



Annabelle Ong

 [annabelle.ong@frontier-economics.com](mailto:annabelle.ong@frontier-economics.com)

Chris Cuttle

 [chris.cuttle@frontier-economics.com](mailto:chris.cuttle@frontier-economics.com)

---

Frontier Economics Ltd is a member of the Frontier Economics network, which consists of two separate companies based in Europe (Frontier Economics Ltd) and Australia (Frontier Economics Pty Ltd). Both companies are independently owned, and legal commitments entered into by one company do not impose any obligations on the other company in the network. All views expressed in this document are the views of Frontier Economics Ltd.

# CONTENTS

Acknowledgements	5
Abstract	6
Foreword	7
Executive Summary	9
<b>1 Introduction</b>	<b>20</b>
1.1 Background and objectives	20
1.2 The structure of this report	22
<b>2 The economics of water catchments</b>	<b>23</b>
2.1 Introduction	23
2.2 Water catchments are prone to market failure	23
2.3 The environmental challenges faced by catchments are interrelated and complex	25
2.4 The case for government intervention is clear	26
<b>3 The current approach to environmental regulation is inefficient</b>	<b>30</b>
3.1 Introduction	30
3.2 The current approach to environmental regulation	30
3.3 The current approach is inefficient and stifles innovation	35
3.4 WINEP review taskforce	39
3.5 TIGRR calls for regulatory reform across the UK	40
3.6 The current approach is not future-proof	42
<b>4 Moving towards a more efficient solution by enabling innovation: Water-focused OBER</b>	<b>43</b>
4.1 Introduction	43
4.2 Water-focused OBER	43
4.3 How to move towards a more efficient solution quickly: water-focused OBER	45
4.4 How would water-focused OBER work in practice?	49
4.5 OBER needs to be based on a strong, trusted monitoring framework	54
4.6 What are the benefits of water-focused OBER?	55
4.7 High-level impact assessment: Water-focused OBER	57
4.8 Options for moving towards OBER in AMP8	58
<b>5 OBER can be applied more widely across the UK economy</b>	<b>60</b>
5.1 Introduction	60
5.2 OBER can be extended beyond the water sector	60
5.3 Introducing a system of tradeable permits and credits	62
5.4 Creating effective OBER markets	69
5.5 The combined effect of OBER: Society gets greater environmental improvements at lower costs	71
5.6 High-level impact assessment: OBER	72

<b>6</b>	<b>Implications for economic regulation</b>	<b>74</b>
6.1	Introduction	74
6.2	Why it is important for economic regulation to adapt to OBER	74
6.3	How does OBER affect the level of risk companies take	74
6.4	How economic regulation needs to adapt	75
6.5	What might economic regulation look like under a full-scale OBER	78
6.6	Wider implications for economic regulation	79
<b>7</b>	<b>Conclusion</b>	<b>80</b>

## ACKNOWLEDGEMENTS

We would like to acknowledge the contributions of the following peer reviewers and thank them for their valuable feedback and challenge:

- Sharon Darcy, Director, Sustainability First
- Martin Hurst, Associate, Sustainability First
- Paul Johnson, Director, Institute for Fiscal Studies
- Dr Paul Leinster CBE
- Cathryn Ross, Strategy and Regulatory Affairs Director, Thames Water
- Jill Rutter
- David Young, Senior Fellow, Broadway Initiative

## ABSTRACT

The UK government's 25 Year Environment Plan (25YEP) sets ambitious targets to improve the environment in England. Water companies directly influence many of the outcomes targeted in the 25YEP, but are limited in their ability to contribute due to inefficiencies in the current approach to environmental regulation. This report demonstrates how outcomes based environmental regulation (OBER) can meet the goals of the 25YEP in a far more efficient way and deliver a range of benefits, including improving the environment for lower private and social cost, encouraging cross-sector collaboration and facilitating private investment in the environment. Introducing OBER in the water sector first, by allowing the sector to deliver against outcome-based targets either by implementing solutions itself or by paying others, is relatively easy to implement and could go a long way to speed up the delivery of the 25 YEP. If proven successful in the water sector, this approach could be extended further to other sectors, at a higher level of complexity but with greater benefit to the environment.

## FOREWORD

The UK is faced with unprecedented environmental challenges. The climate change emergency and biodiversity emergency require urgent action as “our unsustainable engagement with Nature is endangering the prosperity of current and future generations.”<sup>1</sup> In England, the government’s 25-year plan to improve the environment (25YEP) provides an ambitious policy framework for improving the environment. The water sector is one of the key stewards of the environment and will need to play an important role in addressing these environmental challenges. There is already significant upwards pressure on water bills as the sector has to mitigate and adapt to climate change, meet increasing consumer expectations, renew ageing infrastructure and tackle increasing financial vulnerability while delivering step-changes in environmental improvements. It is therefore more important than ever to find ways to deliver environmental improvements with minimal impact on bills.

Designing environmental regulation that improves the environment in a holistic way is not easy. Even specific challenges such as carbon emissions take a long time to address. The environmental improvements that are required to achieve the 25YEP are more complex. For example, the number of nutrients that contribute to the ecological status of rivers is currently at 83. This illustrates the size of the challenge. In the past, large scale improvements could be achieved by focusing environmental regulation on point source pollution. This was an effective approach when large gains could be made by requiring site specific actions. But this approach is not optimal when we are often faced with diminishing returns from site specific actions and need to deliver holistic solutions to improve the environment and deal with pollution from multiple sources and the need to reduce the amount of water we take from the environment.

The current approach to environmental regulation in water catchments will not deliver the 25YEP in an efficient or innovative way and will not always be effective. This is because it is fragmented across different sectors, prescriptive, output focused and not based on systems thinking. It therefore does not lead to the most efficient solution being chosen for each environmental issue and does not incentivise innovative solutions.

This report discusses how **Outcome-based environmental regulation (OBER) provides a solution that enables society to pay less for more environmental improvements**. In a nutshell, OBER involves setting outcomes-based targets that allow companies to choose solutions that deliver the biggest environmental benefits (across a range of dimensions) at the lowest costs. It therefore unlocks the inefficiency with the current approach to environmental regulation.

OBER is a flexible approach that can first be introduced in the water sector to learn important lessons and could then be rolled out more widely. Successfully implementing OBER requires a number of conditions to be met such as a strong monitoring framework, enabling partnerships, listening and engaging with communities and creating appropriate incentives in the economic regulation of

---

<sup>1</sup> The Economics of Biodiversity: The Dasgupta Review Headline Messages, 2021, Available: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/957629/Dasgupta\\_Review\\_-\\_Headline\\_Messages.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/957629/Dasgupta_Review_-_Headline_Messages.pdf)

water companies. Work is already underway (e.g. as a result of the water industry national environment programme (WINEP) reform taskforce and the emerging thinking on the next price control PR24) to create these conditions. The significant benefits delivered by OBER provide a strong rationale for going a step further to implement OBER.

OBER is aligned with all of the principles presented by the Taskforce on Innovation, Growth and Regulatory Reform. In particular, it provides an outcome-focussed and responsive way forward so it is an excellent opportunity for government and regulators to realise a significant efficiency gain as a result of the flexibility gained by Brexit.

This important report demonstrates how the water sector can best make a significant contribution towards the government's commendable long term vision embodied in 25 YEP.



Colin Skellett, CEO, Wessex Water



Gus O'Donnell, Chairman, Frontier Economics



# EXECUTIVE SUMMARY

## Introduction and objectives

The UK government has published an ambitious 25 Year Environment Plan (25YEP) to improve the environment in England.<sup>2</sup> Water companies have the potential to make a significant contribution to the 25YEP as they directly influence many of the outcomes being targeted for improvement in the 25YEP, and they are experts in their local environments.

However, the current approach to environmental regulation in the water sector leads to inefficient outcomes as companies are not incentivised to choose solutions that deliver the biggest environmental benefit at the lowest societal costs. While a taskforce has proposed changes to the Water Industry National Environmental Programme (WINEP), the current reform proposals will not deliver the step-change needed for the sector to deliver its contribution to the 25YEP.

In parallel, there is significant pressure on water bills as the sector is expected to adapt and mitigate climate change, meet increasing consumer expectations and deliver a step-change in environmental improvements. This is evidenced by Defra's draft Strategic Policy Statement (SPS) that sets out the government's expectations for the sector.<sup>3</sup> As a result, it is now more important than ever to find efficient ways to deliver environmental improvements.

In response to this challenge, Frontier Economics has been commissioned by Wessex Water to:

- review the current approach to delivering environmental outcomes in the water sector;
- identify how environmental and economic regulation need to adapt to make sure that the water sector can deliver its contribution towards the 25YEP in the most efficient way.

This report demonstrates that outcome based environmental regulation (OBER) is needed to unlock the inefficiency in the current approach to environmental regulation and to enable water companies to deliver greater environmental benefits at lower costs. Society benefits from bigger improvements in the environment (which directly link to the wellbeing of citizens and communities) without impacting water bills in the way the current approach would.

## Water catchments are common pool resources that are subject to multiple externalities and require a holistic approach to regulation

Given that the focus of this report is on the contribution that the water sector can make to the delivery of the 25YEP, this report looks at the problem through the lens of water catchments.

<sup>2</sup> Defra, 2018, *Our 25 Year Plan to Improve the Environment*, Available: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/693158/25-year-environment-plan.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf)

<sup>3</sup> Defra, 2021, *The government's strategic priorities for Ofwat*, Available [https://consult.defra.gov.uk/water-services/government-new-sps-consultation/supporting\\_documents/newstrategicpolicystatementofwatdraftforconsultation.pdf](https://consult.defra.gov.uk/water-services/government-new-sps-consultation/supporting_documents/newstrategicpolicystatementofwatdraftforconsultation.pdf)

Water catchments are an example of a ‘common pool resource’.<sup>4</sup> It is very difficult to limit access to them, but their supply is limited meaning they can be depleted over time. Abstracting water and discharging pollutants create negative externalities, and because private costs are lower than the true social costs water catchments are prone to over-usage and over-pollution. The case for government intervention is therefore clear.

However, the environmental challenges faced by catchments are interrelated and complex and a holistic approach is required. For instance, a traditional asset-based solution to improve river water quality may increase carbon emissions and negatively affect biodiversity, whereas a nature-based solution could achieve the same outcome whilst also delivering wider environmental benefits in the form of biodiversity gain, reduced flood risk, and carbon sequestration. An integrated systems-based approach is therefore needed.<sup>5</sup>

### The current approach to environmental regulation will not deliver the 25YEP in an efficient or innovative way

For any piece of land in England there are numerous regulations, incentives and funding programs administered in silos by multiple public bodies and other organisations. The inefficiency of this approach and the perverse outcomes that it creates have been highlighted by the Natural Capital Committee as a key threat to the government’s environmental ambitions.<sup>6</sup>

The current approach to environmental regulation of water catchments is:

- **Fragmented:** Different sectors that impact the water environment are subject to different types of environmental regulation, and they face very different incentives.
- **Prescriptive in the water sector:** Historically, the WINEP has been a prescriptive list of outputs that the water sector must deliver, reducing opportunities for innovation and working across sectors to deliver the best value solutions (taking into account financial cost as well as environmental and social benefits).
- **Output not outcome focused in the water sector:** The WINEP has not taken into account whether the solutions prescribed are the most efficient way of achieving the desired outcomes.
- **Not based on systems thinking:** The current approach does not take into account externalities. Through the WINEP, water companies have been required to invest heavily in physical assets to improve water quality, even when it is not efficient to do so, and perversely, many of these asset-based

<sup>4</sup> See Section 8 of the Dasgupta Review, *The Economics of Biodiversity*, 2021: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/962785/The\\_Economics\\_of\\_Biodiversity\\_The\\_Dasgupta\\_Review\\_Full\\_Report.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/962785/The_Economics_of_Biodiversity_The_Dasgupta_Review_Full_Report.pdf)

<sup>5</sup> A similar approach has been suggested by Dieter Helm: *Catchment Management, Abstraction and Flooding: the case for a catchment system operator and coordinated competition*, 2015. Available at: <http://www.dieterhelm.co.uk/assets/secure/documents/Catchment-Management-Abstraction-and-Flooding.pdf>

<sup>6</sup> Natural Capital Committee 2020, *Advice on using nature based interventions to reach net zero greenhouse gas emissions by 2050*, Available: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/879797/ncc-nature-based-interventions.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/879797/ncc-nature-based-interventions.pdf)

solutions are energy intensive adding to their carbon footprint. The current approach creates additional negative externalities and misses the opportunity to create additional positive externalities (e.g., solutions that look holistically at all environmental and social outcomes, and financial cost).

These inefficiencies result in **society paying more for less environmental improvement**. Efficiency in this context includes all private and social costs and benefits. The current approach does not optimise the solutions but instead leads to an arbitrary mix of solutions across different sectors. Emerging schemes and approaches such as the Environmental Land Management Scheme (ELM), Natural Flood Management and Biodiversity Net Gain (BNG) do not address these issues.

In the past, obliging water companies to deliver a prescriptive list of outputs was arguably a proportionate approach to improve river water quality as there were likely many “low hanging fruit” options. However, output-based regulation has now reached a point where those low hanging fruit options have already been delivered, and marginal costs are now rising. For instance, based on data from the Environment Agency (EA), it is estimated that, for the water sector, the cost of abating one kiloton of phosphorus per year will more than double from 2020 onwards, from around £150 million to £350 million per year from 2020-2027.<sup>7</sup>

A good example which highlights the overall inefficiency of the current approach to environmental regulation in the water sector is Wessex’s experience at Poole Harbour. Wessex was obliged to reduce nitrate pollution at Poole Harbour through investing in a carbon-intensive treatment process, with an estimated cost of £31,000 per tonne of nitrogen removed. Wessex was able to show that it could achieve the same outcome by delivering a nature-based solution in partnership with farmers, at a cost of £9,000 per tonne of nitrogen removed – i.e. 71% cheaper and also with biodiversity benefits instead of more carbon emissions. But despite this, Wessex was still ultimately obliged to invest in the costlier carbon-intensive asset solution.

**71% cheaper**

Wessex’s experience at Poole Harbour shows that nature-based solutions have been as much as **71% cheaper** than WINEP-prescribed solutions, **and they bring wider biodiversity benefits**, but they are not allowed under current legislation.

### The solution is outcome based environmental regulation (OBER)

These inefficiencies can be overcome by introducing a new holistic approach to environmental regulation – OBER. At a high-level this involves the following steps:

- **Outcome based targets:**

- The ambition of the 25YEP needs to be converted into a comprehensive set of long-term outcome based targets covering all key aspects of the environment: air, land and water. This is a requirement of the Environment Act 2021.<sup>8</sup>

<sup>7</sup> Based on EA, 2019, *Phosphorus and Freshwater Eutrophication Pressure Narrative*, Available: [https://consult.environment-agency.gov.uk/++preview++/environment-and-business/challenges-and-choices/user\\_uploads/phosphorus-pressure-rbmp-2021.pdf](https://consult.environment-agency.gov.uk/++preview++/environment-and-business/challenges-and-choices/user_uploads/phosphorus-pressure-rbmp-2021.pdf)

<sup>8</sup> UK Parliament, 2021, Environment Bill, Explanatory notes, Available: <https://publications.parliament.uk/pa/bills/cbill/58-01/0009/en/20009en.pdf>

- Those targets should then cascade down to a catchment level and be allocated on an equitable basis across different industries, based on each sector's contribution to the problem, – including the water sector – with milestones along the way.
- Relevant to the water sector, in the first instance, this should include targets for water abstraction, biodiversity, carbon, and river water quality, including phosphorous and nitrate levels.<sup>9</sup> More measures could be added over time, but at a minimum they need to cover they key environmental outcomes to ensure a holistic approach is taken.
- In principle, OBER could cover all aspects of the environment. This involves developing a set of well-considered measures which serve as a good proxy for the environmental outcomes. It is important that these are as outcome based as possible and do not require specific outputs. They should be objective, measurable and verifiable, easy to understand, and controllable.
- **Flexibility to deliver outcomes in partnership:**
  - Water companies should no longer be obliged to carry out particular actions themselves, and should be able to deliver outcomes in partnership with other agents who are able to implement the most efficient solutions – where efficiency here captures financial costs as well as environmental and social benefits.
  - Market-based mechanisms could be developed to help facilitate this partnership working, and help draw out the best value solutions. These mechanisms could range from a simple procurement-type model, to a more sophisticated reverse auction-type approach<sup>10</sup>, and could eventually develop into even more sophisticated markets for permits and credits, such as the cap and trade approach which underpins the UK and EU Emissions Trading Systems (ETS). More sophisticated approaches are more complex, but they have the potential to deliver the greatest efficiency benefits. However, the key features of OBER are that targets should be outcome based and sectors should be able to deliver those outcomes in partnership with others.



A high-level illustration of the main differences between the historical approach to the WINEP and water-focused OBER is set out below.

---

<sup>9</sup> In practice, river water quality is a made up of a number of components. Reducing phosphorus and nitrate levels are not strictly outcomes in their own right – they are closer to outputs – but they are essential to achieving good river water quality, and they are also controllable by water companies. In other words, water companies are able to control phosphorus and nitrate levels, and reducing these levels will certainly improve river water quality. In this respect, the relationships between phosphorus and river water quality, and nitrates and river water quality are similar to the relationship between carbon and air quality.

<sup>10</sup> A reverse auction is a type of auction where sellers bid for the prices at which they are willing to sell their goods and service. In this instance, this would involve third parties who are able to improve the environment – e.g. farmers, land managers, developers, local authorities – bidding to deliver environmental services.

**Figure 1 The historical approach to the WINEP versus water-focused OBER**

	Historical approach to the WINEP	Water-focused OBER
Nature of obligations	<ul style="list-style-type: none"> <li>Output focused: Companies obliged to deliver thousands of individual outputs designed by the EA.</li> </ul>	<ul style="list-style-type: none"> <li>Outcome focused: Companies receive targets at a catchment level</li> <li>Initially this could cover a small number of the most important outcomes that are controllable (e.g. P or N reduction) by water companies. More measures could be added over time.</li> <li>Companies have flexibility about how they deliver these targets</li> </ul>
Who delivers the work?	<ul style="list-style-type: none"> <li>The water company - even though other agents might be able to deliver better value solutions, in terms of lower cost and greater environmental and social benefits.</li> <li>The EA obliges a water company to invest in a carbon-intensive asset which improves river water quality whilst also emitting more carbon in the process.</li> </ul>	<ul style="list-style-type: none"> <li>The water company can pay other sectors to carry out the work on its behalf. Markets could be used to help facilitate.</li> <li>In rural areas: The water company pays a farmer to develop a wetland.</li> <li>In urban areas: The water company pays a local authority or developer to invest in sustainable drainage.</li> <li>These solutions can help improve river water quality, reduce carbon, reduce flood risk, and boost biodiversity.</li> </ul>
Example	<p><b>Carbon Intensive Water Treatment Plant<sup>11</sup></b></p> 	<p><b>Sustainable Urban Drainage<sup>12</sup></b></p> 

The water sector in England is well-placed to lead the adoption of OBER to accelerate delivery of the 25YEP. Water companies are experts in their local environments, they have experience delivering the WINEP, they have the ability to bring together different parties and work with bodies that are already experienced in catchment partnerships. They also have experience with delivering outcomes through markets.

<sup>11</sup> Image from Wessex Water

<sup>12</sup> Image from Water UK, 2021, Sustainable Drainage. Available: <https://www.water.org.uk/policy-topics/managing-sewage-and-drainage/sustainable-drainage/>



Water-focused OBER would deliver substantial efficiency gains with relatively small policy changes required and at no additional cost to the government. The overall benefits include:

- **Greater environmental improvements for lower private and social costs** – taking into account the full scope of private and social costs and benefits, water-focused OBER can ensure that the best value solutions are delivered first. Ultimately, the cost incurred by water companies to deliver environmental improvements is funded by customers through bills, meaning any cost savings would result in lower bills for consumers, or greater environmental improvement for the same cost.
- **Systems-based approach to delivery** – water-focused OBER would incentivise companies to take a systems-based approach to identifying solutions. For built solutions, companies would likely have to pay for permits for additional negative externalities, reducing their attractiveness, whereas nature-based solutions would generate credits, boosting their attractiveness. This is a big step towards more efficient delivery of the 25YEP.
- **Encourage partnerships across sectors without having to create specific policies for each sector** – water companies would work with other sectors in the catchment to identify the most efficient solutions. But the government would not have to design a specific policy for each sector. It only has to change the approach to environmental regulation in water and give direction to regulators to act upon this accordingly.
- **Easy to implement** – as this approach requires changes to environmental regulation in one sector only, it is relatively easy to implement but could go a long way to speed up the delivery of the 25YEP.
- **Greater role for community partnerships** – historically, there was limited scope for communities to input into the design and delivery of the WINEP. However, through OBER, companies would have greater flexibility in how they deliver improvements. This opens up opportunities for partnerships with local community groups. The scope of these partnerships could range from identifying the improvements that are needed and the best way to deliver these, to co-delivery and co-funding. Harnessing the local expertise of communities could lead to significant co-benefits. Community partnerships can help define the scope of local outcomes, allowing amenity benefits to be realised alongside environmental benefits and ensuring value will be delivered across urban, rural and coastal communities. This will help to level up communities that may have been relatively excluded from the benefits of environmental investment in the past. This would also help to make water companies more accountable to communities.
- **Provides important lessons and learnings to inform more widescale OBER** – water-focused OBER can be expected to deliver important insights that can help inform the policy design of OBER for many more sectors in future. This includes insights on the ability of different sectors to deliver improvements, cost data, practical lessons on monitoring and the pace of change that can be achieved.

## The need for a strong, trusted monitoring framework

Introducing OBER in the water sector will require some effort but the benefits can be expected to significantly outweigh the costs, and it can provide valuable insights to help enable and reduce the risks of a much wider adoption of OBER in future. There are challenges, but they are not insurmountable, and it is worth noting that even an imperfect approach to OBER would still be a significant improvement on the current approach.

