



# From blue to green

How to get the best for the  
environment from spending  
on water

By William Andrews Tipper,  
Stephanie Shields and James Elliott



# Foreword

## **Angela Smith**

MP for Penistone & Stocksbridge, chair of the All-Party Parliamentary Group on Water and member of the EFRA Select Committee

Throughout much of the twentieth century our rivers and beaches were in a state of crisis. The Thames was declared dead in the 1950s. In 1988, over a third of our beaches fell below legal standards. But today, that number stands at less than half a percent, thanks in large part to the almost £30 billion of investment that we have seen since then.

But this change hasn't come in a vacuum. EU regulations have played a crucial role in raising standards and in driving changes to the structures of the water sector. The realisation that the vast costs associated with meeting these standards could not be met by government funds strengthened significantly the case for private investment; in that sense, privatisation in the late 1980s was a pragmatic response to an environmental imperative.

Even now, however, the need for investment is as pressing as ever. There is a lot more to do as far as our waterways are concerned. That is why we must not only maintain the standards we have achieved, but also ensure that the water industry focuses on how best to improve on present standards.

As this report clearly explains, at present we are subsidising farming practices that pollute our waterways, with water companies being forced to pick up the tab. And so we must ensure that any subsidy scheme that comes after Brexit is taken as an opportunity to increase environmental standards by, for example, incentivising farmers to play their part in avoiding pollution of our watercourses.

That is why, as a passionate environmentalist and champion of real investment in our public services, I do not want to go back to the 1980s when Britain was labelled the 'dirty man of

Europe', with beaches overflowing with sewage, filthy rivers, excessive power station emissions and a poor conservation framework.

Green Alliance's analytical report is studious in making the case for increased investment in water quality, whatever the ownership structure of the industry might look like in the future. For me, that is paramount: we must have clean water and a safe marine environment, and that goal should be the overriding priority for good public policy.

To further improve our rivers and beaches we need smart and efficient regulation. That is what we must focus on, now more than ever, which is why this report is so timely.

# Executive summary

“In terms of ecological health, England’s waters are in a poor and, in some instances, declining state.”

The water sector is a significant private funder of environmental improvements in the UK. Between 2010 and 2015 water company spending on environmental improvements was more than double that spent by the Department for Environment Food and Rural Affairs (Defra) on pollution abatement and the protection of biodiversity and landscape.

In the period since privatisation in 1989, the English water sector will have raised and spent £28 billion on measures to reduce pollution and improve water quality. This has resulted in some striking successes, with nearly all English beaches now classified as good or excellent, and massive reductions in the presence of nutrients, heavy metals and other pollutants in UK waters.

However, if measured in terms of ecological health, England’s waters are in a poor and, in some instances, declining state. Despite some notable successes, such as the river Tyne being cleaned up to become the best salmon river in England and Wales, overall progress to restore the ecology of waters has been slow, with the UK failing to meet legal targets under the EU’s Water Framework Directive (WFD).

The water sector could certainly do more in terms of pollution prevention, but the poor health of our waters reflects the wider decline in the UK’s natural environment. This is largely attributable to farming and land management practices, with agriculture being the single biggest cause of water quality problems.

The government’s goal to restore the natural environment within a generation, coupled with its proposed reforms to public payments to farmers as the UK leaves the EU, have created the possibility of a radically different policy framework for managing land and water.

Maintaining existing levels of spending on land management and water will be essential to achieve the government’s

“Aligning direct farm payments and water company spending to achieve common environmental objectives should result in much better returns on investment.”

ambition. The cost of simply meeting existing conservation targets and commitments in the UK has been calculated at £2.3 billion per year over ten years, while current government spending on biodiversity protection is estimated at £445 million. Realising the full economic benefits of restoring nature will require significant upfront investment: restoring 75 per cent of water bodies to good status by 2027, as required by the WFD, would create £22.5 billion of benefits in England alone, but require £17.5 billion of investment.

It is also not just a question of how much money is being spent. What matters more is how and when it is spent. The costs of cleaning up water have arguably been driven up by farming subsidies, which have failed to curb sub-optimal agricultural practices, resulting in excessive run-off of pollutants from farmland to rivers and groundwater.

Aligning public payments to farmers and water company spending to achieve common environmental objectives should result in efficiency gains, and much better returns on investment.

Water companies are already switching water resource protection spending from end-of-pipe treatment to catchment management, tackling agricultural pollution at source. But, to be as cost effective as possible, extra investment is needed now: catchment management schemes take time to show results, so delaying further action could make it necessary to invest in expensive hard infrastructure in the short term to deal with pollution. But better value catchment management would render this infrastructure redundant in the medium term, and can reduce operational and capital costs of running and replacing existing infrastructure.

In this policy insight, we make the following three recommendations to encourage the best value approach to environmental protection and the improvement of water:

**Write existing legal commitments for water into the new Environment Bill.**

Enshrining the existing legal goals of the EU's Water Framework Directive into the new Environment Bill, as part of a broad set of targets for ensuring nature's recovery, would provide certainty and kick-start delivery of the government's 25 year plan for the environment. These targets would inform spending and investment decisions by both the public and private sectors.

**Accelerate the adoption of 'catchment management by default' by water companies.**

This will require support from water sector regulators (Ofwat, the Environment Agency and the Drinking Water Inspectorate) to enable water companies to pursue innovative, large scale programmes without being penalised where schemes fail to deliver as anticipated. Experimentation at scale during the water sector's 2020-25 funding period would enable full scale adoption of this approach after 2025.

**Design the new Environmental Land Management System to enable co-investment by the public and private sectors.**

As the UK leaves the EU, the government will be designing a new Environmental Land Management System to replace the Common Agricultural Policy in England. The government should explore the creation of new platforms or mechanisms capable of accessing and blending funding from water companies, state payments to farmers and other sources, to support delivery of ecosystem enhancing land and water management projects.

# The water sector's track record on the environment

“The water sector is one of the most significant private sector investors in improving the natural environment.”

The government has sparked an intense discussion about how to cover the costs of environmental protection in the UK. Its 25 year plan for the environment sets out the ambition to reverse entrenched declines in English nature within a generation. Proposed reforms to the system of public payments to farmers are intended to fund a major part of the work necessary to achieve this. However, the costs of simply meeting existing conservation targets and commitments in England have been estimated at £1.4 billion annually for ten years (£2.3 billion for the UK as a whole),<sup>1</sup> while current government spending on biodiversity protection in the UK as a whole is estimated at £445 million. Going beyond the bare legal minimum to restore the health of the UK's natural environment will require significantly higher spending.

If the government's environmental ambitions are to be achieved, the private sector will, in future, need to finance more of this environmental restoration work. Currently, the water sector is one of the most significant private sector investors in improving the natural environment, based on a funding model that has developed over nearly 30 years.

