agencies developing and implementing approaches to water management on the ground. This will ensure more effective delivery and exploration of more sustainable approaches to water management based on the natural functioning of catchments.

NEED FOR PARTNERSHIP WORKING

Community engagement in water management decisions is crucial but not always easily achieved. Building consensus takes time and effort, but it is essential. There is a need for partnership working at a catchment scale to find mutually beneficial solutions to the challenges we face.

INVOLVE AND ENGAGE THE PUBLIC

We cannot continue to take water for granted – climate change means we’ll increasingly have too much of it in some places, and too little in others. We believe improvement is needed in the way the Government proactively communicates the risks of both flooding and water shortages to the public. There is a need to raise general awareness and facilitate practical adaptation by promoting actions that people can take in everyday life.

The National Trust
working with water

- We will work with natural processes as far as possible
- We will take a strategic and long-term approach to the protection of water
- We will operate at a landscape scale and beyond our boundaries, working with partners to manage water throughout catchments
- We will minimise our demand for water and our production of waste water
- We will include water resource conservation in our planning
- We will minimise the damage our activities cause to the water environment and improve it where we can.

The National Trust
facts and figures

43% of the land in England and Wales drains to the boundary of National Trust land (light area, pictured right). It's clear we have a responsibility to help maintain and improve the water environment.

5% of National Trust land and nearly 2,000 of our buildings are at high risk of flooding (1 in 100 years) – wherever we have such flood risk areas, we must know what is at risk and how it will respond to the flood when it comes, so that we can mitigate and adapt ahead of the flood event.

120 National Trust sites are in very high Flash Flood Risk areas – flash floods can happen very quickly and their impact on settlements, infrastructure and people (such as in campsites and caravan parks) can be devastating, as we experienced at Boscastle in 2004.

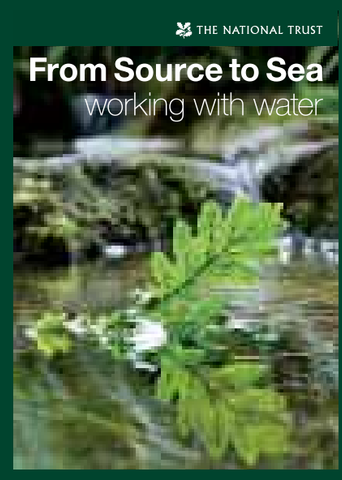
27% of National Trust properties have areas designated as Special Areas of Conservation – these are designated under the EU Habitats Directive because they support wildlife and habitats of European importance.

20% of National Trust sites are currently in net rainfall deficit areas; this is predicted to rise to 34% by 2050 – these areas will increasingly experience droughts and be at high risk of water shortages.

92% of National Trust land provides groundwater suitable for drinking – we must be exceptionally careful in all our activities to avoid pollution of public water supplies.

26% of National Trust land is classified as a Nitrate Vulnerable Zone – farmland management and run-off must be carefully managed to reduce nitrate use and losses.

40% of National Trust land has a slope of 11 degrees or more and 28% of our land is prone to erosion – these areas are at a high risk of soil erosion, and may require soil-management plans.



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