For any form of outcome based regulation to work, effective measurement and monitoring of outcomes is needed. Outcome based regulation in any context increases the level of risk that both the regulator and the companies are willing to take as it introduces a degree of uncertainty. Additional risk is also introduced as water companies work in partnership with others. A strong, trusted monitoring framework is therefore needed to make OBER a success. This could be achieved by initially focussing on a small number of outcomes and monitoring actions and resultant outcome delivery. Monitoring schemes could be funded using re-invested efficiencies delivered by OBER. To ensure that OBER is a success, lessons need to be learned from early implementation and a proportionate and responsive approach is needed when widening the scope. Effective backstops (e.g. fines by the EA) are already in place and can mitigate the risk of under-delivery.

## Implications for economic regulation in the water sector

Ofwat is currently developing its approach for the next regulatory price review (PR24).<sup>13</sup> The way economic regulation and environmental regulation interacts plays an important role in influencing company behaviour. As noted in the Taskforce on Innovation, Growth and Regulatory Reform (TIGRR) report, “good regulation, set up in the right way, can be a vital part of the infrastructure to support growth”.

Economic regulation needs to adapt to incorporate OBER. There are two key principles that need to be considered for OBER to be integrated effectively:

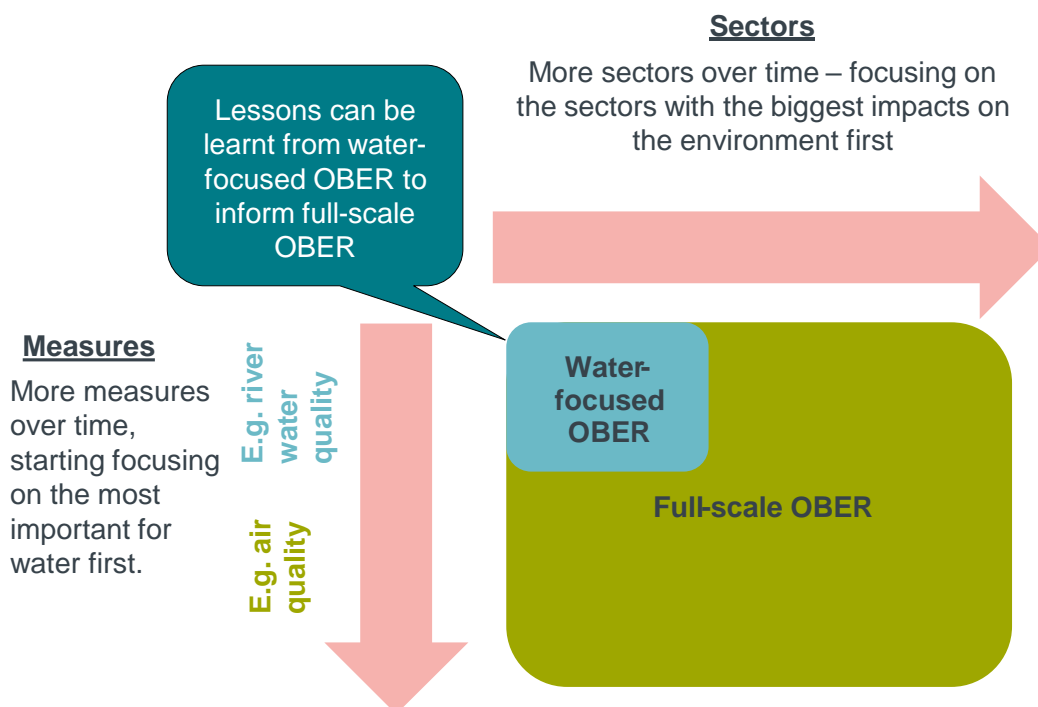
- **Appropriate risk and reward balance:** OBER increases the risk companies take as they deliver innovative solutions in partnership with others. The additional risk needs to be allocated appropriately between companies and customers so that there are sufficient incentives for companies to fully engage with OBER where it is efficient to do so.
- **Level playing field:** Economic regulation needs to ensure a level playing field between different types of solutions. For instance, the cashflow profile of a nature-based solution and a capital intensive solution may be different. Levelling the playing field involves ensuring that incentive mechanisms result in an outcome where companies are indifferent to the cashflow profile of different solutions.

<sup>13</sup> Ofwat, May 2021, PR24 and beyond: Creating tomorrow, together, Available: <https://www.ofwat.gov.uk/wp-content/uploads/2021/05/PR24-and-Beyond-Creating-tomorrow-together.pdf>

## Expanding OBER outside of the water sector

In making the case for OBER in the water sector, there is obvious potential to use the approach much more widely across the UK economy in support of the 25YEP. One of the key advantages of OBER is that it is flexible and can be gradually rolled out to cover more sectors and more ‘measures’ capturing other aspects of the environment, such as air quality, over time.

**Figure 2** The scope of full-scale OBER can be gradually increased over time



Expanding OBER outside of the water sector would clearly require some time to implement as it involves setting up and monitoring trading systems for a large number of complex externalities. Nevertheless, achieving the ambition of the 25YEP already requires a comprehensive and integrated delivery plan. A system of tradeable permits for negative externalities and tradeable credits for positive externalities that covers all sectors and key externalities could help to ensure that the 25YEP is delivered in the most efficient way. There are successful precedents for this approach. As highlighted in the Dasgupta Review, there are a number of tradeable permit schemes in place today, ranging from hunting and fishing to waste disposal and pollution.<sup>14</sup>

The advantages of this approach are:

- **It ensures that all sectors take a systems-based approach** – a system of tradeable permits and credits covering key environmental measures would incentivise a systems-based approach.

<sup>14</sup> Dasgupta, 2021, *The Economics of Biodiversity*, Available: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/962785/The Economics of Biodiversity The Dasgupta Review Full Report.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/962785/The_Economics_of_Biodiversity_The_Dasgupta_Review_Full_Report.pdf)



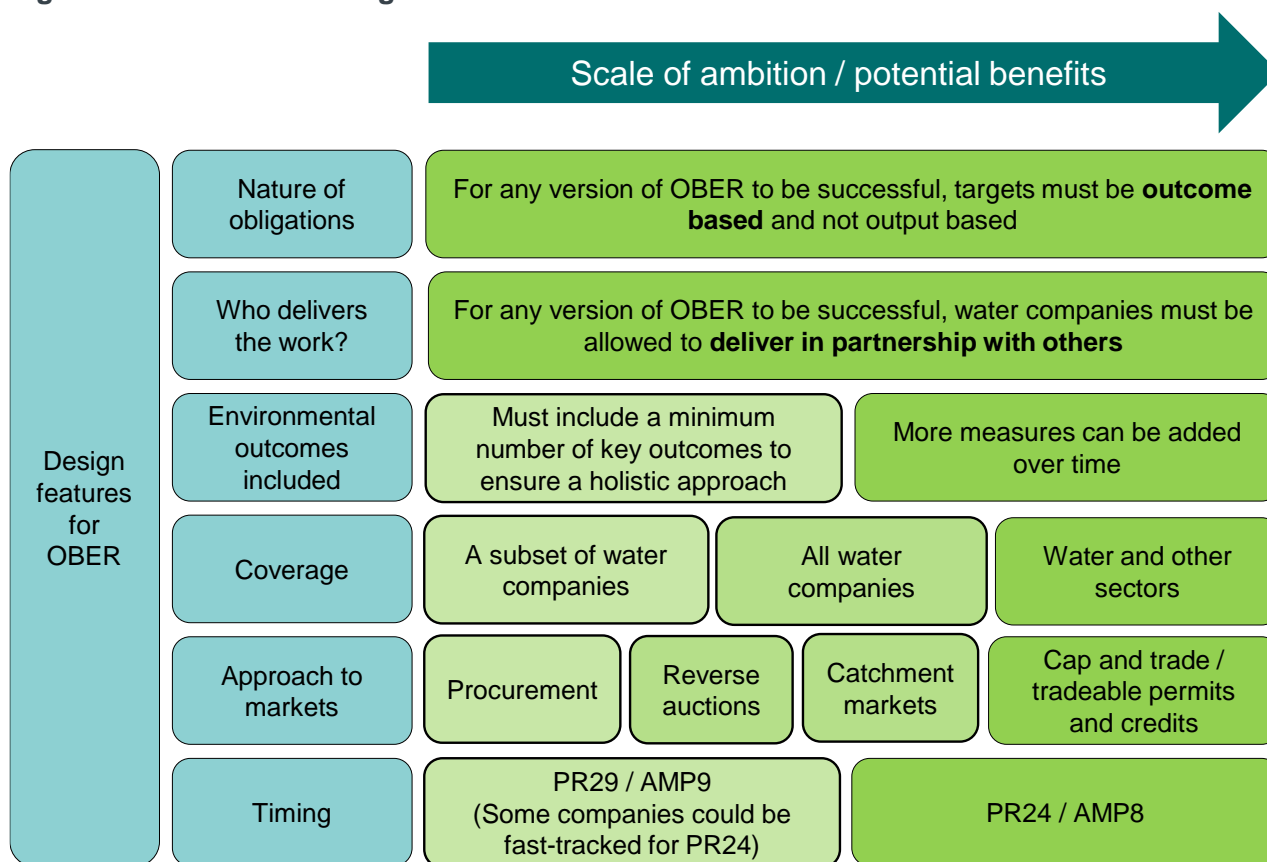
- **It facilitates private investment to deliver environmental solutions in an efficient way** – imposing obligations onto the private sector, ensures that those sectors and their customers fund the improvements. This is important as the scale of the ambition in the 25YEP means that it is unlikely to be feasible for government to simply “buy” the outcomes. It also creates a pricing mechanism to enable this to be achieved efficiently. Obligations can be set to align with ‘polluter pays’ principles, which is one of the key principles set out in the Environment Act 2021, where the sectors that are responsible for polluting the environment are held accountable for it and pay their fair share in delivering improvements.

This approach could appear to create winners and losers. Sectors that are responsible for a large share of pollution would become responsible for delivering a large share of the targeted improvement – which could imply a large increase in cost for those sectors. On the one hand, this is aligned with polluter pays principles, and would incentivise companies to internalise negative externalities. However, depending on the scale of the challenge, this could potentially conflict with other policy objectives (e.g. farmers being required to reduce certain types of pollution could potentially conflict with food security). If some sectors do appear to be particularly impacted, there could be scope for government to intervene and provide support to those sectors.

### OBER’s flexibility presents a choice to regulators

OBER is a flexible model which can start off small, but the potential benefits could be greatest when it is implemented in its fullest form. This presents a set of choices for regulators:

Figure 3 Choices for regulators



Water-focused OBER does not necessarily need to be rolled out to all water companies in England at the same time. Instead, it could initially be rolled out to a smaller number of companies. This allows for greater scrutiny, as it would be easier for regulators to concentrate resources on monitoring how the approach progresses with a smaller number of companies. It also presents a controlled experiment and gives an opportunity to compare how environmental outcomes and unit costs change for companies that are subject to OBER versus those that are not. This would help reveal information on the scale of the potential cost savings and benefits. This approach is also in line with the recommendations set out in the TIGRR report and those being consulted on in BEIS’ consultation on Reforming the Framework for Better Regulation, which notes that regulators should “encourage innovation by allowing innovators to trial new products, services or business models in a real-world environment under regulator supervision. This can accelerate the introduction of new and improved products, processes, and services to market.”

However, the roadblocks to a wider roll-out appear to be small and can be overcome. Therefore, water-focused OBER for the whole sector should be considered.

## Concluding remarks

The scale of ambition in Defra's 25YEP, the rising costs of environmental improvements, and the inefficiency of the current approach to environmental regulation in England drive a strong need to introduce a more efficient mechanism to improve the environment.

The recent TIGRR report highlights that “bad regulation is ineffective, expensive and difficult to implement. Good regulation, set up in the right way, can be a vital part of the infrastructure to support growth”. Current work to reform the WINEP is positive but does not grasp the potential to reshape environmental regulation at a more fundamental level. It does not fully recognise how a systems- and outcomes-based approach can deliver multiple benefits at a more efficient cost.

This report demonstrates how OBER can be expected to deliver the 25YEP in a far more efficient way. There may be practical issues with implementing OBER, however these are not insurmountable and the risks can be mitigated by adopting a more gradual approach. Also, while there might be some implementation issues with OBER, an imperfect approach could still be a significant upgrade on the current approach.

A recent report by the Green Finance Institute has analysed the amount of spending required to meet the delivery of England's nature based outcomes over the next 10 years, and the amount that has actually been committed.<sup>15</sup> It has found a finance gap of between £21 billion and £53 billion. This demonstrates the importance of private finance and sector contribution to delivering the 25 YEP goals and for more efficient approaches to existing public funding mechanisms, which OBER can help to deliver.

---

<sup>15</sup> Green Finance Institute, 2021. The Finance Gap for UK Nature. Available: [https://www.greenfinanceinstitute.co.uk/wp-content/uploads/2021/10/EMBARGOED-FINALNature-related-Finance-Gap\\_eftec-report\\_081021-002.pdf](https://www.greenfinanceinstitute.co.uk/wp-content/uploads/2021/10/EMBARGOED-FINALNature-related-Finance-Gap_eftec-report_081021-002.pdf)

# 1 INTRODUCTION

## 1.1 Background and objectives

In 2018, the UK government published an ambitious 25 Year Environment Plan (25YEP) to improve the environment in England.<sup>16</sup> It has made a commitment to “deliver the most ambitious environmental programme of any country on earth”, and to “be the first generation to pass the natural world on in a better state to our children”. The plan is ultimately intended to achieve 10 main goals shown in Figure 4 below.

**Figure 4** The goals of the 25YEP



To achieve these goals, Defra intends “to join up policies in a way that maximises benefits and value for money”.<sup>17</sup> It will be focusing its efforts on six key areas of action:

- Using and managing land sustainably;

<sup>16</sup> Defra, 2018, *Our 25 Year Plan to Improve the Environment*, Available: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/693158/25-year-environment-plan.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf)

<sup>17</sup> Ibid.

- Recovering nature and enhancing the beauty of landscapes;
- Connecting people with the environment to improve health and wellbeing;
- Increasing resource efficiency, and reducing pollution and waste;
- Securing clean, productive and biologically diverse seas and oceans; and
- Protecting and improving the global environment.

Under each of the areas of action it has also set out a number of high-level targets, including:

- Improving at least 75% of our waters to be close to their natural state as soon as is practicable;
- Restoring 75% of our one million hectares of terrestrial and freshwater protected sites to favourable condition; and
- Creating or restoring 500,000 hectares of wildlife-rich habitat outside the protected site network

The first of these is most relevant for the water sector because of the sector's direct impact on water quality.

The 25YEP also places a strong emphasis on 'catalysing private investment' in the natural environment. This will require a policy framework that brings together regulated expenditure, public funding and private finance to enable nature recovery and environmental improvement.

The Environment Act 2021 builds on the 25YEP and sets out the requirement to develop legally binding targets for water, air quality, biodiversity and waste.<sup>18</sup> These need to be developed by the end of October 2022.

Collaborative effort will be needed to take the high-level ambition of the 25YEP and convert it into a clear set of measures and targets for different sectors to implement in the most efficient way possible. Water companies have the potential to make a significant contribution to the 25YEP as they directly influence many of the outcomes being targeted for improvement, they can raise private finance for environmental investment, and they are experts in their local environments.

However, the current approach to environmental regulation in the water sector leads to inefficient outcomes as companies are not incentivised to choose solutions that deliver the biggest environmental benefit at the lowest societal costs. While a taskforce is currently considering changes to the WINEP, it is not clear that the current reform options being discussed will deliver the step-change needed for the sector to deliver its contribution to the 25YEP.

In parallel, there is significant pressure on water bills as the sector is expected to adapt and mitigate climate change, meet increasing consumer expectations and deliver a step-change in environmental improvements. This is evidenced by Defra's draft Strategic Policy Statement (SPS) that sets out the government's

---

<sup>18</sup> UK Parliament, 2021, Environment Bill, Explanatory notes: <https://publications.parliament.uk/pa/bills/cbill/58-01/0009/en/20009en.pdf>

expectations for the sector.<sup>19</sup> As a result, it is now more important than ever to find efficient ways to deliver environmental improvements.

In response to this challenge, Frontier Economics has been commissioned by Wessex Water to:

- review the current approach to delivering environmental outcomes in the water sector;
- identify how environmental and economic regulation need to adapt to make sure that the water sector can deliver its contribution towards the 25YEP in the most efficient way.

## 1.2 The structure of this report

This report is structured as follows:

- Sections 2 and 3 analyse the problem with the current approach to environmental regulation in England:
  - In **Section 2** we analyse the **economics of water catchments**. We highlight that water catchments are common pool resources and subject to environmental externalities that lead to over-consumption, over-pollution and under-production of biodiversity, and ultimately this is why intervention in the market is needed in the first place.
  - In **Section 3** we summarise the **current approach to environmental regulation** and we highlight that it **leads to inefficient outcomes** and is not fit for purpose for helping to deliver the 25YEP. Efficiency in this context means more than just low cost, it also captures wider social benefits.
- Sections 4 and 5 discuss the potential solutions firstly within the water sector and then more widely:
  - In **Section 4** we discuss how outcome based environmental regulation (**OBER**) in the water sector could make a significant contribution to ensuring the delivery of the 25YEP.
  - In **Section 5** we outline how full-scale **OBER could be rolled out more widely across the UK economy** in support of the 25YEP.
- In **Section 6** we discuss how **economic regulation** needs to adapt to incorporate OBER and how it presents opportunities for better and lighter touch regulation.
- In **Section 7** we summarise our overall **conclusions**.

---

<sup>19</sup> Defra, 2021, The government's strategic priorities for Ofwat, Available [https://consult.defra.gov.uk/water-services/government-new-sps-consultation/supporting\\_documents/newstrategicpolicystatementofwatdraftforconsultation.pdf](https://consult.defra.gov.uk/water-services/government-new-sps-consultation/supporting_documents/newstrategicpolicystatementofwatdraftforconsultation.pdf)

## 2 THE ECONOMICS OF WATER CATCHMENTS

### 2.1 Introduction

This section provides context on the economics of water catchments and the need for environmental regulation.

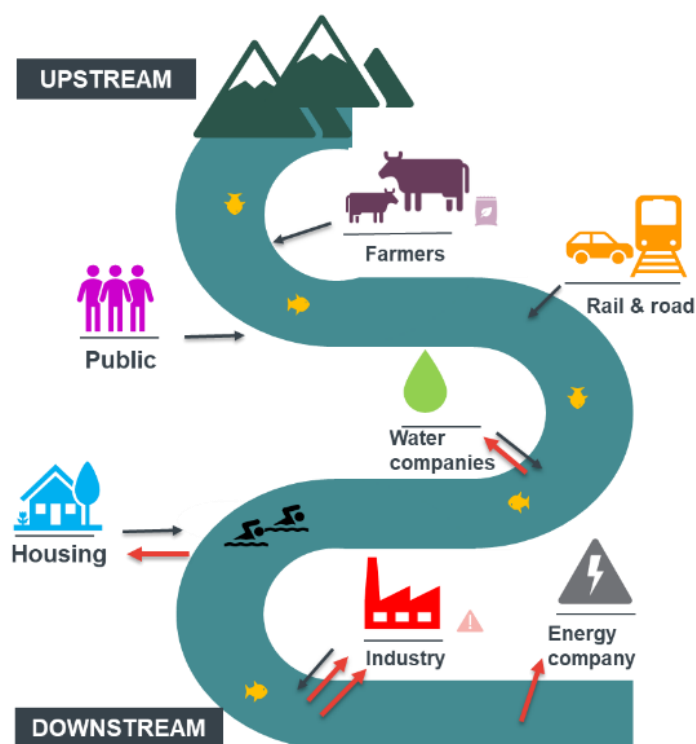
### 2.2 Water catchments are prone to market failure

Given that the focus of this report is on the contribution that the water sector can make to the delivery of the 25YEP, it looks at the problem through the lens of water catchments. Water catchments are used in a number of ways by a range of sectors and the public (see Figure 5 below). A catchment is the geographical area of land through which water from any form of precipitation (such as rain, melting snow or ice) drains into a body of water (such as a river or reservoir). Water is abstracted for various purposes including public water supply and industrial use and pollutants enter catchments as a result of discharge (from sewerage companies or industry) and as a result of run-off (e.g. from farmland or roads). In addition, the public uses rivers for a range of leisure activities such as fishing, boating and swimming. The EA's 'state of the environment' report highlights that there is substantial and growing evidence for the physical and mental health benefits of spending time in the natural environment.<sup>20</sup> This section focuses mainly on water quality (discharge and run-off) but many of the conclusions apply equally to water quantity (abstraction) and in practice there are interactions between the two.

---

<sup>20</sup> Environment Agency, 2021. *State of the environment: health, people and the environment*. Available: <https://www.gov.uk/government/publications/state-of-the-environment/state-of-the-environment-health-people-and-the-environment>

Figure 5 Water catchments are used in many different ways

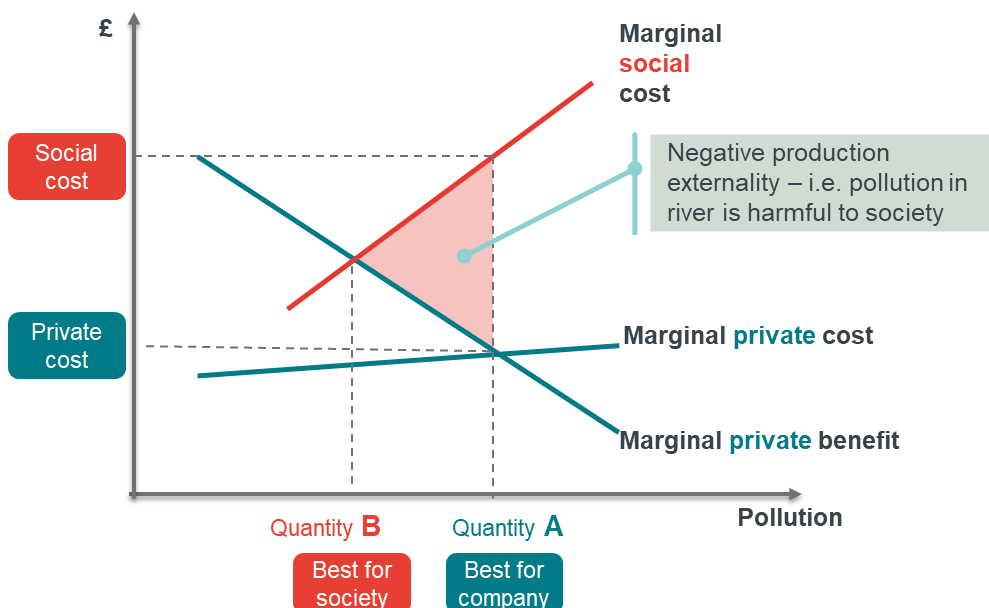


Water catchments are an example of a 'common pool resource'.<sup>21</sup> It is very difficult to limit access to them, but their supply is fixed meaning they can be depleted over time through overuse. Both abstraction of water and discharge of pollutants result in environmental externalities. This means that the private costs of abstraction or discharging is lower than the social costs. Social costs include a number of wider consequences, for example, reduction in biodiversity, and poor appearance and smell of the water.