This report examines how and why the water sector invests in environmental protection, and asks how this spending can be used to deliver better outcomes, working alongside public spending on agriculture and land management. As background for this report, we gained input from the water industry, NGOs and government agencies, and held a workshop for water industry experts (see annex one for the list of attendees).

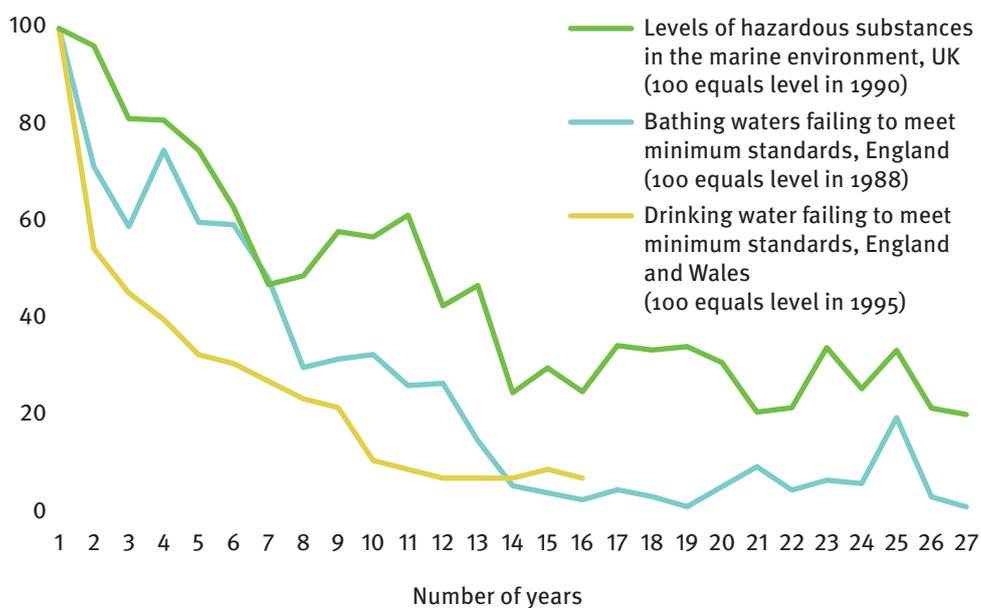
## Post-war problems and privatisation

In the post-war period many UK waters reached crisis point. Most famously, the River Thames was declared biologically dead in the late-1950s. The situation improved over the decades that followed, with new regulations (many as a result of the UK's membership of the European Community in 1973) and increasing public awareness of environmental issues. Nevertheless, environmental gains were often exceeded by continuing declines elsewhere, with nearly 1,000 kilometres of rivers showing net environmental deterioration between 1958 and 1985.

The water industry in England was privatised in 1989, as the result of political acceptance of the need for substantial investment in wastewater treatment infrastructure, coupled with a reluctance to pay for it either through public money or an increase in household water bills. Investment was instead to come from borrowing by private water companies.<sup>2</sup>

There have been considerable improvements since in the quality of drinking water, bathing waters and the marine environment. The proportion of English beaches meeting legal minimum standards rose from 65 per cent in 1988 to 98.3 per cent in 2017, despite the introduction of tougher new standards. The proportion of drinking water samples failing to meet minimum standards in England and Wales fell from 0.55 per cent in 1995 to 0.04 per cent in 2010.<sup>3,4</sup>

## Reduction in water pollution (index)<sup>5</sup>



## What has driven improvements?

EU water quality standards have been the single most significant factor driving pollution reduction efforts by the water sector. Water companies have needed to invest heavily to meet targets contained within a number of EU directives (see below), principally through the National Environment Programme, now known as WINEP (see page six).

## EU directives governing water quality<sup>6</sup>

Water quality legislation	Overview
Bathing Waters Directive	Includes mandatory monitoring of bathing water quality, testing the levels of different bacteria to ensure an area is clean and safe for recreational uses. Water companies must ensure any sewage treatment works comply with EU microbiological requirements.
Urban Waste Water Treatment Directive (UWWTD)	Entails the collection and treatment of wastewater, with different levels of treatment required depending on the population of that area and the sensitivity of the catchments. <sup>7</sup> It requires water companies to upgrade their sewage treatment works to produce cleaner discharges.
Habitats Directive	Water companies must ensure that any discharges do not damage valuable nature conservation sites or threatened species.
Water Framework Directive	Requires the creation of river basin management plans to manage water on a catchment scale. <sup>8</sup> Monitors the ecological and chemical status of water bodies and typically covers objectives for ammonia, phosphorus, biochemical oxygen demand and dissolved oxygen standards in rivers and discharges to groundwater.

## Water Industry National Environment Programme (WINEP)

Formerly known as the National Environment Programme, this is a key component of the five yearly periodic review where company investment plans to meet statutory obligations and customer needs are agreed by Ofwat. It lists environmental improvement schemes to ensure that water companies meet the European and national targets related to water. Each WINEP is individual to each water company and the costings are included in their budgets, approved by Ofwat. The programme has led to significant investment in the environment since privatisation but has mainly been focused on hard infrastructure to clean up water, such as nitrate or phosphate removal plants and other end-of-pipe treatments.

## How have water companies delivered these improvements?

By 2020, water companies in England will have spent more than £28 billion since privatisation on work to meet regulatory requirements for the environment.<sup>9</sup> Historically, the majority of environmental spending has been on wastewater treatment. There are still shortcomings in water company environmental management processes. While the number of serious pollution incidents has fallen by well over 50 per cent since a significant peak in 2005, the Environment Agency considers that progress has plateaued. In 2017 there was a rise in category 1 (the most serious) incidents to 11 from nine in 2016, with the main contributing factors being inadequate monitoring and management, and failures in risk assessment, operational practice and staff culture. The Environment Agency has clearly stated that it expects serious pollution incidents to decline to zero, and that water companies need to do more to protect the environment.<sup>10</sup>

Nevertheless, there has been considerable progress in some areas. Levels of the two main river pollutants, phosphorus and nitrates, have decreased significantly from their historic peaks in the late 1980s and early 1990s, in large part due to improvements in sewage treatment. Pollutant loads to rivers from water company discharges have reduced by 40 to 70 per cent since 1995.<sup>11</sup>

The water sector has also escalated its use of catchment management, involving interventions that prevent pollution at source, for example by working with farmers to minimise run-off from agricultural land, or restoring wetlands to 'slow the flow' and naturally treat water. In the 2009 periodic review (PR09), which set water company spending for 2010-15, only £60 million out of the £4.6 billion allocated to improve drinking water and environmental quality was spent on catchment management schemes and incentives, ie roughly 1.3 per cent.<sup>12,13</sup> In the 2014 periodic review, covering spending for 2015-20, budgets for catchment management more than tripled to £200 million (see graph opposite).<sup>14</sup>

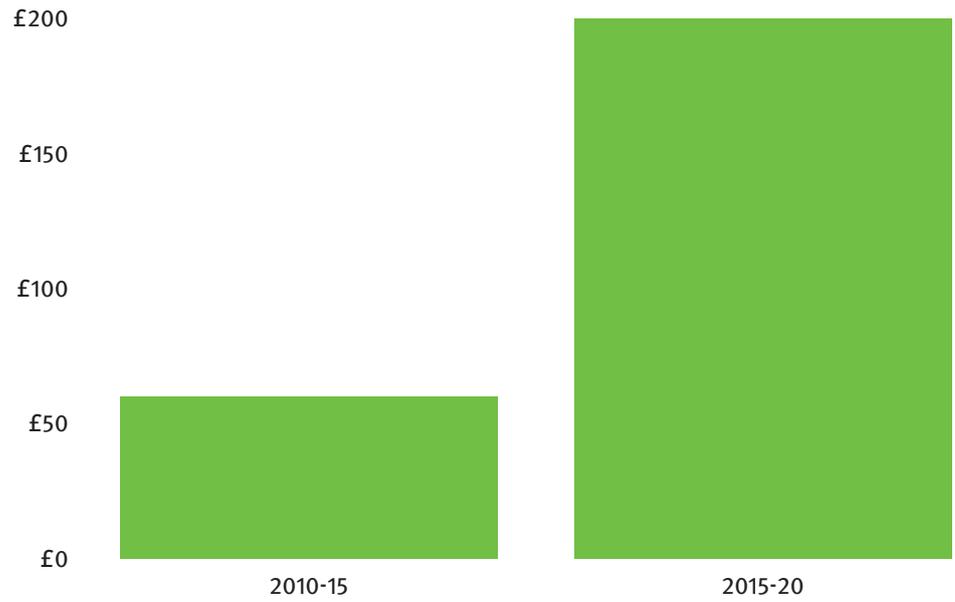
This change in approach has been even more evident under WINEP, where there has been a 40 fold increase over little more than a decade in the number of catchment management schemes. Prior to 2010, fewer than ten catchment management schemes were authorised, but proposals for the 2019 periodic review, covering 2020-25, include over 400 catchment management measures.<sup>15</sup>

Measured by the standards and priorities of 1989, pollution reduction efforts have been sustained and successful. Yet, as we will show, broader environmental threats to the health of England's waters mean that a new approach is now needed.

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“Broader environmental threats to the health of UK waters mean that a new approach is now needed.”

Catchment management spending by water companies between 2010 and 2020 (£millions)



# The role of the 25 year environment plan

“The poor state of England’s waters reflects profound declines in the health of the wider natural environment over the past 50 years.”

Viewed in isolation, sustained progress has been made to improve drinking water quality and reduce pollution from wastewater. Yet the overall picture is that the ecological health of England’s waters is poor.

For the past decade, management of UK waters has been governed by EU legislation seeking to transition from traditional ‘command and control’ approaches to pollution reduction, to an approach integrating all parts of the wider environmental system. The 2000 Water Framework Directive (WFD) introduced the catchment-based approach and integrated river basin management, aiming to understand and minimise human induced pressures on the water system. It sets out an integrated framework for preventing deterioration and achieving ‘good status’ objectives for water bodies, based on their biological, chemical and hydromorphological condition, and the sustainability of water abstraction.<sup>16</sup>

The overall status of English waters is not improving, and some water bodies are still deteriorating. Water bodies must meet required standards for all indicators to achieve good status. While there have been some improvements in individual indicators since 2009, to date this has not led to any improvement in the overall status of English waters, with only 16 per cent of surface water bodies reaching good status in 2017. The WFD is being implemented in six year management cycles: 2009-15, 2015-21, and 2021-27, meaning the UK must reach good status for all water bodies where this is cost effective and technically feasible by 2027.<sup>17,18</sup>

## Why is our water environment still in decline?

The poor state of England’s waters reflects profound declines in the health of the wider natural environment over the past 50 years.<sup>19</sup> In 2015, the abundance of priority species in the UK had declined to 32 per cent of their levels in 1970, with 58 per cent of species in decline between 2010 and 2015.<sup>20</sup> An estimated one million hectares of soils in England and Wales are at risk of erosion from wind or water, with soil loss of one to three centimetres per year in some areas.<sup>21</sup> Carbon concentrations in arable topsoil, an important indicator of overall ecosystem health, declined by 11 per cent between 1978 and 2007.<sup>22</sup>

River Basin Management Plans, the delivery mechanism for the WFD, promised a radical shift away from traditional water management practices towards more integrated planning of water and land. However, it has been argued that government policy has failed to get to grips with the complexity of the conditions operating within catchments.<sup>23</sup> In particular, policy has failed to tackle three key challenges:

### Agricultural pollution

In England and Wales agriculture is estimated to be responsible for 50-60 per cent of nitrate in water bodies, 75 per cent of sediment and pesticides and 20-30 per cent of phosphorus.<sup>24</sup> Agriculture and land management is the single largest contributor to failures of water bodies to reach good status, accounting for 31 per cent of failures.<sup>25</sup> The water sector is the next biggest contributor, accounting for 28 per cent of failures. Urban development and transport account for 13 per cent and the remainder is shared between other sectors or is unknown. Despite this, water companies have to deliver about 87 per cent of measures in River Basin Management Plans (RBMPs), while only seven per cent of RBMP measures apply to farming.<sup>26</sup>

Agriculture’s impacts have been exacerbated by a system of farm payments, under the Common Agricultural Policy (CAP), which has limited environmental requirements, and a lack of capacity and mechanisms to enforce regulations such as Nitrate Vulnerable Zones. The government pays about £2.5 billion a year to farmers in England but only about £0.5 billion of this is directed at environmental schemes. Conversely, the costs of water pollution are estimated at up to £1.3 billion a year in England and Wales.<sup>27</sup>

## Focus on single outcomes and end-of-pipe solutions

Targets in EU directives have focused water company environmental spending on building end-of-pipe treatment infrastructure. This has been reinforced by the UK's regulatory regime which, in the past, required investment to be justified by a single driver or outcome, like water quality or environmental protection, but not both, making it harder to justify spending on catchment management projects which deliver multiple benefits. There has been criticism that an emphasis on meeting regulatory requirements for individual pollutants, rather than focusing on better ecosystem health, has contributed to failure to improve the overall environmental health of waters.<sup>28</sup> Traditional end-of-pipe solutions led to dramatic reductions in certain pollutants, but the marginal gains that are now needed to improve the ecological health of waters can be very expensive to achieve through further treatment infrastructure when compared to the cost of land management changes to achieve the same outcomes. In addition, there are newly emerging pressures and pollutants, such as pesticides, microplastics, and chemicals such as medicines and hormones, for which end-of-pipe solutions will not always be cost effective, or even technically viable.<sup>29</sup>