A company that discharges a particular pollutant does not have to bear the social costs that may arise as a consequence. In the absence of government intervention, private individuals and companies have little to no incentive to take those externalities into account when making their own private decisions. Figure 6 below illustrates the problem with externalities.

<sup>21</sup> See Section 8 of the Dasgupta Review, *The Economics of Biodiversity*, 2021: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/962785/The Economics of Biodiversity The Dasgupta Review Full Report.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/962785/The_Economics_of_Biodiversity_The_Dasgupta_Review_Full_Report.pdf)



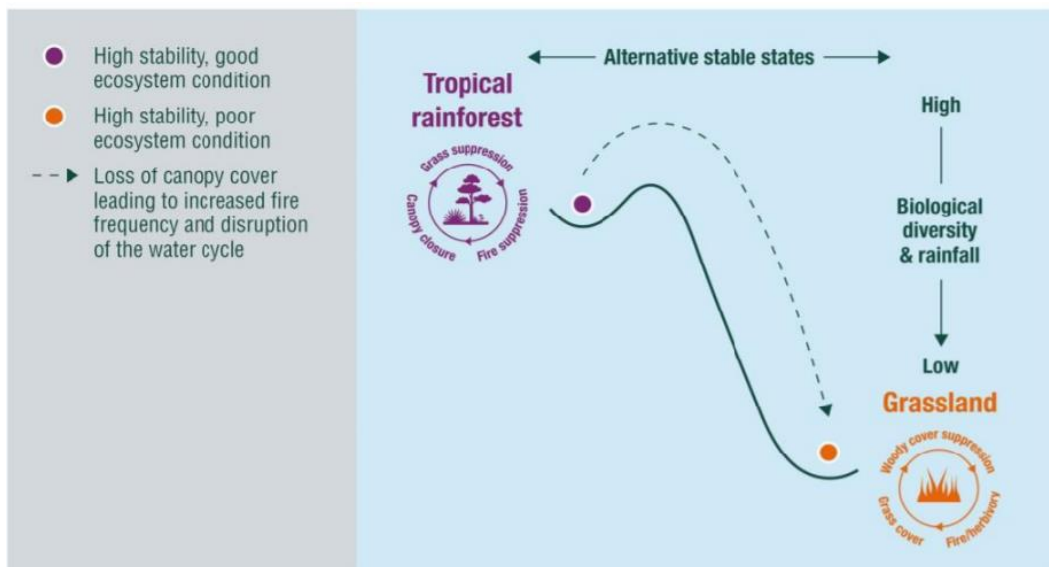
**Figure 6 Externalities lead to over-pollution**

The optimal level of pollution from a private company's point of view is the quantity where the marginal private costs are equal to marginal private benefit (Quantity A in the Figure 6). However, the marginal social costs are higher than the marginal private costs so from society's point of view, Quantity B is the optimal level of pollution. The red triangle shows the size of the negative externality when pollution is at Quantity A. This stylised example illustrates that in the absence of government intervention, water catchments will be over-polluted as private firms have no incentive to take social costs into account. This creates a market failure.

## 2.3 The environmental challenges faced by catchments are interrelated and complex

While section 2.2 describes the water catchment market failure, the issue with water catchments is more complex as different aspects of the environment of water catchments are highly interconnected. Changes in one area of the environment can have a knock-on effect on many others. For instance, planting additional trees and hedges on the edges of farmland can improve air quality, reduce flood risk, increase biodiversity by housing birds and other wildlife, and reduce agricultural runoff from entering the rivers by acting as 'nutrient sinks'. And the opposite is true too. This results in virtuous and vicious cycles, and 'tipping points', beyond which improvements or deteriorations can quickly gather pace. For example, Figure 7 below, from the Dasgupta Review, highlights that a tropical rainforest can tolerate some loss of canopy cover, but beyond a certain point there is then a rapid decline, and the rainforest quickly descends into a grassland, with significantly less biodiversity. Applying this to the context of water catchments in England, if abstraction from a river during hot weather causes the river to dry, it can be very difficult for the river to fully recover to its previous state.

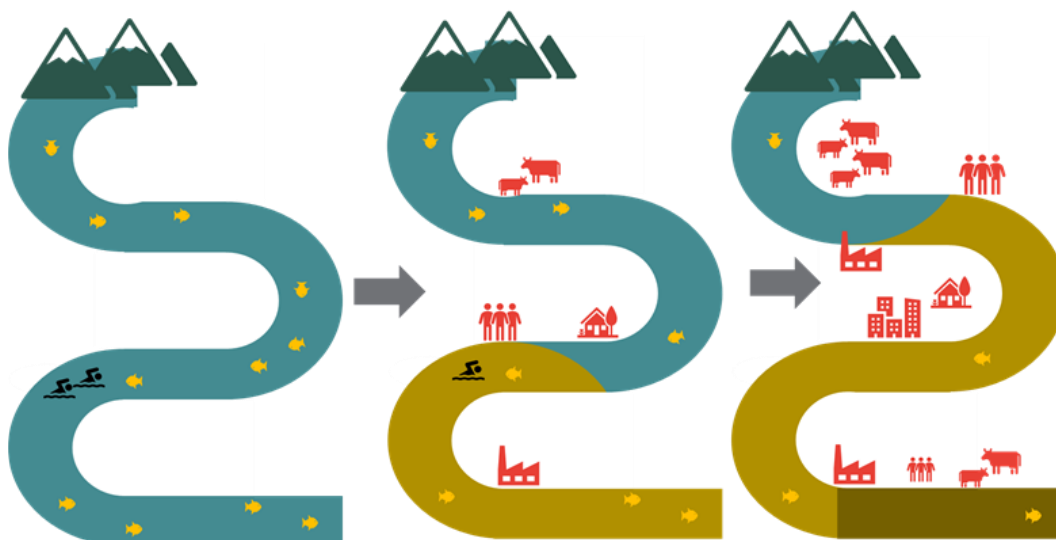
**Figure 7 Tipping points**



Source: *The Dasgupta Review, Interim report*, Available: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/88222/The\\_Economics\\_of\\_Biodiversity\\_The\\_Dasgupta\\_Review\\_Interim\\_Report.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/88222/The_Economics_of_Biodiversity_The_Dasgupta_Review_Interim_Report.pdf)

Without intervention, every individual agent over-consumes and under-invests, reflecting their own private interest but not the interests of society as a whole. This results in harmful overconsumption and a depletion of the common pool resource. This 'tragedy of the commons' is illustrated below.

**Figure 8 The tragedy of the commons**



## 2.4 The case for government intervention is clear

Governments typically intervene to remedy these market failures, and different approaches can be used, as summarised in Figure 9 below.

**Figure 9** Types of environmental regulation / government intervention

Regulation	Description	Example
Permit systems	Permits give firms the right to pollute a certain amount per year. By controlling the access to and quantity of permits, the regulator reduces pollution.	Companies that wish to abstract water must apply for an abstraction permit from the Environment Agency. <sup>22</sup>
Tradable permits	This sets a maximum allowable cap on total emissions. Allowances are distributed among individual polluters, and then polluters must reduce emissions directly, or purchase allowances from other firms.	EU ETS is a cap-and-trade system on carbon dioxide, nitrous oxide and perfluorocarbons produced by certain sectors in the EU. <sup>23</sup> As highlighted in the Dasgupta Review, there are a number of tradeable permits schemes in place today, ranging from hunting and fishing to waste disposal and pollution.
Pollution charges	Emissions/ pollution charges are taxes or fees levied on the discharge of pollutants.	Landfill tax must be paid by landfill operators on the disposal of material at landfill sites, which is passed onto businesses and local authorities through a gate fee for disposing waste at the landfill. <sup>24</sup>
Subsidies	Subsidies are financial assistance offered to a producer, such as to encourage pollution control or to help firms meet compliance costs.	The Environmental Land Management Scheme provides for payments to farmers for certain activities (such as planting hedgerows). <sup>25</sup>
Product charges	Product charges are fees/taxes levied on outputs or inputs that are hazardous to the environment. By increasing the cost of the polluting items, product charges encourage producers and consumers to substitute more environmentally sustainable products.	Fuel duty disincentivises the use of fossil fuels for travel. It is currently 57.95 pence per litre for petrol and diesel. <sup>26</sup>
Banning products	Banning the production and sale of products that are harmful to the environment.	In October 2020 the government banned single-use plastic straws, making it illegal to businesses to sell or supply the items. <sup>27</sup> The government has also banned several chemicals that are harmful to health if found in drinking water, such as PCBs. <sup>28</sup>

<sup>22</sup> Environment Agency, 2021, *Apply for a Water Abstraction or Impound Licence*, Available: <https://www.gov.uk/guidance/water-management-apply-for-a-water-abstraction-or-impoundment-licence>

<sup>23</sup> European Commission, 2021, *EU Emissions Trading Scheme*, Available: [https://ec.europa.eu/clima/policies/ets\\_en](https://ec.europa.eu/clima/policies/ets_en)

<sup>24</sup> HMRC, 2020, *Landfill Tax Bulletin Commentary (October 2020)*, Available: <https://www.gov.uk/government/statistics/landfill-tax-bulletin/october-2020-commentary>

<sup>25</sup> Defra, 2021, *Environment Land Management Scheme*, Available: <https://www.gov.uk/government/publications/environmental-land-management-schemes-overview/environmental-land-management-scheme-overview>

<sup>26</sup> OBR, 2021, *Fuel Duties*, Available : <https://obr.uk/forecasts-in-depth/tax-by-tax-spend-by-spend/fuel-duties/>

Government can develop incentive schemes using several of the options listed in Figure 9, such as offering financial rewards and penalties for environmental improvement or decline. When deciding which approach to use, governments must strike a balance between different objectives. For instance, a simple approach may impose the least cost on businesses whereas a more complex approach may deliver the greatest environmental benefits.

One of the guiding principles for consideration is the ‘**polluter pays**’ principle, one of the cornerstones of environmental economics. It is a simple principle which argues that the party responsible for the pollution should be held accountable for it and be required to pay their fair share in remedying the issue. This ensures that externalities are internalised when enterprises make decisions that have an impact on the environment, bringing private costs in line with social costs and avoiding the market failure.<sup>29</sup> This increases the cost of producing goods and services that impact negatively on the environment, and this cost would be passed through to consumers, ensuring that prices reflect the true social cost of the goods and services being consumed. If demand for these goods and services falls as a result, then ultimately this would result in less harm to the environment. The Environment Act 2021 refers to the polluter pays principle as one of the key environmental principles underpinning the 25YEP, and it refers heavily to ‘producer responsibility’.<sup>30</sup> This approach performs well in terms of efficiency and sending strong signals to each sector to reduce their pollution and is arguably the fairest way of dealing with significant negative externalities.

One of the complexities of dealing with negative environmental externalities in water catchments is the interconnected nature of the environment. An intervention to reduce one type of negative externality could have positive or negative consequences on other externalities. For example, a built solution to reduce runoff may result in additional carbon emissions and reduce biodiversity, whereas planting trees or investing in sustainable urban drainage may achieve the same improvement in water quality whilst also reducing carbon and boosting biodiversity.

Government intervention that does not take into account the interconnected nature of the environment runs the risk of unintentionally creating negative externalities. Equally, there is a great opportunity for well-designed intervention to not only improve river water quality but also deliver other positive externalities.

---

<sup>27</sup> Defra, 2020, Start of ban on plastic straws, stirrers and cotton buds, Available: <https://www.gov.uk/government/news/start-of-ban-on-plastic-straws-stirrers-and-cotton-buds>

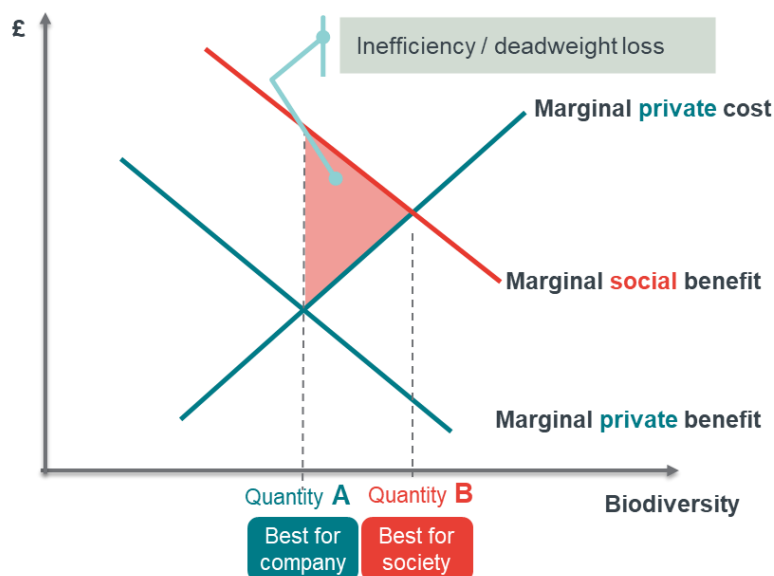
<sup>28</sup> UK Government, 2015, Polychlorinated biphenyls. Available at: <https://www.gov.uk/guidance/polychlorinated-biphenyls-pcbs-registration-disposal-labelling>

<sup>29</sup> According to Coase Theorem, assigning property rights to environmental goods will internalise externalities and lead to an efficient outcome, regardless of the initial allocation of property rights. However, Coase Theorem is built on the requirements that the environmental good is excludable. Dasgupta provides an example of a non-excludable environmental good in which Coase Theorem breaks down. Consider an economy where every household emits toxic fumes from its kitchen. No household can choose to restrict the emission to any one group of household, meaning the fumes are a ‘public harm’. The dilemma facing households is to find a way to reduce every household’s emission, but because participation is voluntary, each household would individually be better off not participating. This would lead to no reduction in emissions at all. *The Economics of Biodiversity*, Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/962785/The\\_Economics\\_of\\_Biodiversity\\_The\\_Dasgupta\\_Review\\_Full\\_Report.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/962785/The_Economics_of_Biodiversity_The_Dasgupta_Review_Full_Report.pdf)

<sup>30</sup> <https://bills.parliament.uk/publications/41652/documents/310>

Focusing on biodiversity as one of the key potential positive externalities<sup>31</sup>, Figure 10 below illustrates that a government intervention that does not allow private firms to capture the full social benefit of a particular solution will lead to a lower than optimal level of biodiversity. In this stylised example, the private benefits are lower than the social benefits as the firm cannot capture the additional benefits from improving biodiversity. As a result, it will deliver biodiversity at Quantity A instead of B.

**Figure 10 Biodiversity is prone to underinvestment**



Government intervention is needed to address market failures and avoid the tragedy of the commons, but it also needs to take into account the interconnected nature of water catchments.

The following sections discuss the current approach to environmental regulation in England, and how it can be improved to help deliver the 25YEP more efficiently.

<sup>31</sup> Biodiversity could also be viewed as a negative externality of actions in the past but in the context of starting with water catchment externalities, biodiversity can be seen as one of the potential positive externalities of solutions that improve river water quality.

## 3 THE CURRENT APPROACH TO ENVIRONMENTAL REGULATION IS INEFFICIENT

### 3.1 Introduction

This section first provides a high-level overview of the current approach to environmental regulation in England, with a particular focus on river water quality and biodiversity. It then highlights the inefficiencies of the current approach. Efficiency in this context means more than just 'lowest cost', it also captures environmental and social benefits. Having identified these inefficiencies, the rest of this report then discusses how relatively small changes can have a significant impact and help us achieve the 25YEP much more efficiently.

### 3.2 The current approach to environmental regulation

#### 3.2.1 River water quality

Section 2 explained that there are many agents across many sectors that all have impact on our water environment. However, rather than applying a consistent form of environmental regulation across all sectors, the current approach is fragmented and varies from sector to sector. Figure 11 provides a high-level overview of the approach to environmental regulation across the sectors that are relevant to river water quality.

**Figure 11 Different Industries are regulated in different ways** Outcome based environmental regulation

Area	Regulator	Description	Example of rules	Enforcement/penalties?
Water companies	EA	The WINEP is a set of actions that the EA require all water companies to complete between 2020 and 2025. The WINEP has hundreds of requirements for each water provider, covering phosphorus and nitrate removal, chemical investigations and removal, water quality investigations etc.	<ul style="list-style-type: none"> <li>▪ Reducing phosphorus content to a specific level.</li> <li>▪ Installing monitors in certain locations to gather data on storm overflows.</li> </ul>	The EA undertake Environmental Performance Assessments of water companies every year on various environmental indicators, including the WINEP delivery. Water companies must meet a certain % of overall delivery or face financial penalties.
Agriculture	Defra / EA	Defra's <i>Farming rules for water 2018</i> were introduced as part of Defra's 25-year environment plan. This specifies a list of requirements for farmers, primarily concerned with use of manures and fertilisers and soil management.	Organic manures or manufactured fertilisers must not be applied if soil has been frozen for more than 12 hours in the previous 24 hours.	The EA carries out risk-based targeted farm inspections to check compliance with the farming rules. If a breach is identified, the EA will work with farmers to agree which changes must be made. If there is a high risk of immediate pollution, then the EA will act in line with its enforcement and sanctions policy.
		Defra sets out guidance for farmers and landowners operating in areas designated as Nitrate Vulnerable Zones (NVZs), which are areas designated as being at risk from agricultural nitrate pollution. They include about 55% of land in England.	If land is in an NVZ, farmers and landowners must follow rules when using nitrogen fertiliser and storing organic manure.	The Rural Payments Agency carries out cross compliance inspections to check farmers and landowners are complying with these rules. Farmers and landowners must meet all NVZ rules, as well as other cross compliance requirements to qualify for full payments from the Basic Payment Scheme (BPS) and Rural Development Programme for England (RDPE) schemes, such as Countryside Stewardship and Countryside Productivity
Road	Office for Rail and Road (ORR)	The Office for Rail and Road set a list of rules in relation to water usage, including rules around drainage, discharge of effluents to watercourse, herbicides and chemicals.	Weed-killing trains must use specific pre-approved herbicides.	The ORR require rail companies to self-monitor and develop a statement on how they are meeting requirements.

## Outcome based environmental regulation

Public	EA	Owners of private septic tanks that discharge to a surface water must meet a set of binding rules.	Must make sure the top end of the pipe that releases sewage is below the 'mean low water spring mark'.	If requirements are not met, in the first instance the EA will help the consumer to meet these. If this does not work the EA can act in line with its enforcement and sanctions policy.
Housing	Natural England	In certain regions of the UK, Natural England impose nutrient neutrality to ensure developers deliver homes that do not discharge excess nitrates into natural habitats.	All new housing developments must ensure that the development does not add to existing nutrient burdens.	Housing developments that do not meet the nutrient neutrality requirements may be delayed until they are able to demonstrate compliance.
Industry	EA	Industry that discharges liquid effluent or wastewater into surface waters or into the ground must obtain a discharge permit from the EA.		The EA check compliance with permits by inspections and sampling permitted water discharge. If rules are not being followed the EA may remove permit, serve enforcement notices or prosecute.



In England and Wales, the water sector must deliver the EA's WINEP. The water sector has been subject to the WINEP (in one form or another) since 1990. It is effectively a list of schemes and outputs that the water sector must deliver to improve the environment. For instance, the WINEP may include a scheme for a water company to enhance treatment processes at a specific site to reduce nutrient loads from entering the water environment. Delivering the WINEP is expected to cost water companies around £5 billion over the course of AMP7 (2020-2025), with the cost then recovered through customer bills over time. Over AMP7, companies will be obliged to deliver over 1,600 outputs, around 800 of which relate to phosphorus removal. (A taskforce, led by the EA, Defra and Ofwat, has recently reviewed the WINEP and proposed potential changes. This is described in more detail in Section 3.4.)

Compared to the water sector, other sectors face much lighter touch regulation. For instance, the agricultural sector is subject to regulations set out in Defra's Farming Rules for Water.<sup>32</sup> The rules contain relatively high-level guidance for farmers such as not using fertiliser on waterlogged, flooded or snow-covered soil, or when the soil has been frozen for more than 12 hours in the past 24 hours, or within 2m of inland freshwaters, coastal waters, a spring, well or borehole. The EA monitors compliance using a risk-based approach. The Salmon & Trout Conservation organisation found that, in the current approach, *“every farm business could expect to receive just one visit in the next 263 years, or by the year 2282.”*<sup>33</sup>

These two examples demonstrate that different sectors that impact river water quality are not only regulated in different ways but the mechanisms and incentives for delivering improvements are not consistent. Given that many aspects of the environment are interrelated, and characterised by vicious cycles and tipping points, taking different approaches in different sectors makes it very difficult to achieve positive outcomes overall, and a more co-ordinated approach is needed.

### 3.2.2 Biodiversity

Biodiversity is one of the key externalities in water catchments, and there are several emerging ways in which biodiversity is regulated. The urgency of the biodiversity emergency has been recognised relatively recently and is most clearly articulated in the Dasgupta Review. As a result, government policy and environmental regulation specifically targeted at biodiversity is still developing. The approaches below are emerging policies to help fund improvements.

#### Environmental Land Management

In 2020, Defra introduced the Environmental Land Management (ELM) scheme to replace the EU's Common Agricultural Policy. ELM will be fully rolled out by the

<sup>32</sup> Defra, 2018, *Rules for farmers and land managers to prevent water pollution*. Available: <https://www.gov.uk/guidance/rules-for-farmers-and-land-managers-to-prevent-water-pollution>

<sup>33</sup> Salmon & Trout Conservation, 2021. *Doing it's job? A report by Salmon & Trout Conservation on the Environment Agency's role in protecting and enhancing the rivers, lakes and streams of England*. Available at: [https://salmon-trout.org/wp-content/uploads/2021/04/Doing-its-job.stc\\_.pdf](https://salmon-trout.org/wp-content/uploads/2021/04/Doing-its-job.stc_.pdf)

end of 2024. In effect, it offers farmers and land managers a financial incentive to improve the environment through one of three ‘tiers’, as set out in Figure 12 below.