## Divisions and fragmentation between policy, regulation and funding

Lack of co-ordination in setting priorities and responsibility for delivery were barriers to more catchment and nature-based approaches identified in a workshop we held in 2018 for water sector experts (annex one). These barriers can lead to the inefficient use of resources, or even conflict between funding streams that have similar overarching goals. For example, in some areas, the government's Catchment Sensitive Farming scheme has been withdrawn when water companies have entered into agreements with farmers. Research by Indepen found that, in 2016, in each of the 109 water catchments in England, "typically 30 organisations manage 50 blocks of funding, under the guidance of around 20 co-ordinating plans and mechanisms".<sup>30</sup>

## How to improve environmental outcomes

An assessment of the goals and targets of the 25 year plan highlights that new policy, mechanisms and, in some cases, funding will be needed to achieve them (see table on page 13). Much of this is expected to be delivered through the new Environmental Land Management System but, as discussed above, it is unlikely that the public sector alone will be able to deliver the scale of change required. If done right, water company investment in catchment management approaches does not only benefit water quality, it can also have a range of co-benefits for restoring nature, reducing risks from flood and drought, and increasing sustainability of resources such as forests and soils.

For example, changes to land management and use designed to improve water quality, such as restoring wetlands or creating vegetation next to waterways, could also create and restore priority habitats for plants and wildlife, and help restore soil health. This provides an additional mechanism for delivering the 25 year plan's 'Nature Recovery Network'. Similarly, creating new woodland to manage water quality could provide a much needed funding source for the government's tree planting ambitions. These measures could also reduce risks from natural hazards such as flooding and drought by slowing the flow of water through the landscape.

We propose three ways that environmental outcomes for water could be improved, while also contributing to the achievement of other goals of the plan:

## 1. Use legal targets to drive further improvements

The 25 year environment plan retains the headline goal of the WFD: to restore 75 per cent of water bodies to close to their natural state, but it does not give a target date for achieving this, and instead aims to do so “as soon as is practicable.” There are strong economic as well as environmental reasons for prioritising the restoration of water bodies.

The Environment Agency has calculated that restoring 75 per cent of water bodies to good status by 2027 would create net benefits for England of £5 billion.<sup>31</sup> The value of the benefits reflects natural capital improvements in areas including water quality, air quality and recreation.

The cost of the measures needed was identified by the Environment Agency as a significant barrier. In particular, the share of the cost that will fall on agriculture – roughly 40 per cent – as well as the requirement for short term investment needed before 2021, to realise long term benefits up to 2043.<sup>32</sup>

The UK’s departure from the EU will trigger profound changes to agriculture which could, if managed sensitively, be a chance to transform the environmental management of UK farmland, overcoming the difficulties and making significant ecological improvements to waters a genuine possibility.

Post-Brexit England will be outside the CAP, and the government has proposed to make future payments to farmers (the Environmental Land Management System or ELMS) contingent upon the delivery of ‘public goods’ including environmental protection and improvement.

Furthermore, the government’s 25 year environment plan, published in early 2018, has raised ambition by reaffirming its goal of being “the first generation to leave the environment in a better state than we found it.”

Delivering existing legal goals for water by 2027 would ensure a fast start and consistent progress towards meeting the ambitions of the 25 year plan. As well as the explicit goal for clean and plentiful water in the plan, achieving objectives under the water framework directive to restore protected areas to favorable condition provides a legislative driver for the 25 year plan goal to restore 75 per cent of terrestrial and freshwater protected areas.

Explicitly linking delivery of the WFD by 2027 to the delivery of the 25 year environment plan would enable a new integrated approach to managing and funding improvements to land and water.

## 2. Reward innovative approaches

The water sector has made significant strides in reducing a whole range of environmental impacts. However, this has generally come in response to pressure from government and regulators.

For example, there have been substantial reductions in leakage and improvements in water efficiency. In 2001, water companies supplied an average of 15,641 million litres of drinking water per day to 52.7 million consumers.<sup>33</sup> In 2017, this had come down to 13,863 million litres per day to 55.5 million consumers.<sup>34</sup> In other words, the volume of water needed for the public water supply decreased by over 11 per cent, in spite of the population being supplied increasing by over five per cent.

Government climate change mitigation policies have helped to drive significant emissions reductions by the sector. Water companies are now required to factor climate change impacts into their investment decisions, by calculating a total carbon cost across each 25 year water resource management plan period, on the basis of carbon prices set by Ofwat.<sup>35</sup> In 2009-10, total annual operational emissions from the sector were approximately 4,700 kilotons of carbon dioxide equivalent (ktCO<sub>2</sub>e), driven by a doubling of the sector’s energy between 1989 and 2010, reflecting the demands of expanding and operating the network.<sup>36,37</sup> In 2017-18 greenhouse gas emissions from the water sector had fallen to

“End-of-pipe technological fixes are increasingly less cost effective, and do not address diffuse pollution from agriculture.”

2,714 ktCO<sub>2</sub>e, a reduction of over 40 per cent.<sup>38</sup> Greater use of renewable energy has underpinned this reduction, such as on-site generation by passing sewage sludge through anaerobic digesters. Some companies have also entered into 100 per cent renewable agreements with their energy suppliers.<sup>39</sup>

### Summary of UK water sector environmental performance

<b>Water efficiency</b>	11 per cent reduction in the volume of water put into the public water supply from 2001-17, in spite of a five per cent population increase
<b>Bathing water quality</b>	98.3 per cent of beaches at good status, up from 65 per cent in 1988, despite the introduction of tougher new standards
<b>Drinking water quality</b>	Only 0.04 per cent of water samples now fail quality standards, down from 0.55 per cent in 1995
<b>Carbon emissions</b>	40 per cent reduction in water company operational emissions from 2009-18
<b>Volumes of pollution from water companies</b>	Reductions of up to 70 per cent in water company discharges of pollutants to rivers since 1995
<b>Pollution incidents caused by water companies</b>	11 serious category 1 incidents in 2017, a level largely unchanged since 1995

In terms of managing risks to water quality, the challenge is different. As we have already discussed, end-of-pipe technological fixes are increasingly less cost effective, and do not address diffuse pollution from agriculture. Furthermore, in urban catchments where waste water accounts for a higher proportion of pollution, emerging challenges, such as domestic chemicals and microplastics pollution may be more cost effectively addressed with extended producer responsibility and resource efficiency approaches to reduce the amount of these substances getting into water in the first place.