**Figure 12 What is the Environmental Land Management Scheme?**

ELMS has two main strategic objectives:

- 1 To secure a range of positive environmental benefits, prioritising between environmental outcomes where necessary.
- 2 To help tackle some of the environmental challenges associated with agriculture, focusing on how to address these in the shorter term.

To achieve these objectives, activities in the scheme are related to three tiers:

	<b>Tier 1: Sustainable Farming Incentive</b>	<b>Tier 2: Local Nature Recovery</b>	<b>Tier 3: Landscape recovery</b>
Eligibility	All farmers – ‘farmers, tenants, landowners, land managers, growers and foresters’ widely available in the form of simple ‘packages’.	All land managers; focus on collaboration.	All land managers. Limited to large scale projects of strategic national importance.
Types of actions	E.g. management of livestock, trees and woodland, efficient water use.	E.g.: creating, managing, restoring and connecting habitats; natural flood management; species management; navigation; recreation and education infrastructure.	E.g. large-scale forest and woodland creation, restoration and improvement, restoration of ecosystems, peatlands and coastal habitats.
Funding	May be most appropriate to base payments on rates on the income forgone and costs incurred.	Considering payment by results (PbR) with top-up for additional results.	Case-by-case negotiated payments; procurement model; potential for reverse auctions and public-private finance.

A key feature of ELM is that under Tier 1 and 2, the government will pay farmers and land managers a certain amount to carry out the improvements, meaning that the government itself will in effect define a price per unit of improvement. The price may be linked to the costs incurred by the farmers and the income forgone by improving the land instead of using it for farming. Under Tier 3, the government may use more market-based approaches, such as procurement and reverse auctions.

### Biodiversity Net Gain

Biodiversity Net Gain (BNG) is a new scheme included in the Environment Act 2021 that requires building developers in England to take steps to improve the environment. Defra notes that “the negative environmental, social and economic impacts from property development are not fully accounted for in developers’ decisions. This leads to loss and damage of habitat, biodiversity and other environmental goods.” The main aim of BNG is to deliver habitat creation and enhancement.<sup>34</sup>

The scheme proposes that a company developing a new site in England will be required to demonstrate a 10% increase in biodiversity on or near the new site.<sup>35</sup>

<sup>34</sup> Regulatory Policy Committee, 2020, *Biodiversity net gain*, Available: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/858037/2019.06.06\\_-\\_RPC-4277\\_2\\_-\\_DEFRA-EA\\_biodiversity\\_net\\_gain.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/858037/2019.06.06_-_RPC-4277_2_-_DEFRA-EA_biodiversity_net_gain.pdf)

<sup>35</sup> The percentage requirement has initially been set to 10% and may be updated in the future. Defra, 2019, *Biodiversity net gain: updating planning requirements*, Available: <https://www.gov.uk/government/consultations/biodiversity-net-gain-updating-planning-requirements>

Biodiversity will be measured using Natural England's 'Biodiversity Metric'.<sup>36</sup> The proposals could involve developers carrying out the work themselves, or potentially buying credits from others to demonstrate that the obligation has been met.

### Natural Flood Management

Natural flood management (NFM) relates to using natural processes to reduce flood risk and coastal erosion risk. Examples of this include changing the way land is managed so soil can absorb more water, and creating salt marshes in coastal areas to absorb wave energy. NFM can also improve water quality, biodiversity and increase carbon storage, by helping restore and rebuild habitats and by reducing nutrient runoff. The Environment Agency's *Working with Natural Resources* guidance gathered evidence on various natural processes and found that these can reduce flood risk by slowing, storing and filtering water, whilst also achieving other environmental benefits.<sup>37</sup>

In the 2020 Budget, the government committed to doubling expenditure on flood and coastal risk management to £5.2 billion between 2021 and 2027, which will include spending on NFM.<sup>38</sup>

## 3.3 The current approach is inefficient and stifles innovation

Government intervention needs to strike the right balance between different policy objectives, which is not straightforward. Nevertheless, the current approach to environmental regulation in water catchments is:

- **Fragmented:** Different sectors that impact the water environment are subject to different types of environmental regulation, and they face very different incentives.
- **Prescriptive in the water sector:** Historically, the WINEP has been a prescriptive list of outputs that the water sector must deliver, reducing opportunities for innovation and working across sectors to deliver the best value solutions (taking into cost as well as environmental and social benefits).
- **Output not outcome focused in the water sector:** The WINEP's list of outputs has not taken into account whether this is the most efficient way of achieving the desired outcome.
- **Not based on systems thinking:** The current approach does not take into account externalities. Through the WINEP, water companies have been required to invest heavily in physical assets to improve water quality, even when it is not efficient to do so, and perversely, many of these asset-based solutions are energy intensive adding to their carbon footprint. The current

<sup>36</sup> Natural England, 2021, [Biodiversity Metric 3.0](http://publications.naturalengland.org.uk/publication/6049804846366720), Available: <http://publications.naturalengland.org.uk/publication/6049804846366720>

<sup>37</sup> Environment Agency, 2021. *Working with Natural Processes*. Available: <https://www.gov.uk/flood-and-coastal-erosion-risk-management-research-reports/working-with-natural-processes-to-reduce-flood-risk>

<sup>38</sup> Environment Agency, *Natural Flood and Coastal Risk Management Strategy for England*, 2020. Available at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/920944/023\\_15482\\_Environment\\_agency\\_digitalAW\\_Strategy.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/920944/023_15482_Environment_agency_digitalAW_Strategy.pdf)

approach creates additional negative externalities and misses the opportunity to create additional positive externalities (e.g., nature-based solutions).

All of these points individually lead to inefficiencies and in combination they lead to society paying more for less environmental improvement. For example, water companies are obliged to implement particular solutions, even though other more innovative solutions exist which may be less costly and/or deliver greater environmental and wellbeing benefits.

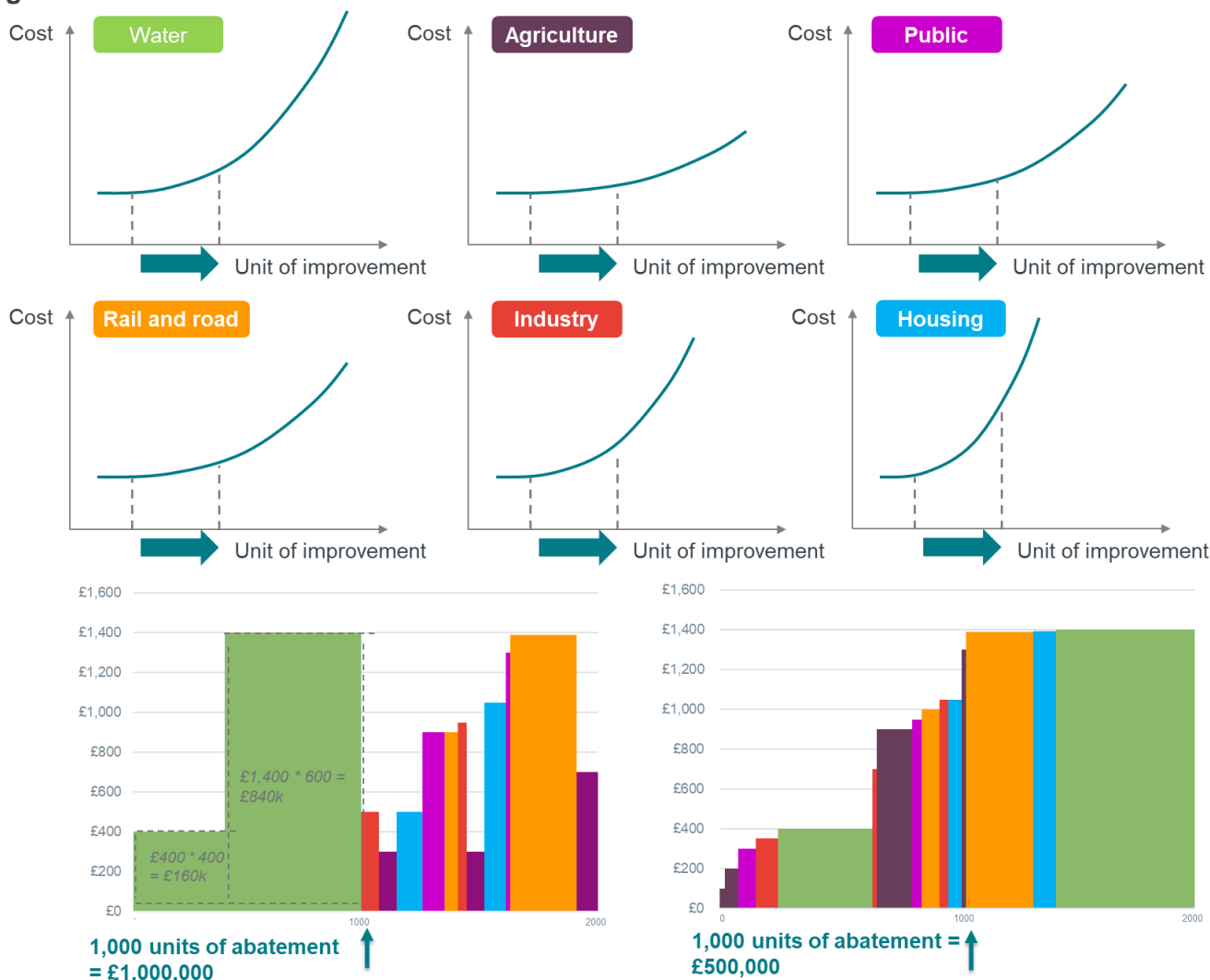
### 3.3.1 How a fragmented approach to environmental regulation leads to inefficiency and stifles innovation

There are clear reasons for this fragmented approach, as other policy objectives are also important. For example, agricultural policy is not just focused on efficiently delivering environmental outcomes as it needs to deliver food security. Different competing objectives for different sectors will lead to different approaches to environmental regulation. However, it is important to look at the impact of the fragmentation from the water catchment's point of view.

The issue with a fragmented approach that provides different incentives to different sectors in the same catchment is that it does not lead to the most efficient solutions being implemented first, or the most innovative solutions being identified. Efficiency in this context includes all private and social costs and benefits, so this would include the costs of improving water quality for the company, the quantity of the improvement as well as the social costs and benefits. An efficient solution is one that performs best from a "whole of society" point of view.

To illustrate this point, Figure 13 below shows a range of different sectors and illustrative cost curves for improving river water quality by a single unit. The cost curves are likely to differ between different sectors as the types of solutions available to each sector are different. The figure includes an illustrative example that shows the costs of 1,000 units of abatement. The left-hand chart shows the costs if sectors face different regulations and requirements. In this case, the order of the solutions is driven by each sector's set of specific requirements - some more costly solutions will be included while others that are less costly will not be carried out. The right-hand chart shows how 1,000 units of abatement could be achieved if there was a consistent approach and the solutions with the lowest abatement costs are carried out first - the same level of abatement is achieved at a much lower cost. The current fragmented approach is likely to lead to the outcome on the left where a mix of solutions is applied but it is unlikely that this is the most efficient combination of solutions.

Figure 13 Different sectors face different cost curves – illustrative



Note: Illustrative data

A fragmented approach also creates allocative inefficiency in the economy as different sectors effectively face different costs of polluting. This runs the risk of producing more of some goods than is optimal and less of others than is optimal as the true cost of the negative externalities are not taken into account.

### 3.3.2 How a prescriptive and sector-based approach compounds the inefficiency and stifles innovation

In the past, obliging water companies to deliver a prescriptive list of outputs was an effective approach to improve river water quality as there were many “low hanging fruit”. However, output-based regulation has now reached a point where those low hanging fruit have already been delivered, and now marginal costs are rising. For example, based on information from the EA we estimate that, for the water sector, the cost of abating one kiloton of phosphorus per year is expected to more than double from 2020 to 2027, from around £150 million to £350 million per

year.<sup>39</sup> Therefore, this prescriptive and sector-based approach is no longer efficient and will likely become increasingly more costly over time.

Water companies currently have very limited flexibility in engaging with other actors in the catchment to identify more efficient ways of delivering the same level of river water quality improvement. While some innovative approaches have been used at the margin - for instance water companies have made payments to farmers to reduce nutrient run-off into the local watercourse instead of pursuing built solutions - these require substantial transaction costs and negotiations with the EA. The vast majority of the current WINEP is therefore delivered by the water companies themselves, by working on their own assets.

Similarly, the sector-based approach limits the extent to which local communities can engage with and contribute to solutions to improving the water environment. Enabling community-based approaches could ensure that there is focus on both urban as well as rural environments when improving the value of local watercourses, for instance by identifying and incentivising sustainable urban drainage approaches.

### 3.3.3 How a focus on outputs not outcomes compounds the inefficiency and stifles innovation

If water companies were regulated on outcomes instead of outputs, this would enable them to begin to “reshuffle” the bars in the bottom picture of Figure 13 so that the most efficient solutions that they were capable of delivering themselves were implemented first.

If the focus on outcomes also enabled a cross-sector approach to delivery then the bars could be reshuffled completely so that the lowest cost solutions for society as a whole could be delivered first.

### 3.3.4 How a lack of systems thinking compounds the inefficiency and stifles innovation

The current approach to environmental regulation focuses on individual aspects of the environment in isolation, which fails to recognise that the environment is interconnected. For instance, the WINEP generally obliges companies to implement the lowest cost ‘single-issue’ solutions with a preference for more traditional asset-based solutions. The WINEP might oblige a company to reduce river water pollution by investing in a relatively low-cost, carbon-intensive solution, even though a more costly, nature-based solution could achieve the same outcome whilst also delivering wider biodiversity benefits.

To illustrate this point, Wessex has estimated that planting a wetland at Cromhall was able to remove phosphorus at a cost of around £170 per kg of phosphorus removed and produce significant biodiversity. However, it estimates that a more traditional asset-based approach would have cost around £200 per kg of phosphorus removed – and it would have also increased Wessex’s carbon

<sup>39</sup> Based on EA, 2019, *Phosphorus and Freshwater Eutrophication Pressure Narrative*, Available: [https://consult.environment-agency.gov.uk/++preview++/environment-and-business/challenges-and-choices/user\\_uploads/phosphorus-pressure-rbmp-2021.pdf](https://consult.environment-agency.gov.uk/++preview++/environment-and-business/challenges-and-choices/user_uploads/phosphorus-pressure-rbmp-2021.pdf)



footprint. The nature of the WINEP has historically encouraged traditional asset-based solutions as they deliver environmental improvements at the point source with certainty.

### 3.3.5 Poole Harbour Case study

A good example which highlights the overall inefficiency of the current approach to environmental regulation in the water sector is Wessex's experience at Poole Harbour. Wessex was obliged to reduce nitrate pollution at Poole Harbour through investing in a carbon-intensive treatment process, with an estimated cost of £31,000 per tonne of nitrogen removed. Wessex was able to show that it could achieve the same outcome by delivering a nature-based solution in partnership with farmers, at a cost of £9,000 per tonne of nitrogen removed – i.e. 71% cheaper and also with biodiversity benefits instead of more carbon emissions. But despite this, Wessex was still ultimately obliged to invest in the costlier carbon-intensive solution.

**71% cheaper**

Wessex's experience at Poole Harbour shows that nature-based solutions have been as much as **71% cheaper** than WINEP-prescribed solutions, **and they bring wider biodiversity benefits**, but they are not allowed under current legislation.

## 3.4 WINEP review taskforce

As it is clear that WINEP needs reform, a WINEP taskforce<sup>40</sup>, led by the EA, Defra and Ofwat, has been established with objectives to:

- “enable a step change in the quality of the water environment and deliver greater value for money”;
- be “outcomes-driven with less prescription”; and
- “to ensure that going forward nature-based solutions are on a level playing field with other solutions and they are considered by default.”

Ofwat is also establishing a ‘nature-based solutions regulatory group’ which is explicitly looking at barriers that may stand in the way of nature-based solution adoption.

The early thinking from the taskforce was that “the WINEP will set out what water companies must deliver but increasingly not set the how” and that it will be the responsibility of the water company to deliver the measures and demonstrate compliance. In practice, the taskforce envisages a three-tiered approach:

- Tier 1: All schemes will be linked to a high-level outcome.

<sup>40</sup> Ofwat, 2021, *Letter to Parliament: Water Quality in Rivers*, Available: <https://committees.parliament.uk/writtenevidence/22688/pdf/>

Defra, 2020, *Economic Recovery – The Water Industry's Role in Building a Resilient Future*, Available: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/902487/green-recovery-letter-to-water-companies-200720.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/902487/green-recovery-letter-to-water-companies-200720.pdf)

- Tier 2: All schemes will be linked to a specific objective, such as reducing nutrient load in a particular river by X%. Water companies must then provide sufficient evidence that this has been carried out.
- Tier 3: All schemes will specify an output to be delivered (in line with the current WINEP).

In July 2021, the taskforce published a consultation on some proposed changes for redesigning the WINEP.<sup>41</sup> The proposals are a step in the right direction, but many of the inefficiencies still remain:

- **Output-focused:** The taskforce is proposing the “three-tiered outcomes” (3TO) approach described above, whereby companies are given more responsibility to develop their work programmes in support of high-level outcomes. However, it has noted that for 2025 to 2030, tier 1 and tier 2 proposals will only be appropriate for “*some, rather than all, drivers*”. It also notes that the EA “*may – at its discretion – allow actions to be included in the WINEP where the actions are not linked to a specific tier 3 output and are instead set as a tier 2 goal or a tier 1 outcome (for non-permitted actions)*”. This suggests that in practice most actions will still likely be linked to a tier 3 output including, crucially, water quality.
- **Delivering in partnership:** The taskforce is proposing that water companies should draw more on the expertise and resources of other catchment partners to co-develop, co-deliver and co-fund environmental solutions. It is proposing that for the next WINEP, “*water companies should work with the EA to select one or more catchment partnerships to trial the co-design and development of the WINEP*”. While this is a step in the right direction the ambition is still limited.
- **Not based on systems thinking:** The proposals appear to create a hierarchy with higher priority given to the statutory requirements on water companies and lower priority given to the wider environmental improvements sought by the 25YEP such as biodiversity improvement and carbon. This is likely to constrain the level of systems thinking, as the wider outcomes outside of statutory requirements are effectively viewed as an optional add-on as opposed to being designed into the system.
- **Sector-integration:** The proposals do not acknowledge the relationship between water sectors and other sectors, such as farming. There is critical co-dependency between the WINEP and the Environmental Land Management Scheme (ELM), which should be recognised to enable multiple outcomes to be delivered across different sectors.

### 3.5 TIGRR calls for regulatory reform across the UK

In addition to the WINEP review taskforce, the recent Taskforce on Innovation, Growth and Regulatory Reform (TIGRR) has outlined that now is the time to review the approach to regulation (in general) used in the UK. BEIS has also published a

---

<sup>41</sup> <https://www.gov.uk/government/consultations/review-of-the-water-industry-national-environment-programme-winep>



consultation which builds upon many of the recommendations set out in the TIGRR report. Both TIGRR and BEIS highlight that poorly designed regulation can stifle innovation, and that good regulation can unlock innovation and support investment. This is described in more detail below. In light of these messages, the WINEP review can be considered a missed opportunity for more fundamental reform.

## TIGRR AND BEIS' CONSULTATION ON REFORMING THE FRAMEWORK FOR BETTER REGULATION

### TIGRR

The recent Taskforce on Innovation, Growth and Regulatory Reform (TIGRR)<sup>42</sup> has highlighted that there are opportunities to overhaul the approach to regulation in the UK to help unlock growth, innovation and investment. It highlights that “Bad regulation is ineffective, expensive and difficult to implement. Good regulation, set up in the right way, can be a vital part of the infrastructure to support growth”. It sets out a number of guiding principles and recommendations for regulators – many of which are also echoed in this report:

- “regulation should focus on outcomes rather than on inputs; regulating the end product, not the process”
- “UK regulation should put innovation at its heart: embracing both innovative ways to regulate more productively and boost UK innovation”
- “It should aim to expand use of new approaches to regulation, for example by using ‘sandboxes’ and ‘testbeds’.” “Standards, testbeds, sandboxes and encouraging best practice are all ways regulators can be more responsive, learning and adapting rather than immediately creating definitive across-the-board rules.”

### *Reforming the Framework for Better Regulation*

Building upon the TIGRR report and recommendations, BEIS has published a consultation on recommendations to the UK regulatory framework<sup>43</sup>. It repeats many of the sentiments outlined in the TIGRR report, including:

- “We have high ambitions to reform the ways in which we design, implement, and evaluate our regulatory interventions.”
- “we... know that poorly designed regulations, administrative systems and compliance mechanisms can lead to costs without... benefits.”
- “regulation should be based on outcomes rather than assessing mechanistic “tick-box” compliance with rules”
- “regulators could be encouraged to adopt more innovation-friendly initiatives in their sectors, such as regulatory sandboxes, and could adopt more agile approaches to regulating where permissible”. “Regulatory sandboxes encourage innovation by allowing innovators to trial new products, services or business models in a real-world environment under regulator supervision. This can accelerate the introduction of new and improved products, processes, and services to market.”

<sup>42</sup> Duncan Smith, Villers, Freeman, 2021. *Taskforce on Innovation, Growth and Regulatory Reform*. Available : [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/994125/FINAL\\_TIGRR\\_REPORT\\_\\_1\\_.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/994125/FINAL_TIGRR_REPORT__1_.pdf)

<sup>43</sup> BEIS, 2021. *Reforming the Framework for Better Regulation*. Available: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/1005119/reforming-the-framework-for-better-regulation.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005119/reforming-the-framework-for-better-regulation.pdf)

### 3.6 The current approach is not future-proof

The current approach to environmental regulation of water catchments runs the risk that the 25YEP will not be delivered and in particular it will constrain the role of the water sector to be a catalyst for efficient delivery. Efficiency is not the only objective when deciding on the form of regulation as there are other important objectives such as simplicity and keeping the cost of the regulation low.