Large scale catchment management should increasingly be the preferred option for protecting the ecological health of water. The regulatory climate means that this is not straightforward. The Environment Agency insists upon a high level of certainty in terms of the results of water resource protection measures. Since there is a lack of evidence regarding the water quality benefits of sustainable land management measures at catchment or landscape level, water companies are discouraged from pursuing ambitious schemes whose outcomes cannot be guaranteed from the outset. This is exacerbated by the fact that, if schemes do not deliver the predicted results, Ofwat is unlikely to sanction funding for a follow-up scheme, meaning the costs of failure would fall on the water company and its shareholders.

A different approach from regulators that rewards genuine innovation, and shares the risks and costs of underperformance from pioneering catchment management schemes, could yield significant benefits over the long run, by accelerating learning and speeding up the adoption of new approaches to managing water quality.

### 3. Retain funding levels, but spend money better

An assessment of the goals and targets of the 25 year environment plan suggests that more funding will need to be directed towards environmental improvement (see the table on page 13). Unless public sector funding is dramatically increased, the private sector will need to finance more of this environmental restoration work.

“Getting more out of existing spending programmes would go a considerable way towards delivering the government’s goal of improving the overall state of the natural environment within a generation.”

For example, it is estimated that the water industry alone will need to bear 36 per cent of the costs to restore three quarters of water bodies if maximum net benefits are to be achieved. The government’s promise to plant 11 million trees over five years is only 20 per cent of the number needed to achieve the target of 12 per cent tree cover by 2060, implying that the private sector may need to fund the other 80 per cent. The cost of meeting existing conservation targets and commitments in England has been estimated at £1.4 billion annually for ten years (£2.3 billion for the UK as a whole), while current government spending on biodiversity protection in the UK as a whole is estimated at £445 million.<sup>40</sup>

As well as retaining or increasing private sector investment, there is also a need to spend existing funding better. Environmental declines have come against a backdrop of massive spending by the public and private sectors on land and water management. During the 20 years from 1995–2015, farming in England received £36.6 billion from the government in basic subsidy payments (not including agri-environment schemes) under CAP<sup>41</sup> During the same period, water companies spent £20 billion through the National Environment Programme (now WINEP) to deliver environmental improvements to water.<sup>42</sup> It is not unreasonable to state that this money could have been used more effectively, given how much water company spending has been focused on cleaning up the pollution caused, or at least enabled, by agricultural subsidies.

On average, state and water company spending on environmental programmes for water comes to over £4 billion per year, through farm subsidies, WINEP and flood defences (see below). Some estimates of total spending on land and water are considerably higher.<sup>43</sup> However, only a small proportion of this funding goes to sustainable land management and catchment-based approaches.

#### Selected public and private spending on land and water management<sup>44</sup>

	Annual total	Proportion focused on sustainable land and catchment management
<b>Farm payments (CAP)</b>	£2,561 million	£380 million
<b>Water and wastewater (WINEP only)</b>	£700 million	£40 million
<b>Flood defences</b>	£434 million	£3.75 million
<b>Environment Agency – water, land and biodiversity</b>	-	£8.7 million

Getting more out of existing spending programmes would go a considerable way towards delivering the government’s goal of improving the overall state of the natural environment within a generation. The cost of restoring 75 per cent of water bodies to good status by 2027 was estimated by the Environment Agency to be £17.5 billion.<sup>45</sup> A greater focus on catchment management approaches is an efficient way to achieve this, as, for every £1 invested by Defra in catchment partnerships, another £8 is mobilised from partners for environmental improvements.

## 25 year environment plan: relevant goals, targets and policy gaps<sup>46</sup>

Goal	Target	Status	Likelihood of meeting target
Clean and plentiful water	Improve at least three quarters of waters to be close to their natural state as soon as is practicable	Far from achieving target	New policy and more investment are needed due to the scale of challenge
	Reducing damaging water abstraction so that, by 2021, 90 per cent of surface water bodies and 77 per cent of groundwater bodies have enough water to support environmental standards	Not achieving target, limited progress	The emphasis on “developing a stronger catchment focus” will help to achieve this target
	Reach or exceed River Basin Management Plans objectives for rivers, lakes, coastal and ground waters that are specially protected, whether for biodiversity or drinking water	Not achieving target, limited progress	New policy and more investment are needed based on the content of the plan
	Minimise water lost through leakage year on year, with water companies expected to reduce leakage by at least an average of 15 per cent by 2025	Not achieving target, limited progress	Action will come through PR19, new policy may be needed
	Minimising, by 2030, the harmful bacteria in designated bathing waters and continuing to improve the cleanliness of waters	Good progress	On track to meet target
Thriving plants and wildlife on land and freshwater	Restoring 75 per cent of the one million hectares of terrestrial and freshwater protected sites to favourable condition, securing their wildlife value for the long term*	Not achieving target, limited progress	New policy and more investment are needed based on the content of the plan
	Creating or restoring 500,000 hectares of wildlife-rich habitat outside the protected site network, focusing on priority habitats as part of a wider set of land management changes providing extensive benefits*	Not achieving target, limited progress	Funding is needed for a Nature Recovery Network; new mechanisms are needed to double the area of priority habitat in target condition
	Increasing woodland in England in line with the government aspiration of 12 per cent cover by 2060: this would involve planting 180,000 hectares by end of 2042	Not achieving target, limited progress	New mechanisms are needed to increase private investment in woodland creation

Goal	Target	Status	Likelihood of meeting target
Reducing the risks of harm from environmental hazards	Ensuring interruptions to water supplies are minimised during prolonged dry weather and drought	Assessment of status not possible	Inclusion of nature based approaches could also help to increase resilience and manage supply by 'slowing the flow'
	Boosting the long term resilience of homes, businesses and infrastructure	Assessment of status not possible	New measures are needed to increase investment in Natural Flood Management and Sustainable Drainage Systems
Using resources from nature more sustainably and efficiently	Improving the approach to soil management: so that, by 2030, all of England's soils are managed sustainably*	Far from achieving target	New mechanisms are needed
	Ensuring that food is produced sustainably and profitably	Assessment of status not possible	This target is subjective
Mitigating and adapting to climate change	Continuing to cut greenhouse gas emissions including from land use, land use change, the agriculture and waste sectors and the use of fluorinated gases	Limited progress	New mechanisms are needed to reduce greenhouse gas emissions from land use and agriculture

For full details of this assessment, see annex two, page 21

\* new target introduced in the 25 year environment plan

# Maximising environmental returns from water company investment

“A 25 year, integrated approach to land and water management could enable catchment management at a scale that delivers significant financial savings for the drinking water network.”