Further evidence of the importance of using funds as efficiently as possible is the current finance gap in nature based solutions. The Green Finance Institute has found that there is a gap in England of between £21 billion and £53 billion between the required and committed spending to meet the delivery of nature based outcomes over the next 10 years.<sup>44</sup> At least £3 billion of this is attributable to the water sector.

Given the scale and the ambition of the 25YEP, and the current finance gap in funding for nature based solutions, the potential size of the inefficiency is large. Water companies are expected to spend £5 billion on delivering the WINEP in the 2020-2025 period alone, and across all sectors in England it is estimated that £13 billion is spent each year on improving catchments.<sup>45</sup> It is not unreasonable to expect that with a more efficient approach that catalyses private finance and sector contribution, the 25YEP could be delivered for billions of pounds less – which would ultimately result in lower bills for water customers – and with significantly greater environmental and social benefits than under the current approach. The next section describes how a more efficient and innovative approach to environmental regulation could be introduced in the water sector with relatively simple changes.

---

<sup>44</sup> Green Finance Institute, 2021. The Finance Gap for UK Nature. Available: [https://www.greenfinanceinstitute.co.uk/wp-content/uploads/2021/10/EMBARGOED-FINALNature-related-Finance-Gap\\_eftec-report\\_081021-002.pdf](https://www.greenfinanceinstitute.co.uk/wp-content/uploads/2021/10/EMBARGOED-FINALNature-related-Finance-Gap_eftec-report_081021-002.pdf)

<sup>45</sup> Indepen, 2016. Water works: what else can the water industry model deliver? Available: [http://independen.uk.com/wp-content/uploads/2017/07/water-works\\_what-else-can-the-water-industry-model-deliver\\_22-june2016.pdf](http://independen.uk.com/wp-content/uploads/2017/07/water-works_what-else-can-the-water-industry-model-deliver_22-june2016.pdf)

## 4 MOVING TOWARDS A MORE EFFICIENT SOLUTION BY ENABLING INNOVATION: WATER-FOCUSED OBER

### 4.1 Introduction

The previous section describes the inefficiencies of the current approach to environmental regulation, and highlights the need for change. This section discusses our proposal for outcome based environmental regulation (OBER) in the water sector. This is aligned with the current thinking from the WINEP taskforce, but the proposals go further and faster. OBER is also aligned with the key themes from the TIGRR report and BEIS' consultation on better regulation. If proven successful in the water sector, this approach could be extended further to other sectors, which is discussed in more detail in Section 5.

### 4.2 Water-focused OBER

Introducing OBER in the water sector will involve:

- Long-term outcome targets for the environmental improvements required by the 25YEP (such as phosphorus reduction in rivers, biodiversity improvements and carbon reduction) cascaded to a catchment level, and allocated on an equitable basis across industries with clear milestones.
- Water companies would no longer be obliged to carry out actions themselves, and could instead deliver the outcomes in partnership with others who are able to implement more efficient solutions. In practice, this could involve paying farmers and other land managers to deliver outcomes in rural areas (e.g. to develop wetlands and other nature-based solutions), and local authorities and developers in urban areas (e.g. to develop sustainable drainage solutions). It also opens opportunities for companies to work in partnership with communities.

Market-based mechanisms could be developed to help facilitate these partnerships and draw out the best value solutions. In the first instance, these mechanisms could range from a simple procurement-type model, to a more sophisticated reverse auction-type approach, and could eventually develop into markets for permits and credits. Regardless of the delivery mechanism, the key feature of OBER is outcome based targets that are delivered in partnership with others.

Introducing OBER in the water sector implies a radical shift away from the current approach to environmental regulation. Currently, the WINEP sets out around 11,000 detailed actions (or outputs) that water companies are obliged to deliver in order to improve the environment. These outputs are defined by the EA with the intention that delivering them will go on to achieve particular outcomes, such as improving river water quality. However, an outcome based approach does not prescribe the actions or outputs that need be delivered. Instead, it gives flexibility for companies to deliver the desired outcome without specifying precisely how to

achieve it. The figure below – produced by Ofwat – highlights the distinction between outcomes, outputs and inputs.

**Figure 14** Difference between outcomes, outputs and inputs

Measure	What it is	Examples
<b>Outcomes</b>	<ul style="list-style-type: none"> <li>Higher-level objectives than company actions, activities and achievements are intended to help deliver.</li> <li>Things that customers and society value.</li> <li>Delivered through outputs.</li> </ul>	<ul style="list-style-type: none"> <li>Reliability/availability/safety of supply.</li> <li>Customer satisfaction.</li> <li>Environmental sustainability.</li> <li>Fair, transparent and acceptable bills.</li> <li>Compliance with legislative requirements.</li> <li>Reducing carbon emissions.</li> </ul>
<b>Outputs</b>	<ul style="list-style-type: none"> <li>Observable and measurable activities, actions and achievements needed to deliver outcomes.</li> <li>May be high level or lower level.</li> <li>Should help to achieve outcomes.</li> </ul>	<ul style="list-style-type: none"> <li>Reductions in sewer flooding.</li> <li>Maintaining/restoring serviceability.</li> <li>Pesticide removal.</li> <li>Meter installation.</li> <li>New billing system.</li> <li>Compliance with discharge consents.</li> <li>Reducing service interruptions.</li> </ul>
<b>Inputs</b>	<ul style="list-style-type: none"> <li>Resources an organisation needs to deliver outputs.</li> <li>Includes money, people and products.</li> </ul>	<ul style="list-style-type: none"> <li>Money spent on reducing sewer flooding (opex/capex).</li> <li>Number of people employed on operating a water/sewage treatment works.</li> <li>Length of new pipe needed to comply with drinking water standards.</li> </ul>

Source: Ofwat, 2015. *Inputs, outputs and outcomes – what should price limits deliver?* Available : [https://www.ofwat.gov.uk/wp-content/uploads/2015/12/prs\\_inf1103ploutcomes.pdf](https://www.ofwat.gov.uk/wp-content/uploads/2015/12/prs_inf1103ploutcomes.pdf)

An outcome based approach is more likely to spur innovation and efficiency, as it gives companies more choice about how to meet the targets than an approach which specifies the inputs or outputs to be used. This would incentivise companies to find innovative ways to achieve a given outcome, which could potentially include engaging with other sectors that are able to achieve the outcomes more effectively.

Introducing OBER therefore involves replacing the thousands of rows of detailed actions in the WINEP with a smaller number of enforceable high-level outcome based targets that need to be achieved. These targets can be broader than the outcomes currently targeted in the WINEP and should be linked to the objectives of the 25YEP.

An overview of the main differences between the historical approach to the WINEP and water-focused OBER are set out below.

**Figure 15 WINEP versus water-focused OBER**

	Historical approach to the WINEP	Water-focused OBER
Targets	<ul style="list-style-type: none"> <li>Output focused: Companies obliged to deliver thousands of individual outputs designed by the EA.</li> </ul>	<ul style="list-style-type: none"> <li>Outcome focused: Companies receive targets at a catchment level</li> <li>Initially this could cover a small number of the most important outcomes that are controllable by water companies. More measures could be added over time.</li> <li>Companies have flexibility about how they deliver these targets</li> </ul>
Who delivers the work?	<ul style="list-style-type: none"> <li>The water company - even though other agents might be able to deliver better value solutions, in terms of lower cost and greater environmental and social benefits.</li> </ul>	<ul style="list-style-type: none"> <li>The water company can pay other sectors to carry out the work on its behalf. Markets could be used to help facilitate.</li> </ul>
Example	<ul style="list-style-type: none"> <li>The EA obliges a water company to invest in a carbon-intensive asset which improves river water quality whilst also emitting more carbon in the process.</li> </ul>	<ul style="list-style-type: none"> <li>In rural areas: The water company pays a farmer to develop a wetland.</li> <li>In urban areas: The water company pays a local authority or developer to invest in sustainable drainage.</li> <li>These solutions can help improve river water quality, reduce carbon, reduce flood risk, and boost biodiversity.</li> </ul>

### 4.3 How to move towards a more efficient solution quickly: water-focused OBER

If the water sector was subject to outcome based targets that could be delivered either by implementing solutions itself or by paying others to implement solutions, this would mean that the sector could effectively “reshuffle” the solutions in Figure 13 to ensure that the most efficient solutions are chosen first in each catchment. To ensure companies take a holistic and systems-based approach this would require outcome based targets for multiple environmental outcomes that include both positive and negative externalities.

This relatively small change in policy could achieve substantial efficiency gains and make significant progress to delivering the 25YEP. This would also give insights into the relative cost curves of other sectors which could inform the design and implementation of full-scale OBER covering many sectors (discussed in Section 5).

The water sector is well-placed to lead the way to essentially pioneer OBER as:

- Water companies are experts in their local areas.** They have local knowledge about their catchments and have strong relationships with local

stakeholders, including farmers, industry, NGOs, etc.. This expertise and relationships are crucial in implementing the new model for the first time, as water companies could engage with known stakeholders in specific locations to draw them into action. The recent Discussion Paper published by Water UK has also put forward a 2050 Vision that is focused on environmental stewardship and underlines water companies' ambition to be leaders in their local environment:



---

By 2050, we will be globally recognised as an environmental leader; stewarding the improvement of rivers and seas, acting on the climate emergency, and protecting customers' long-term interests.

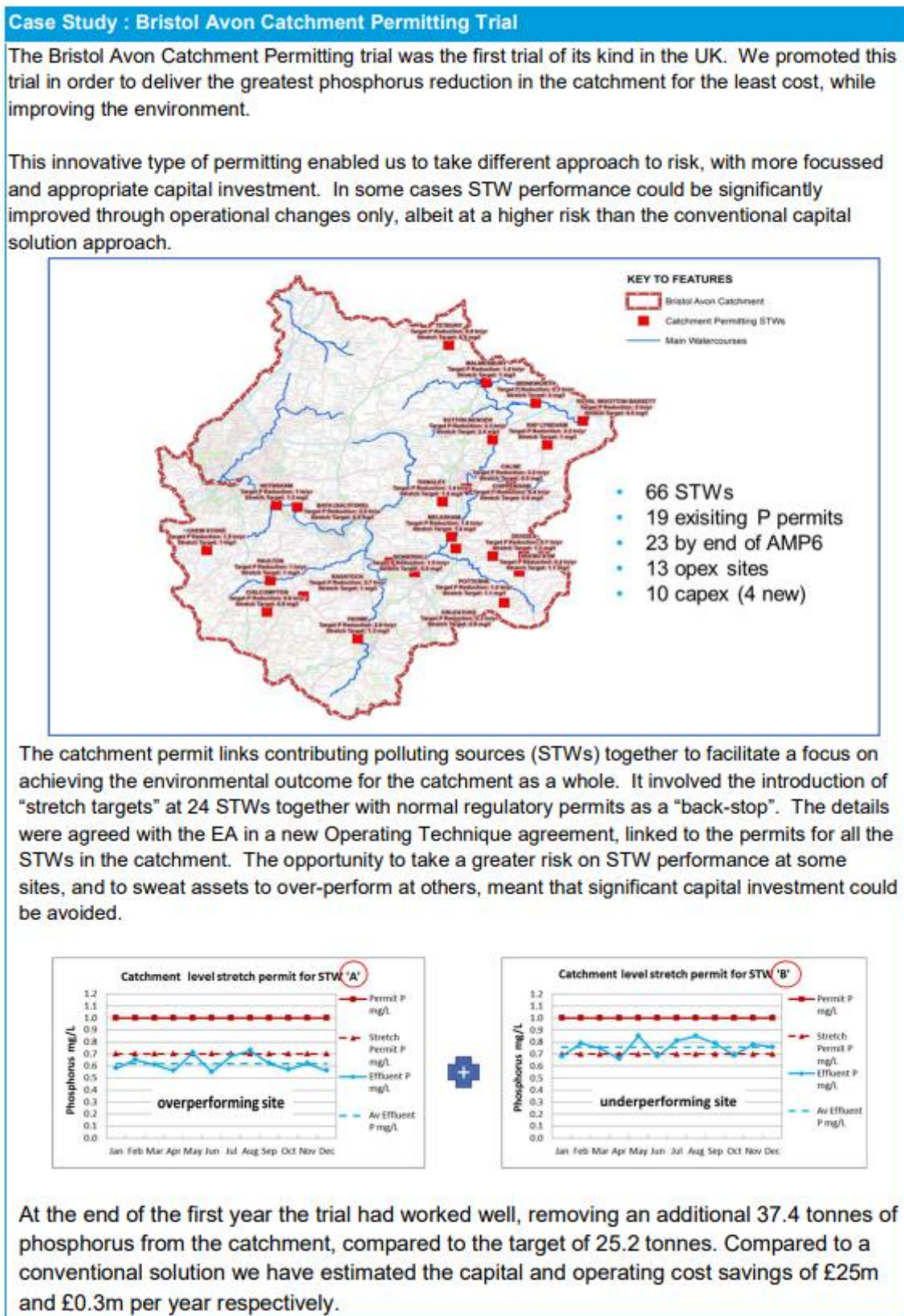
Water UK, March 2021: Developing a 2050 Vision for the Water Sector: A Discussion Paper

---

- **Funding is provided by efficient private investment.** The WINEP has historically been funded by water companies with the cost then recovered through the regulatory capital value (RCV) and therefore customer bills over time. Ofwat ensures that costs are efficiently incurred. This would be the same under the new approach, meaning that the efficient funding channels already exist. This avoids the need for new funding from government during a challenging time for the economy. This is also in line with the government's ambition to deliver the 25YEP through 'catalysing private investment'.
- **Water companies have some experience with environmental markets.** Some companies, including Wessex, already have experience of delivering improvements through markets. The case studies below highlight Wessex's experience in reducing pollutants through market-based approaches. This means that the sector already has experience in the process of creating a new marketplace, and the monitoring and accreditation processes.



Figure 16 Case study – Wessex’s Bristol Avon Catchment Permitting Trial



Source: Wessex Water Appendix 5.1.F – Alternative approaches to delivery of the WINEP

Note: STW = Sewage Treatment Works



**CASE STUDY - ENTRADE<sup>46</sup>**

EnTrade was established by Wessex Water in 2016 as a platform for buying and selling nature-based solutions. The genesis for EnTrade began in the Poole Harbour catchment, Dorset where, in 2015, Wessex Water successfully negotiated with the Environment Agency and Natural England to offset 40 tonnes of nitrogen from entering Poole Harbour by working with farmers rather than by building an asset at Dorchester sewage treatment works. By moving from asset to nature-based solutions, Wessex Water avoided a £9.7m Capex investment. By using a competitive bidding process to purchase measures such as cover crops and arable reversion from farmers through the EnTrade platform, Wessex Water delivered a further 38% saving in the Opex costs of the projects and administration.

EnTrade is now a fully established Wessex Water business that creates and operates online markets in nature-based solutions in multiple catchments. The platform uses a range of different market mechanisms and auction designs to establish prices for nature-based environmental services. To date, EnTrade has run a series of market events for public, private and voluntary sector buyers of nature-based solutions in catchments across England:

Value of trades since inception	
Number of trading events	35
Number of farmers registering on platform	1,500
Value of deals with farmers	£2.8 million
Value of investment in underpinning technology and science	£1 million

In 2020, EnTrade and Wessex Water ran the first multi-benefit auction in Poole Harbour in collaboration with the Environment Agency and Defra under its Environment Land Management Scheme test and trials programme, paying farmers for a wider range of benefits including water quality, biodiversity, carbon and flood prevention. This led to a wider range of interventions being possible including woodland, wetlands and arable reversion. By blending public and private funding and buying measures that delivered multiple environmental services, the auction achieved cost savings of 9%, 7% and 41% respectively for the carbon, nitrogen and natural flood management outcomes. The multiple benefits meant that individual buyers could buy environmental outcomes from measures that would not have otherwise been affordable. For example, nitrogen abatement from hedgerows was delivered at a cost of £0.57 per kg compared to the average price across the entire auction of £3.64 per kg.

<sup>46</sup> Entrade, 2021. *A new deal for the natural environment*. Available: <https://www.entrade.co.uk/>

## CASE STUDY – CATCHMENT MARKET DEMONSTRATION PROJECTS

Wessex Water is developing three Catchment Markets for nature-based solutions to water quality problems, using EnTrade as a market operator. The Catchment Markets will bring buyers and sellers of environmental services from nature-based solutions together to deliver integrated environmental outcomes on the ground. The market will reward cooperation between sectors by lowering the costs of the projects and, by properly accrediting and rewarding the multiple environmental benefits from positive land use change, create a new revenue stream for farmers and landowners. Defra’s green recovery project has enabled EnTrade and Wessex Water to work closely in partnership with the Environment Agency and Natural England in a regulatory “sandbox” to apply existing regulation more flexibly. The learning generated will inform regulatory change at PR24.

In the Bristol Avon catchment, Wessex Water is kickstarting the market in partnership with the Avon and Wiltshire Wildlife Trusts through the government’s Green Recovery Challenge Fund. In the Tone & Parrett catchment in Somerset EnTrade has worked with the Environment Agency and Natural England to develop the Somerset Catchment Market. Wessex Water will meet its Catchment Nutrient Balancing obligations through credits supplied by projects in the market. Following Natural England’s announcement of the unfavourable condition of the Somerset Levels and Moors Ramsar site, the market will also provide a mechanism for housing developers to meet their planning obligation for nutrient neutrality through credits supplied by the market. An independent panel of experts will advise on the evolution of this standard and a programme of monitoring and assurance to build scientific certainty in the performance of the nature-based solutions in delivering nutrient reduction and, as other standards are developed, the other environmental outcomes delivered by land use change.

The markets operate by accrediting the environmental services from nature-based projects, such as wetlands, woodlands and rewilding, in accordance with approved standards, and selling the resulting environmental credits to buyers to meet their regulated or voluntary obligations. Nutrient reduction is one of the environmental services that will be delivered by specific types of nature-based project, as well as carbon sequestration, biodiversity net gain and, longer term, natural flood management and amenity and recreation benefits.

This means that the water sector already has the key ingredients in place and the track record to help implement this new approach successfully. It could deliver large efficiency improvements and increase its contribution to the 25YEP without delay. This would not necessarily require primary legislation. Also, the water sector is highly regulated, and is subject to backstop environmental legislation, meaning it would still be held to account even with a more flexible approach.

### 4.4 How would water-focused OBER work in practice?

Introducing OBER in the water sector involves the steps discussed below.

## Step 1: Develop outcome-based measures

First, the measures that should be included in the approach for the water sector would need to be defined. It is important that these are outcome-based and do not require specific outputs. A good quality measure should be:

- **Outcome focused:** Measures should be as closely related to the outcomes as possible.
- **Measurable and verifiable:** It should be possible to objectively measure / audit performance.
- **Traceable:** It should be clear what and whose actions have delivered a given outcome.
- **Understandable:** Measures should be easy for stakeholders to understand.
- **Controllable:** Measures should be on parameters that are at least partly controllable by those covered by the approach.

In principle, measures should be comprehensive and fully cover all environmental outcomes, leaving no gaps. This could result in a long list of measures. For example, in the Water Framework Directive, there are 83 parameters that underpin the definition of ‘good ecological status’ – albeit some parameters can be considered more important than others.

A key benefit of water-focused OBER is that it is flexible. Initially, water-focused OBER could include a relatively small number of measures that have the biggest impact. The measures would collectively need to cover all aspects of the environment to a reasonable extent to ensure that companies take a more systems-based approach in their planning and consider all key externalities. In the first instance, this could include the following measures which can be considered the most important and relevant environmental outcomes covering water catchments that are controllable by water companies:

- River water quality<sup>47</sup>, including:
  - phosphorus
  - nitrates;
- Water abstraction;
- Net carbon; and
- Biodiversity.

New measures could then be added over time. This is to keep the initial approach simple but also to make sure that there are a number of other enterprises in each catchment that water companies can engage with.

---

<sup>47</sup> Ideally, targets would be set at an outcome level. However, in practice, river water quality is a made up of a number of components, many of which are not fully controllable by water companies. While reducing phosphorus and nitrate levels are not strictly outcomes in their own right – they are closer to outputs – they are essential to achieving good river water quality, and they are also controllable by water companies. In other words, water companies are able to control phosphorus and nitrate levels, and reducing these levels will certainly improve river water quality. In this respect, the relationships between phosphorus and river water quality, and nitrates and river water quality are similar to the relationship between carbon and air quality.

These measures would need to be developed in any policy approach – and work is already underway on this step as part of implementing the Environment Act 2021 – but for water-focused OBER it is important that they are substantially more outcome-based than the current WINEP approach. In theory, Natural Capital could provide a measure of the environment. However, this is not likely to be a practical approach in the short-run as explained further below.

## THE ROLE OF NATURAL CAPITAL

In principle, all aspects of the environment could be boiled down into one single 'natural capital' value, which effectively places an economic value on the status of the environment as a whole based on the benefits that it brings to society. Companies could then be incentivised to increase natural capital as a whole, avoiding the need for individual targets for potentially tens of different environmental measures. However, this is a relatively new concept and valuations have not yet been fully developed, meaning it is not currently ready to be used for this purpose. It would also imply that all natural capital benefits are fully interchangeable which is not supported by environmental science and which would risk companies delivering improvements in those aspects of natural capital that can be achieved at low cost while not delivering high cost improvements. This could create a serious imbalance in the metrics that are improved and without further specific targets could mean that the overall policy goals in the 25YEP are not achieved. Natural Capital Valuation will likely have an important role in future, but at this stage it will not solve the problems that have been identified.