The current trend towards minimising new steel and concrete infrastructure for water improvements, and making increasing use of what could be termed natural engineering methods, indicates a significant shift in attitude by the water sector and its regulators. It reflects the emerging view, both inside and outside the water sector, that the limit has been reached of environmental improvements that can be cost effectively delivered through end-of-pipe water treatment.

Although maximising the environmental gains from WINEP spending should be the first priority for the water sector, it is not the full extent of what is possible. Catchment management approaches provide a more efficient use of investment in two main ways. First, when wastewater is treated to make it safe to discharge back into the environment it can be very expensive to remove nutrients such as phosphorus. It can be more cost effective to reduce the amount of these pollutants entering water from other sources, such as farming. For example, it has been estimated that, in some areas, sustainable land management costs, on average, one sixth of the cost of a treatment alternative.<sup>47</sup> Second, when water companies abstract water to supply to customers, it can also be very expensive to treat the water to remove pollution and make it safe for drinking at this stage. Reducing the amount of pollution in rivers and groundwater can reduce the cost of supplying safe, clean water.

The costs associated with treating drinking water are considerable. The annual running costs of water treatment plants run into hundreds of thousands of pounds. A new policy framework built around a 25 year, integrated approach to land and water management could enable catchment management at a scale that delivers significant financial savings for the drinking water network.

This could support, for example, catchment scale use of integrated pest management (IPM), reducing use of pesticides, whilst potentially improving agricultural yields and reducing water pollution. An international survey of 26 countries, covering 25.5 million hectares of crops, including rice, maize, wheat, sorghum, vegetables, potatoes, cotton and legumes, revealed that IPM methods increased yields by an average of 40 per cent whilst reducing pesticide use by 60 per cent.<sup>48</sup>

We have assessed the theoretical savings possible if catchment management on this scale were to be introduced and found that reducing pollution to enable a 25 per cent reduction in operating costs could save £87,500 per year for a pesticide treatment plant, and £63,500 per year for a nitrate treatment plant (summarised on page 16). If this was constant over the timescale of the government's 25 year environment plan, the resulting savings would be £2.19 million for a pesticide treatment plant and £1.59 million for a nitrate removal plant. Permanently mothballing a treatment facility could save £8.75 million in the case of a pesticide treatment plant, and £6.4 million for a nitrate removal plant, over 25 years. A whole catchment land management project could benefit several treatment facilities, multiplying the savings.

Furthermore, even as they are expanding their use of catchment management, the scale and persistence of pollution means that many water companies are also planning to build additional water treatment plants, with capital costs running into the millions. Reducing pollution to a level sufficient to eliminate the need for a new plant would not only save these capital costs, but also deliver significant savings from avoided running costs. For nitrate treatment, this could mean saving more than £10 million over 25 years.

The practice of using farm level interventions to reduce water treatment costs, or prevent future increases in costs, is well established. For example, Anglian Water calculated the cost of building sufficient treatment facilities to meet regulatory standards for the pesticide metaldehyde across ten failing sites at £595 million, with running costs of £18 million per year. As an alternative, the company will spend upwards of £40 million between 2020-25, paying farmers to use ferric phosphate slug pellets instead of metaldehyde.

The opportunity now exists to implement this in new ways, making use of ecosystem enhancing land management projects to improve the health of waters, as envisaged under

the WFD. Three factors are critical in determining the ability of water companies to invest in this way:

**Scale:** addressing entrenched, expensive pollution problems may need farming practices to change across entire catchments or landscapes.

**Longevity:** the full benefits of catchment management projects can take many years to emerge; water travels through chalk at 0.5-1.0 metre per year, so improvements in groundwater water quality might take decades to show.

**Timing:** early action will enable decisive targeting of areas where the upward trend in pollution is projected to require new treatment infrastructure in the medium term.

This is quantitatively and qualitatively different to the current system.

## Approximate costs reflecting median values – derived from data provided by two water companies

### 1. Costs of running drinking water treatment facilities (annual)

	Energy costs	Liquid oxygen costs	Granular activated carbon (GAC) renewal	Total annual Operational expenditure (opex)
Pesticide removal using GAC and ozonation				
Removes triazines, urons and phenoxyalkanoic acids – not metaldehyde	£264,000	£11,000	£75,000	£350,000
Nitrate removal by ion exchange				£254,000

### 2. Potential savings from lowering the cost of the existing water treatment system

	Annual			Over 25 years		
	Pesticides (GAC)	Pesticides Advanced oxidative process (AOP)	Nitrates	Pesticides (GAC)	Pesticides (AOP)	Nitrates
25 per cent reduction in opex and renewal costs for one treatment facility	£87,500	£300,000	£63,500	£2,187,500	£7,500,000	£1,587,500
50 per cent reduction in opex and renewal costs for one treatment facility	£175,000	£600,000	£127,000	£4,375,000	£15,000,000	£3,175,000
100 per cent reduction in opex and renewal costs, ie mothballing a treatment facility	£350,000	£1,200,000	£254,000	£8,750,000	£30,000,000	£6,350,000

### 3. Potential savings from avoiding the cost of building new water treatment facilities

	Avoided capital expenditure (capex) over 25 years	Avoided opex over 25 years	Total savings over 25 years
Nitrate treatment facility using ion exchange	£3,730,000	£6,350,000	£10,080,000
Pesticide treatment facility using AOP to treat metaldehyde	£6,333,333	£30,000,000	£36,333,333

# Conclusions and recommendations

Significant environmental and economic benefits could be achieved by the adoption of catchment management methods at a larger scale. The main features of a framework to make this possible would be:

## **Enhancing ecosystems, instead of treating pollution, should be the default option for water sector environmental spending through WINEP**

The increasing number of catchment management schemes in WINEP reflect the changing attitudes of the water sector and its regulators. Nevertheless, there is significant scope for greater environmental benefits from this spending, reflecting the approach which underpins the WFD.

Creating the new requirement that ecosystem enhancing catchment management schemes should be the default option, allowing opt outs only where it can be demonstrated that it would be ineffective or disproportionately expensive in particular locations, would be the best way to maximise the environmental returns from this investment.

## **There should be incentives for water companies to fund long term, water resource enhancing land management projects**

Most catchment management projects have been relatively small scale, meaning the evidence base is lacking to quantify the results from larger scale projects that run across catchments or landscapes.

This creates risks for water companies wishing to pursue this scale of project, as regulators are likely to push the costs of schemes that underperform onto the companies themselves. A more balanced approach is needed, whereby regulators show greater tolerance for genuine innovation that, through no fault of the company involved, fails to deliver the anticipated results.

Water companies already produce 25 year Water Resource Management Plans. There should also be scope to invest in 25 year catchment management projects, where this is supported by robust assessments of the financial savings possible for treating drinking water and other environmental benefits.