### Step 2: Set targets

For each of these measures, long-term targets and interim milestones would need to be set. This will promote certainty over what needs to be achieved and by when. In line with polluter pays principles, this could be set by taking the national target (which would need to be developed in any case as a result of the Environment Act 2021) and apportioning it to the water sector based on its 'fair share' – e.g., for pollution type measures this could be based on the sector's share of current pollution. The target for the water sector would then need to be allocated to individual water companies. There is a question as to whether these targets should be set at the national level, or a regional or catchment level. Under a national level approach, water companies could effectively meet their targets by paying for improvements in regions outside of their company area, whereas with catchment or regional targets, they would have to be delivered within a narrower and more defined geographic scope within their own company area. There are pros and cons with each option:

**Figure 17 National targets versus regional / catchment targets**

	National targets	Regional / catchment targets
Overall cost	Lower as companies could improve the least costly catchments first	Higher as companies would have to improve all catchments to a minimum level
Regional impact	Greater regional differences as some regions may be systematically more costly to improve and become overlooked	No regional differences as all regions would have the same requirements.
Customers benefits	Customers could be funding improvements in other regions, giving little to no direct benefit to them	Customers would be funding improvements in their own region, giving more benefits to them
Biodiversity	Adopting a national approach may incentivise companies to implement the least costly solutions and potentially overlook some important sites of scientific and biodiversity interest – e.g. chalk streams could potentially be overlooked	Catchment level targets would ensure that all catchments are improved, including those of scientific interest
In a market based approach: Thickness of markets	A national market for permits and credits (discussed in more detail below) would pool all buyers and sellers into one single market, giving greater confidence in the efficiency of the market outcomes	Having a larger number of smaller markets would result in fewer buyers and sellers in each market, giving less confidence about the efficiency of the market outcomes

From an economic efficiency point of view there would be clear benefits from taking a national approach. However, from a fairness and customer bills perspective, it would seem unreasonable for water customers to be funding improvements outside of their region. Setting targets at a catchment level would go one step further and ensure that all catchments, urban and rural, are improved. Also, from an environmental point of view, it is clear that catchment-based targets are needed (at least in the short-run). This is because:

- The environment is characterised by virtuous and vicious cycles and tipping points. If a particular catchment is overlooked it could deteriorate beyond a tipping point, meaning that reversing the deterioration in future could be significantly more costly, and some of the deterioration could be irreversible. Taking a more local approach also ensures that all catchments are improved, including sites of particular scientific interest – such as chalk streams.
- Many of the benefits are gained at a more local level. Knowledge of the complexities of ecosystems tends to be held locally. Catchment-level targets would help to make water companies more accountable to local stakeholders. This is particularly important in the context of many local actions being taken that are difficult to monitor continuously.
- The WINEP has also historically taken a more regional- and catchment-based approach so a catchment-level approach would require less of a mindset change.

We would therefore recommend a catchment-based approach to setting targets in the first instance, but we could retain an aspiration to move to a national based approach at a later stage.

Ideally, targets and milestones would remain fixed for the long-term in order to promote certainty. However, in principle, targets could be adjusted over time. For instance, if it becomes significantly less costly to deliver certain improvements than previously anticipated then the pace of change could be increased to bring forward the benefits – albeit this could have implications for the economic regulation of the sector. (Section 6 discusses how economic regulation in the water sector would need to adapt in order to incorporate OBER.)

### Step 3: Enable water companies to deliver the most efficient solutions across all externalities

Rather than obliging the water sector to meet the targets by carrying out specific improvements itself, companies should be encouraged to deliver the work in partnership with others and the solutions need to take account of all externalities.

In principle, this could take different forms, including encouraging water companies to develop and use market-based mechanisms to find the most efficient ways of delivering against all of the targets. As water companies bear the burden of demonstrating that the targets have been achieved, they will need to set up appropriate monitoring.

Over time, the following actions would ensure that we can realise the maximum efficiency gains:

- **Encourage and facilitate water companies to establish local systems for trading permits and credits:** This would likely need support from Ofwat and others such as the EA and Natural England to give confidence to potential market participants of the legitimacy of the approach and that the water company can be held to account for its actions.
- **A national authority (such as the EA) could set up a system for credits and permits for the externalities included:** This approach could then be opened up to other sectors, as part of full-scale OBER that covers many sectors. This is discussed in more detail in the next section. While this option would deliver the highest efficiency gains, it could take more time to set up.

### Step 4: Funding and penalties

By imposing targets on water companies, the cost of achieving the targets would be funded through private investments and ultimately via water customer bills. This is in line with polluter pays principles as water companies would be delivering their fair share of environmental improvements. While the total cost would be recovered through customer bills, a better approach to affordability would help ensure that the bill impacts for the poorest in society would be manageable.<sup>48</sup>

---

<sup>48</sup> The 2021 Independent Review of Water Affordability report developed 10 recommendations to improve affordability of water bills and reduce water poverty. Examples of recommendations include: introducing a single social tariff and providing tailored bills and services to meet customers individual needs.



Also, if the government continues to allocate obligations to other parties (e.g. through BNG and ELM) then there will be opportunities for joint funding of multi-benefit schemes that could reduce the costs borne by water customers.

Companies would also be penalised if they do not meet their targets. The size of the penalty per unit of underperformance should be a significant multiplier of the cost per unit of performance to ensure that enterprises have a strong incentive to meet the targets. Also, the water sector is highly regulated, and is subject to backstop environmental legislation, meaning it would still be held to account even with a more flexible approach.

## 4.5 OBER needs to be based on a strong, trusted monitoring framework

For any form of outcome-based regulation to work, effective measurement and monitoring of outcomes is needed. The system needs to be trusted so that participants can be held to account when failing to deliver the outcomes. Outcome-based regulation in any context increases the level of risk that both the regulator and the companies are willing to take. In the past, actions that are directed at point source pollution can be delivered and monitored with a relatively high degree of certainty. Nature-based solutions and other innovative ways of delivering greater environmental improvements at lower costs involve some degree of uncertainty as there is less of a track record and the ultimate outcome is influenced by external factors. Additional risk is introduced as water companies work in partnership with others. A strong, trusted monitoring framework is therefore needed to make OBER a success. This could be achieved in a number of ways:

- An approach is needed, underpinned by the latest environmental science, which estimates the expected outcome of particular actions (in terms of the number of permits and credits generated) so that all participants can have confidence in their actions delivering outcomes. This is similar to the requirements in the government's ELM and BNG schemes. Over time, technology and environmental science are expected to allow us to move towards monitoring of outcomes without the need to monitor individual actions.
- In the first instance, water-focused OBER could include targets for a small number of the most important environmental outcomes. This means that the monitoring could focus on a smaller number of outcomes initially so that lessons could be learned and applied more widely at a later stage.
- Focusing on monitoring agreed actions rather than outcomes in the first instance may be a pragmatic way forward. In the early days, a mixed approach that keeps track of actions and outcomes could be applied to build trust.
- Effective backstops are already in place (e.g. fines by the EA) to ensure that there are consequences for under-delivery. These will provide additional incentives to deliver outcomes in line with OBER.

---

CCW, 2021. *Independent Review of Water Affordability*. Available: <https://www.ccwater.org.uk/wp-content/uploads/2021/05/Independent-review-of-water-affordability.pdf>



The importance of a strong, trusted monitoring framework cannot be overstated and it will require some effort to establish. But the points above show that the risks around the monitoring framework can be managed.

## 4.6 What are the benefits of water-focused OBER?

Water-focused OBER would deliver substantial efficiency gains with relatively small policy changes and no additional cost to the government. The overall benefits include:

- **Greater environmental improvements for lower private and social costs** – taking into account the full scope of private and social costs and benefits, water-focused OBER can ensure that the most efficient solutions are delivered first. Ultimately, the cost incurred by water companies to deliver environmental improvements is funded by customers through bills, meaning any cost savings would result in lower bills for consumers, or relatively higher or faster environmental improvement for the same cost.
- **Innovative systems-based approach to delivery** – as water-focused OBER would include all of the environmental externalities that have a big impact, it would lead to a system-based approach to identifying solutions. This would boost the attractiveness of innovative nature-based solutions and sustainable drainage based solutions, and reduce the attractiveness of carbon-intensive built solutions. This is a big step towards more efficient delivery of the 25YEP.

**Figure 18 Water-focused OBER would boost the attractiveness of nature-based solutions**



Asset Based Solutions → Catchment Solutions → Nature-Based Solutions

Source: Wessex Water and Water UK

- **Cross-sector working without having to create specific policies for each sector** – water companies would work with all sectors in the catchment to identify the most efficient solutions. But the government would not have to design a specific policy for each sector. It only has to change the approach to environmental regulation in water.

- **Easy to implement** – as this approach requires changes to environmental regulation in one sector only, it is relatively easy to implement but could go a long way to speed up the delivery of the 25YEP.
- **Facilitates private investment** – Water-focused OBER would deliver improvements without the need for public funding.
- **Promotes wellbeing benefits and distributional impact** – The EA’s ‘state of the environment’ report highlights that there is substantial and growing evidence for the physical and mental health benefits of spending time in the natural environment.<sup>49</sup> Exposure to pollution, and access to the natural environment are not equally distributed across society – people living in deprived areas often have poorer quality environments with less accessible green space, which contributes to differing disease burdens and life expectancy. Water-focused OBER, with targets at the catchment level, will help transform some communities by improving their access to the natural environment. And for communities which continue to be out of easy reach of the natural environment, an approach is needed which can achieve targets in an efficient way without causing significant bill impacts for communities that struggle to enjoy the benefits first-hand.
- **Greater role for community partnerships** – historically, there was limited scope for communities to input into the design and delivery of the WINEP. However, through OBER, companies would have greater flexibility in how they deliver improvements. This opens up opportunities for partnerships with local community groups. The scope of these partnerships could range from identifying the improvements that are needed, the best way to deliver these to co-delivery and co-funding. Harnessing the local expertise of communities could lead to significant co-benefits. Community partnerships can help define the scope of local outcomes, allowing amenity benefits to be realised alongside environmental benefits and ensuring value will be delivered across urban, rural and coastal communities. This will help to level up communities that may have been relatively excluded from the benefits of environmental investment in the past. This would also help to make water companies more accountable to communities.
- **Flexible approach** - this approach can inform policy beyond water sector (full scale OBER) – as discussed above, water-focused OBER could initially include a relatively small number of outcome-based targets. More measures and targets could then be added over time, meaning that the approach is future proof and can be adapted over time. Water-focused OBER would deliver important insights that can inform the policy design of full-scale OBER – discussed in the next section. For example, this would include insights on the ability of different sectors to deliver improvements, market data, practical lessons on monitoring and the pace of change that can be achieved.

Overall, water-focused OBER would enable the water sector to make a significant contribution to delivering the 25YEP in an efficient and timely way.

---

<sup>49</sup> Environment Agency, 2021. *State of the environment: health, people and the environment*. Available: <https://www.gov.uk/government/publications/state-of-the-environment/state-of-the-environment-health-people-and-the-environment>

## 4.7 High-level impact assessment: Water-focused OBER

Estimating the potential cost savings of water-focused OBER is challenging, as it is difficult to observe the cost curves of other sectors to deliver environmental improvements. However, the case study at Poole Harbour – where Wessex was able to demonstrate cost savings of 71% whilst also delivering biodiversity benefits instead of carbon emissions – suggests that the impacts could be significant.

Another example is Wessex's experience in reducing phosphorous levels in the Dorset Stour and Parrett catchments. Through the WINEP covering the period 2020-2025, Wessex was originally obliged to carry out a particular set of actions prescribed by the EA. However, Wessex was able to demonstrate that it could achieve the same outcome in a more efficient way. At a high-level, this involved reducing phosphorous levels by a lower amount per site than that under the EA's approach, but at a greater number of sites. It highlighted that its approach would result in cost savings of £54 million (c. 20%) over the period 2020-2025 compared to the EA's approach, and extra benefits of around £35 million (c. 10%). This is highlighted below:

**Figure 19 A more outcomes-based approach resulted in cost savings of £54 million and extra benefits worth £35 million**

Catchment	NPV of costs £m	NPV of benefits £m	Net benefits £m	Benefit/cost ratio
Dorset Stour	166	214	47	1.3
Parrett	102	141	39	1.4
Total	268	355	86	1.3
Alternative approach - indicative	~ 214	~ 390	176	1.8

Source: Appendix 5.1.F – Alternative approaches to delivery of the WINEP

The EA accepted Wessex's analysis and agreed to let Wessex deliver its alternative approach instead. This highlights that a prescriptive output-based approach is prone to information asymmetry because the EA does not have complete information to determine the most efficient set of actions for water companies to carry out. However, it is worth noting that Wessex's proposed approach still involved Wessex carrying out the improvements itself. Further cost savings and greater benefits could have been possible if it were able to deliver the improvements in partnership with others, as per the Poole Harbour case study. Therefore, the figures above really only capture the impact of partially moving away from a prescriptive approach and not the full benefits of water-focused OBER.

To give a high-level sense of scale of the potential cost savings and co-benefits from water-focused OBER, the figures above can be scaled up to England as a whole. Wessex's area of operation accounts for around 8% of the size of England. Scaling up these figures – which assumes that other companies would be able to achieve similar cost savings and greater benefits through an improved approach to the WINEP – would imply:

- a total cost saving for England of around £700 million for the period 2020-25, equal to around £6 per household per annum. Assuming the same cost saving

per annum, this equates to cumulative cost savings of £4.2 billion out to 2050, or **£2.7 billion** in net present value (NPV) terms.

- extra benefits of **£1.7 billion** in NPV terms.

Again, it is important to stress that this is only a partial estimate of the potential impact as it does not capture further cost savings and benefits that could be achieved through delivering in partnership with others.

Also, while the WINEP for 2020-2025 amounts to around £5 billion in total, outside of the WINEP water companies also spend significant amounts of money on their day-to-day operations that also impact on the environment. Water-focused OBER would incentivise water companies to assess their spending across their entire business, and not just on the WINEP, which means the cost savings could be even more significant.

## 4.8 Options for moving towards OBER in AMP8

As highlighted above, one of the key benefits of OBER is that it allows for flexibility. Water-focused OBER could initially include a relatively small number of outcome-based targets, with more measures and targets gradually added over time. Also, water-focused OBER does not necessarily need to be rolled out to all water companies in England at the same time. Instead, it could initially be trialled with a small number of companies. This gives a further opportunity to start off small before expanding the scope further. This approach:

- **Allows for greater scrutiny:** If water-focused OBER is piloted initially by a subset of the water companies in England, it would be easier for regulators to concentrate resources on monitoring how the approach progresses. This would then give valuable insights on how it then might be rolled out more efficiently to other companies, and also allow for any implementation issues to arise and be managed on a smaller scale.
- **Presents a controlled experiment:** There would be an opportunity to compare how environmental outcomes and unit costs change in the company areas where water-focused OBER has been introduced with those where it has not. This would help reveal information on the scale of the potential cost savings and benefits.

This approach is also in line with the recommendations set out in the TIGRR report and those being consulted on in BEIS' consultation on Reforming the Framework for Better Regulation, which notes that "regulatory sandboxes encourage innovation by allowing innovators to trial new products, services or business models in a real-world environment under regulator supervision. This can accelerate the introduction of new and improved products, processes, and services to market."

Water-focused OBER could be piloted during AMP8 (2025-30) to help align it with the regulatory cycle. Progress would need to be made relatively quickly ahead of PR24. It would be less risky to trial it with companies with a strong track record of environmental compliance and transparency, delivering outcomes in partnerships, and efficient procurement, and various conditions could be attached to give greater confidence. During the trial period, companies would also be subject to

prosecutionary powers and the threat of penalties which could be calibrated to ensure that companies would be exposed to the same financial downside as under the status quo. However, the roadblocks to a wider roll-out appear to be small and can be overcome. Therefore, water-focused OBER for the whole sector should be considered.



## 5 OBER CAN BE APPLIED MORE WIDELY ACROSS THE UK ECONOMY

### 5.1 Introduction

In making the case for OBER in the water sector there is obvious potential for this approach to be used much more widely across the UK economy in support of the 25YEP. The complexities of delivering this approach at a wider economy level increase substantially, but so will the potential rewards.

### 5.2 OBER can be extended beyond the water sector

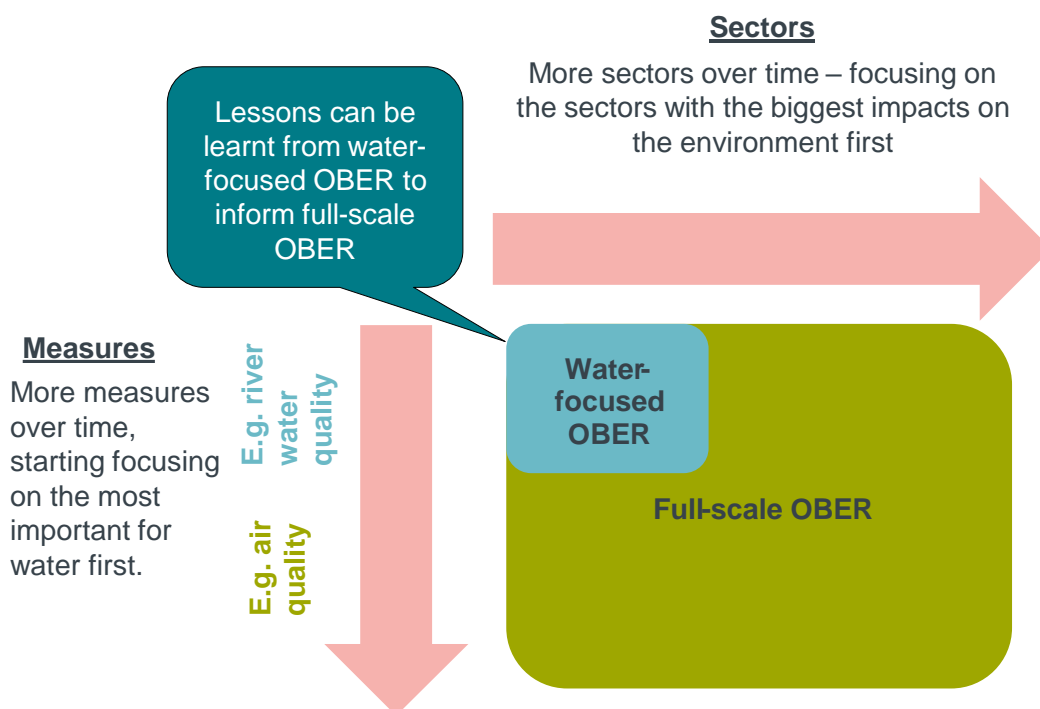
In making the case for OBER in the water sector there is obvious potential for this approach to be used much more widely across the UK economy in support of the 25YEP. This would also give an opportunity to bring together all of the current disparate approaches to environmental regulation, including ELM and BNG, as well as UK ETS, resulting in a holistic approach to environmental regulation.

Full-scale OBER does not need to be rolled out to all sectors in England in one go. Lessons can first be learnt from water-focused OBER, including:

- **Partnerships:** Water-focused OBER would see water companies delivering outcomes in partnership with other sectors. This experience would help to shed more light on which sectors are particularly well-placed to deliver certain types of improvements.
- **Costs:** There would be greater information available on the costs for different sectors to carry out certain types of improvements, and costs per unit of improvement for different outcomes.
- **Benefits:** Water-focused OBER would help draw out innovative new approaches to particular issues, including nature-based solutions which may deliver many different types of co-benefits. This experience would help to improve understanding on what types of solutions and co-benefits are achievable. A particularly innovative approach in one catchment could potentially be rolled out in other catchments too.
- **Markets:** Through water-focused OBER, water companies could deliver improvements through markets, using different types of market-based mechanisms, ranging from a simple procurement-type model to more sophisticated reverse auction type approaches. The most successful models could be scaled up to include other sectors.

In the first instance, full-scale OBER would cover a smaller number of the most important environmental outcomes and focused on a smaller number of sectors that have the biggest on the environment (e.g., water, energy, agriculture, large manufacturers), and it could then be extended over time, with more measures and more sectors gradually being covered to help manage risks. This is summarised below.

**Figure 20** The scope of full-scale OBER can be gradually increased over time



The approach would involve many of the steps discussed in the previous section on water-focused OBER:

- **Measures that cover many (and eventually all) aspects of the environment:** This involves taking the ambition of the 25YEP and converting it into a clear list of well-considered measures, which collectively cover many aspects of the environment: air, land and water. As noted, work on this step has already commenced as part of implementing the Environment Act 2021 and is needed under any new approach.
- **Set long term targets:** For each of these measures, the government needs to set a long-term target and agreed milestones for England as a whole. This will promote certainty over what needs to be achieved and by when. There is a further question around whether targets need to be set at a regional or catchment level, or whether national levels are sufficient. Given that water-focused OBER would involve targets at the catchment level, and see markets created at the catchment level, full-scale OBER could also function at the level of individual catchments. These targets would then need to be allocated to responsible parties based on their 'fair share' – e.g. current share of pollution. This is discussed in more detail below.

As noted above for water-focused OBER, ideally targets and milestones would remain fixed for the long-term in order to promote certainty. However, in principle, targets could be adjusted over time. For instance, if it becomes significantly less costly to deliver certain improvements than previously



anticipated then the pace of change could be increased to bring forward the benefits. Any changes to targets should be communicated well in advance.

- **Cover all sectors:** Because the targets would be set for England as a whole, they would in effect cover all sectors and be aligned with the polluter pays principle, which is one of the key principles set out in the Environment Act 2021.

This approach could appear to create winners and losers. Sectors that are responsible for a large share of pollution would become responsible for delivering a large share of the targeted improvement – which could imply a large increase in cost for those sectors. On the one hand, this is aligned with polluter pays principles, and would incentivise companies to internalise negative externalities. However, depending on the scale of the challenge, this could potentially conflict with other policy objectives (e.g. farmers being required to reduce certain types of pollution could potentially conflict with food security). If some sectors do appear to be particularly impacted, there could be scope for government to intervene and provide support to those sectors.

- **Delivery through markets:** Through water-focused OBER, water companies will create local markets for many environmental outcomes. Full-scale OBER could take advantage of these markets and effectively allow new sectors to participate in buying work. This could be formalised through markets for permits and credits – discussed in more detail below. This should bring together all fragmented markets into one place.

More details on establishing markets for tradeable permits and credits is set out below.

### 5.3 Introducing a system of tradeable permits and credits

Once targets are set for all catchments in England, for each of the measures, full-scale OBER would include the creation of tradeable permits and credits, at a catchment or national level. By first introducing water-focused OBER, water companies will have already laid down the foundations to creating new markets, with valuable insights on the market prices to deliver certain environmental outcomes.

A system of tradeable permits would be used to reduce negative externalities such as river water pollution, while a system of tradeable credits would be used to increase positive externalities such as biodiversity.