## **Public and private spending should be aligned behind a common set of environmental goals**

The current system is highly fragmented and uncoordinated, without common frameworks or even a common language to support decision making over where and how to invest money in environmental enhancement.

The new agricultural policy, and ELMS payments regime, will create opportunities for water companies and farmers to work together in fundamentally different ways. Using water company money and farm payments in this way will help to deliver bigger, more complex and cost effective catchment management schemes.

The 25 year plan outlines platforms and measures which could facilitate private investment, including the Natural Infrastructure Scheme, proposed by Green Alliance and the National Trust. However, previous attempts to develop payments for ecosystem services pilots have been unsuccessful. Combining investment from the public and private sector is a new challenge.

A recent report by the RSPB, exploring how to attract private finance, found a number of challenges.<sup>49</sup> Private investors are likely to be wary of projects subsidised by the government or where revenue streams rely on government policy which could change. Projects also need to show sufficient return on investment to be attractive. For businesses like water companies to get involved, schemes need flexibility to address their priorities as well as those of public bodies.

## Recommendations

### **1. Write existing legal commitments for water into the new Environment Bill**

The government has committed to retain existing EU environmental legislation beyond the UK's membership of the EU. But the 25 year plan seems to undermine this commitment with regard to the WFD by replacing the 2027 deadline with the statement "as soon as is practicable."

This risks creating uncertainty at a time when important funding decisions are being taken. Water companies are in the process of negotiating investment programmes with Ofwat for 2020-25, and Defra is looking to invest in pilot projects that could underpin the new ELMS from 2021.

A formal commitment to delivering the goals of the WFD, in line with the existing timetable, would clarify the situation. It would also provide an indication as to how the ambitions of the 25 year plan can be achieved. The government has been criticised by MPs and NGOs for providing no detail on how it will deliver the 25 year plan.

This commitment could be brought forward as part of the government's annual reporting to parliament on progress delivering the plan. It should also be enshrined in legislation.

In July 2018, the prime minister committed to a new Environment Bill to implement the vision already set out in the 25 year plan. The timing of the bill is unclear; elements relating to environmental principles and governance will need to be published before the end of 2018, but other bill proposals may not emerge until well into 2019. It should bring forward the WFD targets alongside a range of other appropriate, time bound targets that are collectively capable of reversing declines in nature within 25 years. These targets would then inform spending and investment decisions by both the public and private sectors.

### **2. Accelerate the adoption of 'catchment management by default'**

Our consultation with water sector experts revealed a belief that water companies are moving rapidly towards making catchment management their default option. Nevertheless, there remain considerable challenges to widespread delivery of large scale ecosystem enhancing catchment management programmes.

Realising this new approach will require support from water sector regulators: Ofwat, the Environment Agency and the Drinking Water Inspectorate. Clear guidance will be needed on the conditions under which water companies may pursue innovative, large scale programmes, where failure to deliver anticipated outcomes can be tolerated, provided projects have been delivered as planned and in good faith.

Funding programmes for 2020-25 will be negotiated between Ofwat and water companies in 2019. The major opportunity for this process will be to use WINEP projects to increase knowledge about the performance of catchment management schemes, and to generate evidence for how they can support delivery of the 25 year environment plan goals. Projects should be assessed against the full range of natural capital benefits, not just those enshrined in existing legislation, and opportunities should be sought to integrate with pilot projects for the new ELMS funding programme.

This would enable a major programme of reform in the 2024 funding agreement for projects to be delivered between 2025 and 2030, by which time the new ELMS payments for farmers will have been in operation for two years. It could include the option for 25 year public-private collaborative catchment management projects, delivering landscape scale ecosystem benefits.

### **3. Design the new Environmental Land Management System to enable co-investment by the public and private sectors**

As part of the new ELMS, the government should explore the creation of new platforms or measures capable of accessing and blending funding from water companies, state payments to farmers and other sources, to support the delivery of ecosystem enhancing land and water management projects. The Natural Infrastructure Scheme proposed by Green Alliance and the National Trust could be one example of how this could be done.<sup>50</sup> However, there are a number of challenges which will have to be overcome to align and blend funding, including providing sufficient return on investment, appropriate sharing of responsibility and ownership of projects to make involvement worthwhile. There is an opportunity to experiment with these new funding approaches during the ‘tests and trials’ and pilot phases underpinning the development of the new ELMS payments between 2018 and 2021.

# Annex one

## Attendees of the workshop 'Working for water: achieving the ambitions of the 25 year environment plan', 25 July 2018

Name	Organisation
Steve Smith	Aecom
Dr Lucinda Gilfoyle	Anglian Water
Edward Lockhart-Mummery	Broadway Initiative
Karen Gibbs	Consumer Council for Water
Adams Koshy	eftec
James Peacock	EnTrade/Wessex Water
Tony Grayling	Environment Agency
Paul Hulme	ESI Consulting
Dominic Gogol	Indepen
Ed Mitchell	Pennon Group
Arlin Rickard	Rivers Trust
Rob Cunningham	Severn Trent
Jodie Rettino	Severn Trent
Amina Aboobakar	United Utilities
Robert Okunnu	Water UK
Stuart Colville	WaterUK
Cat Moncrieff	WWF

# Annex two

## 25 year environment plan: water relevant goals, targets and policy gaps: full assessment

Goal	Target	Status	Measures	Likelihood of meeting target
Clean and plentiful water	Improve at least three quarters of waters to be close to their natural state as soon as is practicable	Between 2015 and 2017 there has been no improvement in water body status, with 84 per cent of surface waters failing to be close to their natural state <sup>51</sup>	New farming rules for water (existing policy)  A new Environmental Land Management Scheme	New policy and more investment are needed due to the scale of challenge
	Reducing damaging water abstraction so that, by 2021, 90 per cent of surface water bodies and 77 per cent of groundwater bodies have enough water to support environmental standards	Eighty two per cent of surface water bodies and 72 per cent of groundwater bodies currently meet this target. The sustainability of groundwater abstraction is not improving. <sup>52</sup>	Water companies are put at the forefront of reducing damaging abstraction through the Water Industry National Environment Programme  Bring more abstractors under regulatory control, and update licensing strategies	The emphasis on “developing a stronger catchment focus” will help to achieve this target
	Reach or exceed River Basin Management Plans objectives for rivers, lakes, coastal and ground waters that are specially protected, whether for biodiversity or drinking water	Forty two percent of surface drinking water protected areas and 47 per cent of groundwater protected areas are at risk. <sup>53</sup> Further action is needed on 42 per cent of sites protected for their biodiversity importance.	No specific additional measures are proposed	New policy and more investment are needed based on the content of the plan
	Minimise water lost through leakage year on year, with water companies expected to reduce leakage by at least an average of 15 per cent by 2025	In recent years there has been no reduction in total leakage overall, although some companies have reduced leakage <sup>54</sup>	No specific additional measures are proposed	Action will come through PR19; new policy may be needed
	Minimising, by 2030, the harmful bacteria in designated bathing waters and continuing to improve the cleanliness of waters	98 per cent pass minimum standards and 65 per cent at ‘excellent’ status in 2017	No specific additional measures are proposed	On track to meet target