To generate confidence in the market and to encourage participation there needs to be a public authority that has full ownership of this system, and which owns and develops the codes that oversees the functioning of the credits and permits (including trades). The authority would also be responsible for monitoring, compliance, and enforcement. This could be a new function for an existing public body or a separate entity.

### 5.3.1 Reducing negative externalities – tradeable permits

For reducing negative outcomes, full-scale OBER would be based on a system of **tradeable permits**. As highlighted in the Dasgupta Review, there are a number of tradeable permits schemes in place today, ranging from hunting and fishing to waste disposal and pollution.<sup>50</sup> The Emissions Trading Systems (ETS) in the UK and the EU are high profile examples of the ‘cap and trade’ model of tradeable permits.

A system of tradeable permits would help facilitate the delivery of these targets in the most efficient way. There would be separate permits for each of the negative externalities included in full-scale OBER.

The model works as follows:

- **Allocate permits:** The target each year would be divided into a quota of tradeable permits that allow the permitholder to emit a unit of pollution. Different approaches to allocating permits are described below.

---

<sup>50</sup> Dasgupta, 2021, *The Economics of Biodiversity*. Available: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/962785/The\\_Economics\\_of\\_Biodiversity\\_The\\_Dasgupta\\_Review\\_Full\\_Report.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/962785/The_Economics_of_Biodiversity_The_Dasgupta_Review_Full_Report.pdf)

## APPROACH TO ALLOCATING PERMITS

The initial allocation of permits could take various forms, including charging for initial permits, auctioning or grandfathering permits (i.e. giving all sectors permits in line with their historical emissions). There are various pros and cons for each of these approaches. Any approach that involves a charge for permits covering initial activities has the potential to reduce negative externalities with immediate effect (e.g., enterprises may determine that the cost of buying the permits is greater than the abatement costs) but could also simply lead to higher costs (e.g., if enterprises' abatement costs are higher than the cost of the permit).

As highlighted in the Dasgupta Review, “if the permits are distributed free of charge, the rents are enjoyed by the polluters themselves; if the permits are sold by the authority, the revenue is enjoyed by the authority. Other than that distributional difference, the schemes are the same”.

When EU ETS was first introduced, allowances were allocated to companies for free and proportionate to their historical emissions. The rationale was that obliging companies to buy permits – a brand new cost item – would put them at a cost disadvantage if they competed internationally with companies not covered by the scheme, at least for a period of time after purchasing the permits.<sup>51</sup> However, over time, the EU ETS began reducing the share of permits allocated to companies for free.

On balance, grandfathering of permits with initial allocations and then reducing relatively rapidly appears to be a sensible way forward as it is administratively simple, keeps transaction costs low and does not increase production costs. As this approach can lead to unintended consequences such as increasing pollution just before the permit allocation, it would have to be administered carefully (e.g., basing initial allocation on a longer-term average). Grandfathering initial permits could still involve the authority charging for the administrative cost of the permit to recover its costs. This would be consistent with the approach currently used by the EA to charge for consents to discharge and licences to abstract water.

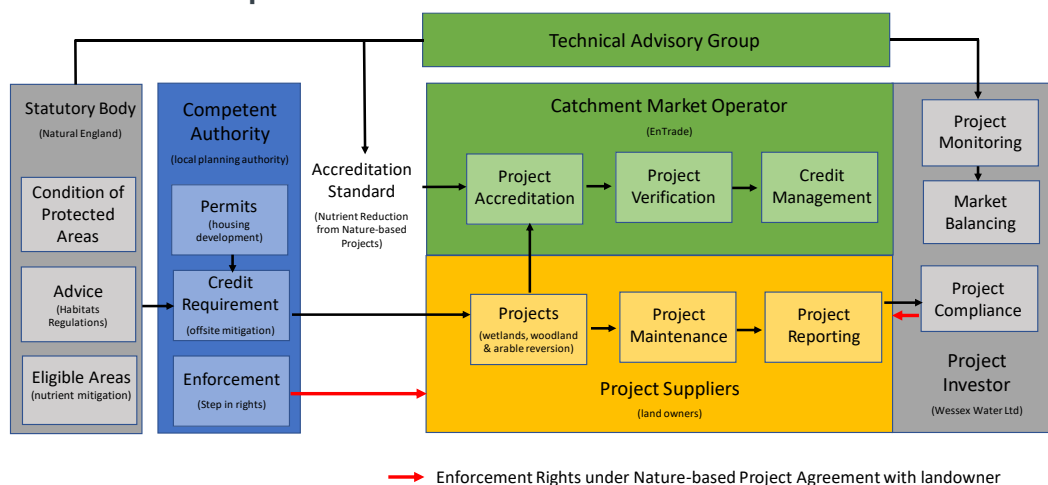
- **Measuring and monitoring pollution:** A process needs to be introduced which can measure the total pollution for each company in each year. For example, for airlines covered by ETS, a formula is used which takes into account the amount of fuel used. Enterprises could be required to self-report their own levels, with the authority responsible for overseeing the process. While this is not straightforward given the scope of full-scale OBER, proxies could initially be developed for the level of environmental benefit / improvement that certain actions deliver. However, technological progress will likely make this process easier over time as more innovative ways of monitoring (e.g., drones collecting data) can be adopted.
- **Using permits:** At the end of each year, each company is required to hand over to the authority enough permits to cover its verified levels of pollution.

<sup>51</sup> EC, 2021, *Free Allocation*, Available: [https://ec.europa.eu/clima/policies/ets/allowances\\_en](https://ec.europa.eu/clima/policies/ets/allowances_en)

- **Buying / selling spare permits:** The tradeable nature of the permits is a key principle of the cap-and-trade model. It gives an incentive to all enterprises to seek to reduce their own levels of pollution and then sell their spare permits to those that are struggling to reduce their negative externalities or to buy additional permits where abatement costs are high. This would facilitate innovation and entry in the market for permits.
- **Whole-life costs:** Environmental improvements could be delivered in different ways, for instance through capex-based solutions which require one upfront investment, or through opex-based solutions which may require investment in a number of years. To incentivise companies to deliver these solutions, the revenue generated from selling permits would effectively need to cover the whole-life cost of delivering the improvements, including financing costs to compensate for cashflow issues. Market forces would deliver this outcome organically (as long as they have certainty and confidence in the scheme). In practice, there would need to be some monitoring to ensure that once improvements have been delivered those solutions remain in place.
- **Penalties:** Enterprises would be penalised if they do not hand over enough permits to cover their levels of pollution. The size of the penalty should be a significant multiplier of the market price of a permit to ensure that enterprises have a strong incentive to buy permits.
- **The cap falls over time:** The cap decreases over time which increases pressure on enterprises to reduce their pollution. The increasing scarcity of permits increases their value, other things being equal, meaning that more and more enterprises will be incentivised to reduce their own pollution and sell their spare permits to others struggling to meet the cap. Over time, the cap would be reduced and reach the final target.

The diagram below provides an overview of a catchment market monitoring and verification process for nutrient mitigation. In principle, there would need to be a similar process for each of the environmental outcomes included in the system. However, as noted, the number of measures included in the system could be gradually increased over time, avoiding the need to jump straight to an approach which covers all environmental outcomes.

**Figure 21 Catchment Market Project: Accreditation, Verification, Monitoring and Enforcement Process - nutrient mitigation example**



Source: Wessex Water

The outcome of tradeable permits is that improvements would be made at the most efficient cost. Another outcome of the cap-and-trade model is that the authority responsible for the model is not required to set the price of permits. This is determined by market forces. This helps to overcome information asymmetry, as alternative approaches such as “public money for public goods” need to estimate an appropriate price which should in theory be linked to the demand of the goods and services that produce the emissions, the supply of permits, and abatement costs. Also, there would already be a growing source of data on market prices through water-focused OBER.

The system of tradeable permits is relatively flexible and can be adapted to meet other policy objectives. For example, if the government wants to ensure that the costs of production in particular sectors do not rise to the point where they become unviable, they could provide specific subsidies. While these would have to be designed carefully to not distort the market, they can be targeted at specific sectors.

### 5.3.2 Increasing positive externalities – tradeable credits

To incentivise positive externalities, two key approaches need to be considered:

- If externalities such as biodiversity are viewed as negative externalities as a result of past or potential future actions, a system of tradeable credits that enterprises have to generate can be used to ensure that the biodiversity decline is reversed.
- Alternatively, externalities such as biodiversity are viewed as positive impacts of addressing other negative externalities (such as river pollution), the government could put an explicit value on the social benefit by paying a price for delivering positive externalities.

Emerging government policies provide examples of both approaches. As discussed earlier, ELM will be paying a price to farmers and land managers to

deliver improvements while BNG will oblige developers to demonstrate a 10% increase in biodiversity on or near the new site.

To incentivise positive externalities, such as biodiversity, full-scale OBER includes a system of tradeable credits. The approach is broadly similar to the permit system discussed in 5.2.1, with the key difference that instead of reducing the availability of permits over time, this is reliant upon the government creating demand for credits. This means the government will need to require private companies to hold a specified number of credits. The governing authority would need to adopt an approach to measure biodiversity, which could build upon metrics. While this is not straightforward full-scale OBER can build on water-focused OBER and technological progress can help create meaningful and verifiable metrics over time. The government would then require enterprises to hold increasing amounts of credits over time. This approach has a number of benefits over the direct purchase of positive externalities:

- Improvements are funded by the private sector and the onus is on the private sector to demonstrate that it has met targets – the scale of the improvement is therefore not limited by availability of government funding.
- The government does not have to set a price for each externality – while there are various methods available for valuing social goods, establishing an efficient price is not straightforward. A price that is too high or too low would risk incentivising too little or too much improvement.

Full-scale OBER therefore is based on a system of tradeable credits. However, this is compatible with support for specific sectors where other policy goals have priority. For example, ELM could work alongside full-scale OBER if it was focused on the agricultural sector and designed carefully so the full-scale OBER market price is not affected.

Tradeable credits for positive externalities such as biodiversity would mean that the first step would involve apportioning the targets. Two key questions arise:

- First, similar to the tradeable permits, the **geographic market definition** matters as a national approach would create a more flexible market but runs of the risk of improving outcomes such as biodiversity in an uneven way. This may be less of a problem when looked at in a 25-year timeframe if there is confidence that the overall targets will be achieved, but in the first instance a more local approach may be preferable to align with where the expertise and understanding of local ecosystems is held and to build confidence in the approach. Furthermore, the economic characteristics of water catchments (detailed in Section 2), mean that they are more responsive to localised interventions.<sup>52</sup>
- Second, **there are different ways to apportion targets to individual sectors.** For pollution type measures, in principle, it is possible to observe the enterprises and sectors responsible for the current levels of pollution and allocate the targets to them accordingly which would be in line with the polluter

---

<sup>52</sup> Water catchments are characterised by viscous / virtuous cycles and by tipping points. The existence of viscous / virtuous cycles means that small changes to the local environment can have a significant impact, through feedback loops. Similarly, localised intervention could avoid more 'tipping points', after which restoring the environment becomes significantly more costly and difficult. See Section 2 for more detail.

pay principle. However, in other areas where environmental damage is not necessarily the result of a continuous process, (e.g., biodiversity loss) identifying the parties responsible for the environmental loss is less clear. In certain areas, the loss may have been caused decades ago by enterprises and sectors which have since declined, so imposing an obligation on current landowners may not be considered legitimate and may conflict with wider strategic policy objectives such as food security. A combination of approaches could be adopted to overcome these issues:

- In instances where there are observable new biodiversity loss enterprises can be obliged to commit to delivering at least no net loss in biodiversity, or potentially going further and also requiring them to deliver a net gain in biodiversity. This is in line with the current approach to BNG and also the recently announced proposals for net biodiversity gain for large infrastructure projects.
- The government could then also allocate targets to other sectors on a proportionate basis, e.g., on the basis of the overall environmental footprint or even proportionate to revenue. And in instances where this presents issues or conflicts with other objectives apply sector-specific support arrangements.

Having allocated the targets to individual sectors, the system would then involve:

- **Obtaining credits, measuring and monitoring improvements:** Improvements would need to be measurable and verifiable and monitored over time.
- **The requirement to hold credits increases over time:** Over time, enterprises will be obliged to hold an increasing number of credits. This creates demand for additional credits over time. Importantly, all sectors could make a contribution to these positive externalities.
- **Buying / selling credits:** Enterprises can buy or sell credits so if others can deliver the same improvement more efficiently, enterprises could buy credits or if an enterprise can efficiently make the improvements itself it could fund these by selling credits. This would facilitate innovation and market entry. One of the issues with carbon trading is the sometimes doubtful nature of the additionality of carbon offsets. A similar issue could arise here, so it is important that the system of monitoring is robust. As the market would not be international to start with, it will be easier to monitor.
- **Whole life costs:** As discussed above, the revenue generated from selling credits would need to deliver the whole-life costs of delivering the solution. There would also need to be monitoring to ensure that the biodiversity gain remains in place over time. Tradeable credits would ensure that the market price covers whole-of-life costs.
- **Penalties:** Enterprises would be penalised if they do not hold a sufficient number of credits. Ideally the penalty should be a large multiple of the price of the credits at the time, so compliance is incentivised.

This approach would require a system of independent accreditation, which would be already be required under BNG.



## 5.4 Creating effective OBER markets

Full-scale OBER has the potential to deliver significant benefits to society. Compared to water-focused OBER, setting up full-scale OBER requires more government and private sector time and cost. This would involve significant regulatory reform across many sectors and private companies setting up capabilities to deal with environmental markets. Some of this effort will be required in any case if we want to achieve the goals set by the 25YEP. The Dasgupta Review also makes the point that our economic success (measured in narrow terms) is linked to the natural environment so the additional time and costs should not be seen as a trade-off but as an essential input to economic growth. Overall, there is a good case to move towards full-scale OBER once important lessons from successful implementation of water-focused OBER has been achieved.

To make full-scale OBER a success a strong, trusted monitoring framework is as important as it is for water-focused OBER (see section 4.5). In addition to effective monitoring, there are a number of considerations around how markets would work under full scale OBER and what type of regulatory interventions may be needed to ensure that markets deliver the outcomes we are seeking.

Assuming that we have a strong, trusted monitoring framework, the extent to which well-functioning markets evolve depends on the number of enterprises in the market and their relative cost curves. The greater the geographical scope of the market, the more likely it is that a “thick” market with many buyers and sellers would develop. This means that targets and permits set at a national level are likely to create more market activity than small, localised markets at the catchment level. With catchment level markets, there would likely be a spectrum with well-functioning markets on one side and less active markets on the other. At the latter end of the spectrum, there may not be a lot of trading activity as the scope for trading permits in a market with a small number of participants could be small. With a smaller number of buyers and sellers there could be potential issues of market dominance if one player can influence the price of the tradeable permits to the detriment of others. In this case the initial allowance can affect the efficient outcome.<sup>53</sup> The overseeing authority would need to assess the state of competition in the market and, if market dominance should arise, address this accordingly. Potential ways to address this include encouraging or incentivising market entry or defining a price floor or price ceiling based on outcomes observed in more competitive markets.

Practical applications and academic reviews of cap-and-trade systems to reduce environmental externalities have identified the following success factors.<sup>54</sup>

- Transaction costs including search and information, bargaining and reaching a decision, and monitoring and enforcement – it is important that the system is

---

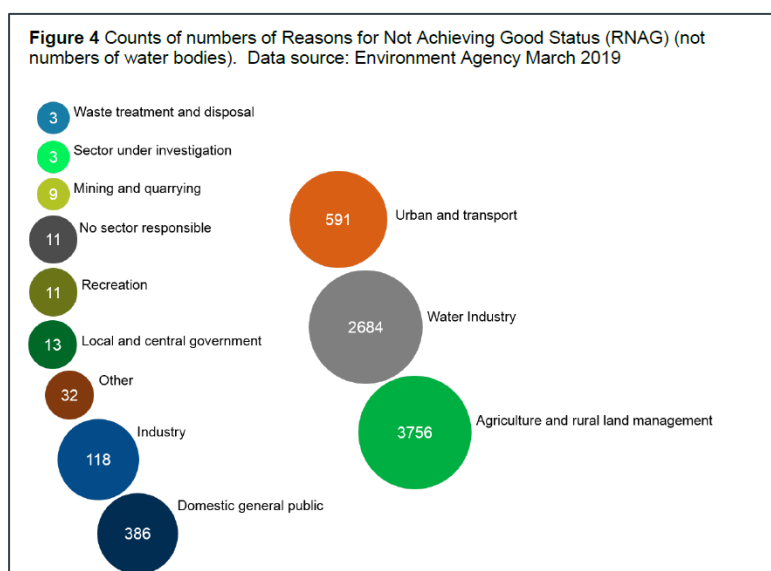
<sup>53</sup> For example, Hahn and Stavins (2011), *The Effect of Allowance Allocations on Cap-and-Trade System Performance*, Journal of Law and Economics, Vol. 54, No. 4, Markets, Firms, and Property Rights: A Celebration of the Research of Ronald Coase (November 2011), pp. S267-S294 discuss this and state that “If the firm with market power is a likely allowance seller, it has an incentive to act as a monopolist and hold back allowances from the market to drive up allowances prices,<sup>11</sup> and if it is a likely allowance buyer, it has an incentive to act as a monopsonist and buy fewer allowances to keep the price low. The approach to initial allowances can have an influence on the efficient delivery of the targets if market power is an issue.

<sup>54</sup> For example, Hahn and Stavins (2011) cited earlier

set up in a way that minimises transaction costs and provides equal access to information to all participants. The governing authority therefore needs to ensure that the system is set up in an efficient way that is easy to engage with. However, the fact that OBER would first be introduced in the water sector covering a small number of measures would ensure that lessons could be learnt before rolling full-scale OBER out to more sectors and measures, maximising public value and reducing the risks.

- Market power and market structure such as dominant firms that can influence the market price by holding back permits - it is well understood that well-functioning markets for goods and services are optimal for the efficient allocation of resources. These benefits are reduced where there are dominant players in the market that through their size are able to leverage power over the market itself, for instance by influencing the volume supplied and therefore the price within the market. The following chart shows that there are likely to be a large number of actors in the market for improving river water quality at least at a national level.

**Figure 22 Reasons for Not Achieving Good Ecological Status by Sector**



- If a catchment-level market definition is adopted, it is likely that market power will be an issue in some catchments, so the governing authority needs to put in place appropriate responses to ensure that an efficient outcome is achieved. This could include merging two or three catchments, setting clear rules around trading or provision of information. Water companies are already subject to economic regulation by Ofwat. The regulatory framework set by Ofwat can also be used to reveal information if water companies were shown to hold market power in particular catchments.
- Uncertainty regarding the existence of the system in the long-run – it is important that all market participants believe that the system will persist in the future. This underlines the importance of long-term targets with clear milestones.

- Regulatory treatment which includes the way in which regulated utilities participate in the market – it is important that economic regulation of water companies is aligned with this approach (see Section 6).

In addition, the complexity of having to deal with a potentially large number of markets for each pollutant needs to be considered. Full-scale OBER could be introduced in a flexible way, starting with the measures used in water-focused OBER and adding sectors progressively. A step-by-step implementation of full-scale OBER would allow the governing authority to learn lessons along the way and refine the market design. This would ensure that the benefits from full-scale OBER outweigh the costs.

## 5.5 The combined effect of OBER: Society gets greater environmental improvements at lower costs

Full-scale OBER would deliver more environmental improvements, at a quicker pace, and at lower costs. It would build on the benefits of water-focused OBER described earlier and magnifies them to a much larger scale. This approach is also in line with Defra’s ‘Putting the Plan into practice’ set out in the 25YEP.

**Figure 23 OBER is in line with Defra’s plan to achieve the 25YEP**

Defra’s objective		Full-scale OBER
Set a clear, long-term direction with flexibility to adapt to new evidence and circumstances	✓	OBER requires government to set long-term targets for many environmental measures
Provide robust and credible reporting, governance and accountability	✓	A robust system of permits and credits would be established
Put in place strong local leadership and a more integrated delivery framework	✓	Targets would be set a catchment level, promoting local leadership, and sectors would be incentivised to take a systems-based approach to delivering outcomes
Resource, set incentives and support innovative finance, including from the private sector	✓	Improvements would be largely funded by the private sectors – although the government could also choose to support certain sectors – e.g., in the interest of food security it could fund farmers and land managers to improve biodiversity
Make sure everyone plays their part in delivering the environment we all want	✓	Targets can be apportioned to different sectors to ensure that each sector pays its fair share in delivering the plan

A key feature of full-scale OBER is that it allows for flexibility. The pace of change can be adjusted, new measures and new sectors can be added, and individual sectors could be supported directly by the government. As the environment is not characterised by linear processes but instead involves tipping points, the pace of change matters to prevent reaching tipping points and having to pay even more in the future to restore deterioration that could have been prevented. The availability

of permits and the requirement to hold credits can be adjusted over time (and in different places). Full-scale OBER allows for flexibility without having to re-design a whole new approach.

## 5.6 High-level impact assessment: OBER

To give a high-level sense of scale, Indepen has estimated all sectors in England spent over £13 billion on improving catchments each year.<sup>55</sup> This breaks down into:

- Direct Spending with a primary aim of protecting and improve England’s water and land environment of £7.7 billion per annum.
- Indirect spending to manage water for the benefit of society (for example, drainage, flood risk and water supply) of £5.7 billion per annum.

These figures are estimates but illustrate that the the potential cost savings could be significant The Poole Harbour case study, and Wessex’s experience at the Dorset Stour and Parrett catchments suggest that savings from taking an outcomes-based approach can be significant. Also, academic literature highlights that the potential cost savings from delivering through markets can be significant.