Goal	Target	Status	Measures	Likelihood of meeting target
Thriving plants and wildlife on land and freshwater	Restoring 75 per cent of the one million hectares of terrestrial and freshwater protected sites to favourable condition, securing their wildlife value for the long term*	On current trends only half of Sites of Special Scientific Interest will be in a favourable condition by 2042. <sup>55</sup>	A new strategy for nature, learning the lessons from Biodiversity 2020  A new Environmental Land Management Scheme	New policy and more investment are needed based on the content of the plan
	Creating or restoring 500,000 hectares of wildlife-rich habitat outside the protected site network, focusing on priority habitats as part of a wider set of land management changes providing extensive benefits*	Excluding new data on woodland management, there was a decrease in the area of priority habitat outside protected areas in target condition between 2015 and 2018. <sup>56</sup>	A new Nature Recovery Network, linked to the new Environmental Land Management Scheme	Funding is needed for a Nature Recovery Network. New mechanisms are needed to double the area of priority habitat in target condition
	Increasing woodland in England in line with the government aspiration of 12 per cent cover by 2060: this would involve planting 180,000 hectares by end of 2042	Over the next 25 years, 7,500 hectares will need to be planted every year. Only 700 hectares were planted in 2016 and 1,700 hectares in 2017.	A new woodland creation grants scheme and Forestry Investment Zones to attract investors  Identification of suitable areas for largescale woodland creation in Cumbria	New mechanisms are needed to increase private investment in woodland creation
Reducing the risks of harm from environmental hazards	Ensuring interruptions to water supplies are minimised during prolonged dry weather and drought	Assessment of status not possible	Consult in 2018 on a National Policy Statement for water resources that will streamline the planning process for new large infrastructure schemes  Work with water industry to ensure there are long term strategies to increase resilience, and manage supply and demand	Inclusion of nature based approaches could also help to increase resilience and manage supply by 'slowing the flow'
	Boosting the long-term resilience of our homes, businesses and infrastructure	Assessment of status not possible	Learn from the current £15 million funding programme for Natural Flood Management (NFM) alongside tradition flood protection  Amend planning guidance to encourage Sustainable Drainage Systems (SuDS)	New measures needed to increase investment in NFM and SuDS

Goal	Target	Status	Measures	Likelihood of meeting target
Using resources from nature more sustainably and efficiently	Improving the approach to soil management: so that, by 2030, all of England's soils are managed sustainably*	An estimated one million hectares of soils in England and Wales are at risk of erosion from wind or water, with soil loss of one to three centimetres per year in some areas. <sup>57</sup>	Invest at least £200,000 to help develop soil health metrics  Publish an England Peat Strategy in late 2018	New mechanisms are needed
	Ensuring that food is produced sustainably and profitably	Assessment of status not possible	Create a robust framework to limit inputs of nitrogen-rich fertilisers  Put Integrated Pest Management at the heart of a holistic approach, by developing and implementing policies that encourage and support sustainable crop protection with the minimum use of pesticides  A new Environmental Land Management Scheme and new farming rules for water	This target is subjective
Mitigating and adapting to climate change	Continuing to cut greenhouse gas emissions including from land use, land use change, the agriculture and waste sectors and the use of fluorinated gases	Agriculture accounts for ten per cent of UK greenhouse gas emissions, and there has been no reduction since 2010. <sup>58</sup>	No specific additional measures proposed.	New mechanisms are needed to reduce greenhouse gas emissions

\* new target introduced in the 25 year environment plan

# Endnotes

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- <sup>16</sup> For surface water bodies, 'good status' means being very close to the biological, chemical and hydromorphological condition they would be in if there was minimal human impact. Groundwater bodies also have to meet good quantitative status, meaning that water should not be taken from them faster than it is being replenished. Source: NVoulvoulis, K D Arpon, T Giakoumis, October 2016, *The EU Water Framework Directive: from great expectations to problems with implementation*
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- <sup>43</sup> For example, Indepen estimates that annual expenditure on catchment services in England is £13.4 billion. Indepen, 2016, *Water works: what else can the water industry model deliver?*
- <sup>44</sup> Farming data: total CAP expenditure in England, average 2015–2017, plus Environmental Stewardship Scheme/ Countryside Stewardship in England, average 2015–2017 £371 million, and £9 million per year Water Environment Grant funding. Source: Defra, 2018, *Agriculture in the United Kingdom 2017*; water data: total WINEP spending 2015–2020 is £3.5 billion. Yearly average £0.7 billion. Source: Environment Agency; total catchment management spending through WINEP 2015–2020 estimated at £200 million. Yearly average £40 million. Source: Ofwat; planned central government capital expenditure on flood and coastal erosion risk management, average 2017–2021. Source: Defra, 2017, *Central government funding for flood and coastal erosion risk management in England*; Environment Agency data: Environment Agency funding for water, land & biodiversity under the Environment Programme in 2017–18. Source: personal communication. Includes: Water Environment Improvement Fund, Fisheries Improvement Fund, Bathing Water Fund and other Defra Grant in Aid funding.
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- <sup>56</sup> The total area of priority habitat outside protected areas is 1.13 million hectares. In 2018, 48 per cent of the total was in target condition, meaning it was being managed in a Higher Level Scheme. While this is an increase of 61 per cent in the area under management since 2015, this increase is due to new data on woodlands. When woodland is excluded from the total there has been a slight decrease in the area of priority habitat in target condition Source: Defra, 2018, 'England biodiversity indicators 2018 dataset', [www.gov.uk/government/statistical-data-sets/env09-england-biodiversity-indicators](http://www.gov.uk/government/statistical-data-sets/env09-england-biodiversity-indicators)
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**Green Alliance**  
11 Belgrave Road  
London SW1V 1RB

**T 020 7233 7433**  
**ga@green-alliance.org.uk**

**www.green-alliance.org.uk**  
**blog: www.greenallianceblog.org.uk**  
**twitter: @GreenAllianceUK**

**The Green Alliance Trust**  
**Registered charity no 1045395**  
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**Authors**

William Andrews Tipper, Stephanie Shields and James Elliott

**Green Alliance**

Green Alliance is a charity and independent think tank, focused on ambitious leadership for the environment. With a track record of over 35 years, Green Alliance has worked with the most influential leaders from the NGO and business communities. Green Alliance's work generates new thinking and dialogue, and has increased political action and support for environmental solutions in the UK.

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