**Figure 24 Academic literature on cost savings from delivery through market-based approaches**

Cost reduction	Market Scheme
15%-90%	Sulphur dioxide allowance trading in the US
40%-47%	NOx trading in the US
43%	South Coast Air Quality Management District

Source: [https://consult.environment-agency.gov.uk/++preview++/environment-and-business/challenges-and-choices/user\\_uploads/phosphorus-pressure-rbmp-2021.pdf](https://consult.environment-agency.gov.uk/++preview++/environment-and-business/challenges-and-choices/user_uploads/phosphorus-pressure-rbmp-2021.pdf)

To provide a sense of the scale of the potential benefits, we first consider how much of the £13 billion would be affected by full-scale OBER. The share of the £13 billion that is most relevant for OBER is the expenditure related to capital projects that enhance the environment. The share that is spent on operating and maintaining existing assets is less likely to be affected by OBER. To estimate the proportion that could be affected by the efficiency gains of OBER, we consider:

- Around 65% of the EA’s budget on flood risk management, is spent on ‘capital’ which “is money that is spent on investment and things that will create growth in the future.”<sup>56</sup>
- 18% of water company expenditure is spent on ‘enhancement’ which includes spending on new assets.<sup>57</sup>

<sup>55</sup> Indepen, 2021. *Catchment Management*, Available at: <https://indepn.uk.com/case-studies/catchments-if-you-can/>

<sup>56</sup> DEFRA, 2021. Central Government Funding for Flood and Coastal Erosion Risk Management in England. Available: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/974066/Funding\\_FCERM\\_March\\_2021\\_Final\\_accessible.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/974066/Funding_FCERM_March_2021_Final_accessible.pdf)

<sup>57</sup> Ofwat, 2019. *PR19 Final Determinations, Securing cost efficiency technical appendix*. Available: <https://www.ofwat.gov.uk/wp-content/uploads/2019/12/PR19-final-determinations-Securing-cost-efficiency-technical-appendix.pdf>

- We therefore consider 40% to be a reasonable high-level estimate of the proportion of total spending that OBER could affect. The purpose of this estimate is to provide a sense of the scale of the benefits.

Using the high-level assumption that 40% of this £13 billion figure relates to spending that could be affected by OBER, and assuming a relatively cautious 10% cost saving on that amount, equates to potential cost savings of £520 million per annum, or £22 per household in England each year.

Assuming the same cost saving per annum, this implies cumulative savings of around £16 billion between now and 2050, or around £10 billion in NPV terms. Given the scale of current spending, even a small efficiency saving in percentage terms would deliver significant value. Spending on environmental enhancement is likely to increase going forward so the benefits could be even larger.

## 6 IMPLICATIONS FOR ECONOMIC REGULATION

### 6.1 Introduction

This section considers how economic regulation in the water sector would need to adapt to reflect and support water-focused OBER. We focus on the principles that should be applied rather than on the detailed mechanisms.

### 6.2 Why it is important for economic regulation to adapt to OBER

Ofwat's regulatory framework sets the incentive structure faced by water companies. For the benefits and opportunities of water-focused OBER to be realised they need to be supported by the regulatory framework.

Ofwat has made delivery of greater environmental and social value one of the key themes for PR24.<sup>58</sup> Ofwat recognises that coordination between different stakeholders on environmental issues is important and is already working with the EA and Defra on a range of initiatives such as WINEP reform, RAPID and the Green Recovery. Ofwat has also indicated that it would like to move to a smaller number of outcomes of enduring interest to customers. This is well-aligned with OBER as the targets under OBER would ideally be set at an outcome level over a 25-year timeframe.

In the best case, economic regulation would provide an incentive framework that explicitly encourages water companies to be ambitious in their engagement with water-focused OBER and maximise the societal benefit, while also ensuring that they and other potential participants are operating on a level playing field. In the worst case, economic regulation could prevent effective implementation and operation of water-focused OBER reducing the benefits to society from more efficient delivery of the 25YEP.

### 6.3 How does OBER affect the level of risk companies take

Water-focused OBER and full-scale OBER increase the level of risk that companies take as a result of:

- **Outcome-focused measures** – water companies would be responsible for delivering outcomes using the most efficient solution. This means that companies would be incentivised to use innovative solutions that may not be based on a long track-record. For example, a traditional asset-based solution may have been implemented many times in the past and be proven to work. In contrast, there is more uncertainty around the effectiveness of nature-based solutions in different contexts and companies would be building their expertise

---

<sup>58</sup> Ofwat, 2021, PR24 and beyond: Creating tomorrow, together

and experience with innovative solutions. There is therefore a greater risk of the solution not delivering the ultimate outcomes.

- **Working in partnership** – water-focused OBER would deliver an efficiency gain by allowing companies to work in partnership with others to deliver environmental solutions. This introduces additional risk as water companies are ultimately held responsible for the outcomes delivered by partners.
- **Market risk** – full-scale OBER would also introduce market risk as companies have to identify their optimal strategies for participating in the market. For example, buying additional credits or permits might look like the best strategy but may not be optimal in hindsight.
- **Compliance risk** – full-scale OBER increases the compliance risk for water companies with regard to competition law (e.g. dominance) and regulatory compliance.

Compared to the efficiency gain delivered by OBER the increase in risk is relatively small but it needs to be managed so that companies are faced with appropriate incentives.

## 6.4 How economic regulation needs to adapt

Water-focused OBER would increase the risk that companies take as they deliver innovative solutions in partnership. The key question is therefore how the approach to economic regulation can provide an appropriate risk and reward balance.

### What risk-reward balance are we aiming for?

First, it is useful to clarify the objective of calibrating the risk and reward balance. Successful implementation of water-focused OBER requires companies to actively seek better ways of delivering environmental outcomes. We want to encourage companies to take risks and explore new and different approaches and partnerships. This means companies need to have sufficient incentives to take risks. As customers and society ultimately benefit from water-focused OBER (as they pay less for more environmental gain), they can bear some of the increased risk. However, water-focused OBER does not mean that companies need to be insured against all of the additional risk. An appropriate allocation of risk is important.

### What mechanisms need to be tweaked to calibrate risk and reward appropriately?

Second, we consider how risks can be allocated appropriately. There are a number of mechanisms that influence the risk-reward balance that companies face when considering investment in environmental improvements:

- **Business plan competition:** In previous price reviews Ofwat has assessed company submissions and awarded reputational, administrative and financial rewards and penalties. To support OBER, the assessment of business plans should include an explicit criterion on how water companies will make use of



OBER to deliver efficient improvements across the whole catchment (including use of market-based mechanisms). Companies whose plans provide credible ways of delivering water-focused OBER could be rewarded with less scrutiny on the environmental aspects of the plan as Ofwat could be more confident that the company will deliver more environmental gain at lower costs.

- **Cost benchmarking:** the current approach to cost benchmarking for WINEP draws in comparative and historical information. Moving towards more innovative solutions delivered in partnership means that the current approach cannot easily be extended as there is a lack of historical nature-based solutions that could provide a sufficient sample for comparison and comparability across projects is likely to be more challenging as costs depend on local circumstances and partners. With a small number of measures, Ofwat could use a more bespoke approach to cost benchmarking but this could be too onerous when applied to all companies. Further work is needed in this area and the most practical approach at PR24 is likely to be a mix of different methodologies.
- **Cost sharing:** In addition to setting allowed costs via benchmarking, the cost sharing rate influences the risk and reward balance as companies share a proportion of out- and under-performance with customers. While the best approach to cost sharing ultimately has to align with the cost allowance, cost sharing rates provide an opportunity to reduce the risk from nature-based solutions and encourage companies to explore new partnerships.
- **Outcome delivery incentives:** OBER would require clear long-term catchment-based targets with milestones. These could be translated into performance commitments with out- and under-performance payments (ODIs). To encourage new solutions in the early days, penalties could be focused on instances where companies take no action instead of focusing on under-delivery. Rewards could be focused on delivering environmental gain beyond the expected level. ODIs would have to be calibrated in the context of cost allowances and cost sharing rates.
- **Longer-term certainty:** One of the potential ways in which economic regulation could undermine water-focused OBER is the lack of certainty around financial incentives beyond the next price control. There is therefore a case for considering how to provide longer-term certainty, e.g., by fixing cost sharing rates or ODIs for longer. This could also help support long-term partnerships.
- **Ensuring a level playing field:** Given that many of the alternative solutions enabled by OBER are expected to be less capital intensive, but may have proportionately higher recurring costs, Ofwat should actively ensure that all of its regulatory mechanisms are indifferent to long-term cashflow profile of solutions (see box on Nature-Based solutions below). Recovering whole-life costs for environmental improvements via the RCV would be one way to ensure that nature-based and capital-intensive solutions are perceived to sit on a level-playing field from the regulated companies' point of view both at the next and subsequent price reviews and that incentives are not unduly skewed in favour of one or the other. As the RCV is a regulatory construct and not tied to accounting rules, this is a practical approach. Companies could still propose deviations to this through amended fast/slow money splits where there are concerns around bill profiles or credit metrics. Ofwat could also commit to ensuring that its price review process does not penalise companies seeking to

deliver wider environmental value outside of the initial OBER measures where there is sufficient support from stakeholders.

- **Managing competition law risk:** Ofwat's duty to protect consumers is met in part through its enforcement processes that include, but are not limited to its powers under the Competition Act. Water-based OBER is likely to be most effective where companies make the most of market-based mechanisms. Creating new markets at the edge of their undertakings creates regulatory and compliance risks for monopolist companies, given that they can often be dominant in these markets as they develop. This compliance risk leads to risk aversion on their part. While in this context it is difficult for regulators to provide certainty, where companies are actively seeking to trial new market-based approaches to deliver greater value overall they should be confident that, where it is necessary, any ex-post corrective action taken by regulators in their enforcement processes is proportionate. Ofwat could facilitate engagement with companies so that they can raise any questions about potential abuse and get guidance on the best way forward.

## NATURE BASED SOLUTIONS VERSUS TRADITIONAL SOLUTIONS

The current approach to economic regulation leads to the cost of capital-intensive solutions being recovered via the RCV over a period of time. These solutions are often carbon-intensive and do not deliver additional positive externalities, but they are relatively low risk.

In contrast, nature-based solutions of the type we expect OBER to enable require mainly opex, and their cash-flow profile is therefore more even over the life of the solution. Cost recovery beyond the current regulatory period is less certain for companies as repeated costs such as opex are benchmarked at each price control.

Under the PR19 methodology used for benchmarking, this means that a company that adopts a large number of nature-based solutions may appear to be inefficient at the next price control compared to those that focus on capital-intensive solutions. This is likely to reduce its future allowed revenues compared to its expected future costs, making these solutions less attractive in an internal cost benefit analysis. This potential issue has been acknowledged by Ofwat in its PR24 and beyond document.

Nature-based solutions are generally less carbon-intensive and deliver positive externalities. However, they are also riskier than capital-intensive solutions as success may depend on external factors, it may take longer to see results, and there is less of a track record. The current approach to economic regulation effectively puts a premium on nature-based solutions as the company is not only faced with the additional risk of the solution not succeeding, but also the risk of not being able to recover future costs and is unable to monetise the benefit from the additional positive externalities. OBER will address the latter point, but economic regulation needs to ensure that there is a level-playing field between types of solutions as far as is possible. Otherwise, economic regulation could undermine OBER as it effectively provides an additional set of cost incentives that go in the other direction.

## 6.5 What might economic regulation look like under a full-scale OBER

Economic regulation could look quite different in some areas if full-scale OBER were to be adopted. Implications would include:

- Remove the need for benchmarking as a competitive market for environmental services exists:** If a system of tradeable permits and credits under full-scale OBER for all environmental externalities leads to well-functioning markets for environmental services, this creates opportunities for economic regulation to rely on competitive market prices. Water companies would deliver environmental services along with many other enterprises and compete for the most efficient way of delivering these services. Regulatory cost allowances for water companies' own obligations could be indexed against the prevailing market prices rather than continuing to rely on a relatively complex ex ante assessment of project costs with various cost sharing mechanisms in place to reduce the consequences of mis-forecasting.

This would be an opportunity to reduce regulatory burden, and, subject to the appropriate regulatory accounting controls on cost allocation, rely more on competition. This itself could result in lower bills for customers.

- **Reflecting market and compliance risk in the risk and reward balance:** If full-scale OBER was adopted, water companies would be subject to market and compliance risks that need to feed into the overall risk and reward balance. As there is no need for benchmarking or setting cost allowances, the mechanisms for dealing with this risk would need to be considered as part of the process of setting the overall risk and reward balance.
- **Keeping an eye on market power:** Under a full-scale adoption of OBER regulators will need to be confident that water companies are not leveraging their market power in providing water and wastewater services into markets for environmental services.
- **Ensuring a level playing field:** Ofwat would need to consider whether its framework puts water companies at any systematic material advantage or disadvantage compared to other non-regulated entities within the market for environmental services. Water companies will need to have confidence that Ofwat will recognise the purchase of legitimate credits/permits in the market as equivalent to carrying out activities themselves. The design of the market itself will also be key to creating a level-playing field, for instance the term-length required in trading contracts and the level of certainty in the long-term validity of credits/permits may interplay with the investment certainty water companies gain from the concept of a Regulatory Capital Value (RCV). Hahn and Stavins (2011) discuss the impact of different ways of treating permits under utility regulation and how this can affect the effectiveness of a cap-and-trade system.<sup>59</sup>

## 6.6 Wider implications for economic regulation

While this report has focused on environmental services, the potential lessons for economic regulation are wider as a similar rationale could apply to other outcomes. If water companies are faced with true outcomes (not outputs) and market mechanisms can be used to deliver these outcomes by engaging with a wide range of enterprises, the regulatory approach needs to encourage this. Ultimately, this creates the potential to reduce information asymmetries and have more confidence that water company costs are efficient. In the long-run this provides opportunities to rely more on information revealed by the market so that economic regulation can focus on other aspects of the value chain. Water-focused OBER therefore provides the potential to develop wider lessons learnt and evolve the regulatory approach in a way that can be applied to other areas in the future.

---

<sup>59</sup> Hahn and Stavins (2011), 'The Effect of Allowance Allocations on Cap-and-Trade System Performance', *Journal of Law and Economics*, Vol. 54, No. 4, Markets, Firms, and Property Rights: A Celebration of the Research of Ronald Coase (November 2011), pp. S267-S294

## 7 CONCLUSION

### The need for Outcomes-based environmental regulation (OBER)

The UK government has published an ambitious 25 Year Environment Plan (25YEP) to improve the environment in England. Water companies have the potential to make a significant contribution to the 25YEP as they directly influence many of the outcomes being targeted for improvement in the 25YEP, and they are experts in their local environments.

However, the current approach to environmental regulation in the water sector will limit the extent to which water companies can deliver significant parts of the 25YEP. The current approach to environmental regulation of catchments is:

- Fragmented;
- Prescriptive;
- Output rather than outcome focused; and
- Not based on systems thinking.

Introducing outcomes based environmental regulation (OBER) in the water sector could address these issues. If the water sector was subject to outcome-based targets that could be delivered either by implementing solutions itself or by paying others to implement solutions, more efficient and more innovative solutions would be delivered. To ensure companies take a holistic and systems-based approach this would require outcome-based targets for multiple environmental outcomes that include both positive and negative externalities. To start with, water-focused OBER could cover a relatively small number of measures, with more measures added gradually over time.

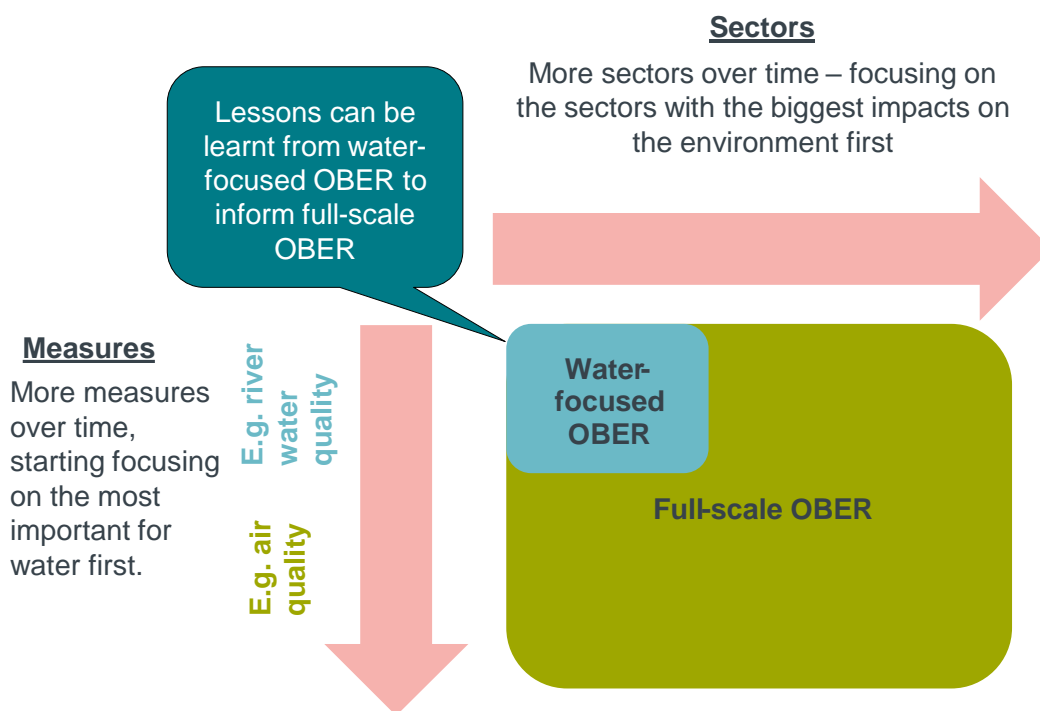
### Water-focused OBER can deliver substantial benefits

Water-focused OBER would deliver substantial efficiency gains with relatively small policy changes and no additional cost to the government, leading to:

- Greater environmental improvements for lower private and social costs;
- A systems-based approach to delivery; and
- Partnerships across sectors being incentivised without having to create specific policies for each sector.

In making the case for OBER in the water sector there is obvious potential for this approach to be used much more widely across the UK economy in support of the 25YEP. The complexities of delivering this approach at a wider economy level increase substantially, but so will the potential rewards.

**Figure 25** The scope of full-scale OBER can be gradually increased over time



### How economic regulation needs to adapt

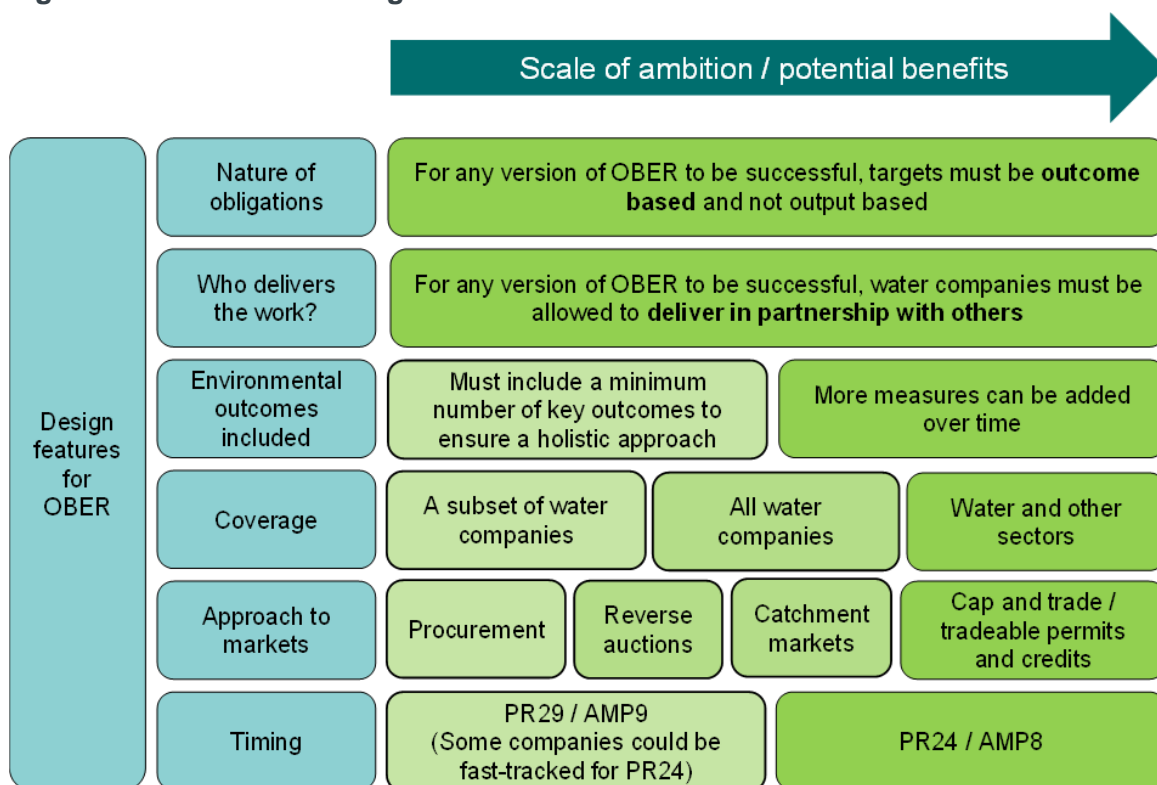
Economic regulation needs to adapt to incorporate OBER. There are two key principles that need to be considered for OBER to be integrated effectively:

- **Appropriate risk and reward balance:** OBER increases the risk companies take as they deliver innovative solutions in partnership with others. The additional risk needs to be allocated appropriately between companies and customers so that there are sufficient incentives for companies to fully engage with OBER where it is efficient to do so.
- **Level playing field:** Economic regulation needs to ensure a level playing field between different types of solutions. For instance, the cashflow profile of a nature-based solution and a capital intensive solution may be different. Levelling the playing field involves ensuring that incentive mechanisms result in an outcome where companies are indifferent to the cashflow profile of different solutions.

### Full-scale OBER can build on water-focused OBER in a flexible way

OBER is a flexible model which can start off small, but the potential benefits could be greatest when it is implemented in its fullest form. This presents a set of choices for regulators (shown in Figure 26 below).

Figure 26 Choices for Regulators



The scale of the ambition in Defra’s 25YEP, the rising costs for environmental improvements and the climate and biodiversity emergency altogether drive a strong need to deliver an efficient mechanism to improve the environment. This report demonstrates how full-scale OBER can deliver the 25YEP in an efficient way and how water-focused OBER can provide many of the same benefits with relatively small policy changes. Given the scale of the challenges faced, changes to environmental regulation should be made at pace.

OBER is a flexible model, which can start off small – and is suitable to be introduced through a regulatory sandbox approach in the water sector – before being rolled out to cover more environmental outcomes and sectors over time. There may be practical challenges with implementing OBER, however these are not insurmountable and the risks can be mitigated by adopting a more gradual approach.



