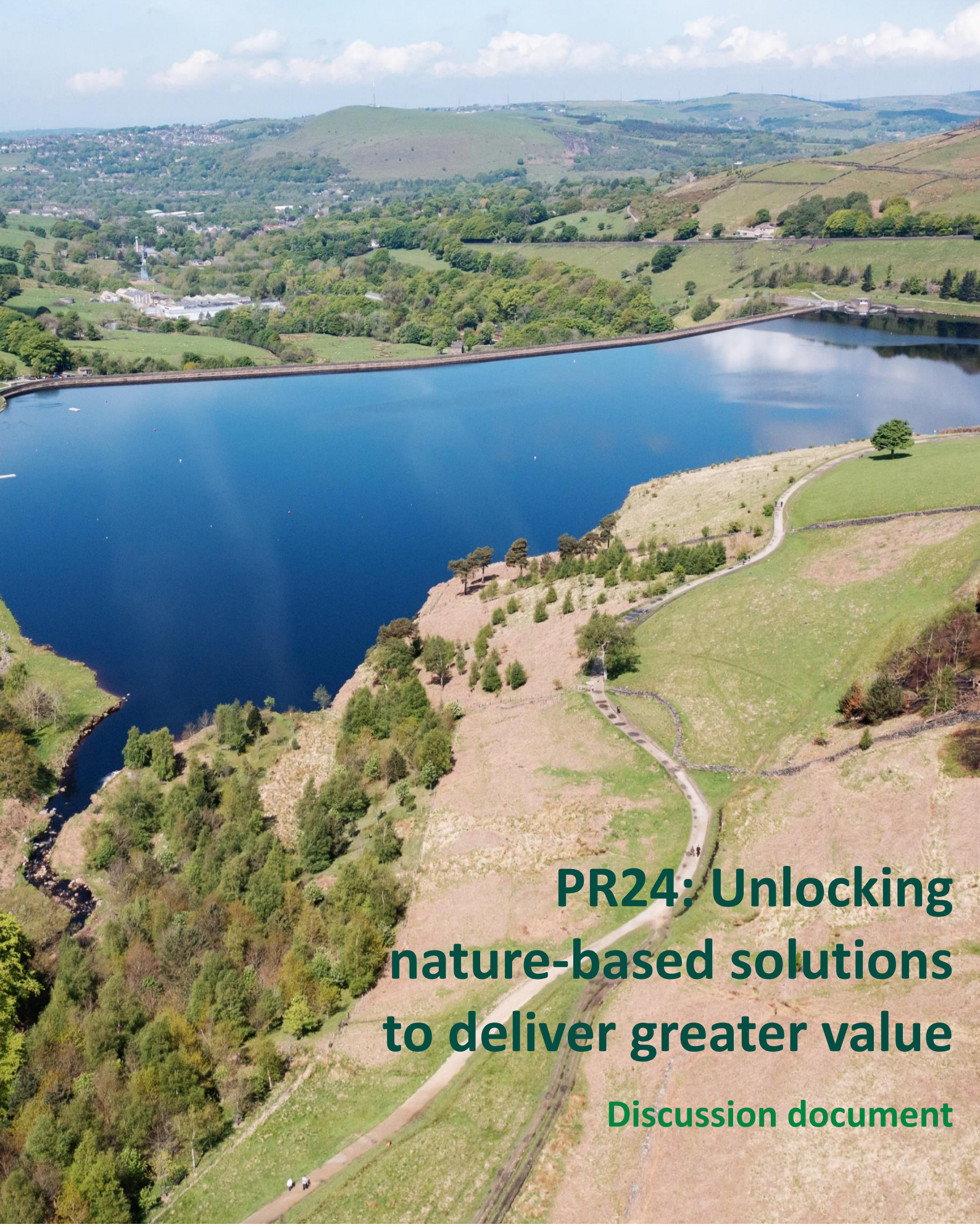


PR24: Unlocking nature-based solutions to deliver greater value

Discussion document

United Utilities
Water for the North West

The Rivers Trust

Summary

In the context of water management, nature-based solutions (NbS) are an umbrella term for a range of activities which utilise natural processes to provide water-related ecosystem services and benefits, either through raw water protection, wastewater treatment or flood mitigation. Many of these are well-documented and are not new; however, the potential of this approach in driving improvements to the water environment has not been fully realised. This paper aims to: identify and summarise the key barriers to large-scale implementation of NbS by water companies and other beneficiaries of the ecosystem services provided by NbS; to recommend actions to overcome those barriers; and to propose practical next steps to deliver recommendations, to be delivered by water companies, regulators, NGOs and multiple stakeholders, working together across a number of sectors to deliver a national programme of work for enabling NbS at scale.

Key barriers identified

- Limited standardised approaches to assess, deliver, verify and report on the effectiveness of NbS
- Limited cost-effective, coordinated monitoring and data collection
- The need for a balanced permitting regime for the water sector, for asset related NbS
- Limited incentives for 'buyers'[1] and 'sellers'[2] of ecosystem services provided by NbS to engage in markets
- Underdeveloped framework for markets for nature to be created and to thrive

Key recommendations on what can be done by water companies working together with government and others:

1. Create NbS approaches across a range of outcomes, including for nutrient levels in watercourses, biodiversity improvements, storm overflow mitigation, carbon reduction/mitigation and faecal matter contamination, amongst other outcomes. Develop standardisation, validation and verification of how NbS are assessed, delivered, maintained and reported on. Create accredited units for the ecosystem services provided by NbS, based on the Woodland Carbon Code model.
2. Support the wider embedment of the Catchment Monitoring Cooperative, a national framework that enables the collaborative governance and standardisation of cost-effective catchment monitoring, management and sharing of data.
3. Create a permitting framework for wastewater treatment related NbS, that incentivises their uptake and recognises the different nature of their operation and the wider benefits.
4. Create financial models that drive buyers and sellers of ecosystem services provided by NbS to market-led approaches, including through equitable enforcement of the polluter pays principle, and economic incentives for wider societal benefits. Review the economic regulation framework (TOTEX assessment and outcome deliver incentives in particular) to see how NbS could better be incentivised.
5. Adopt and test the recommendations from the Financing UK Nature Recovery Coalition, to create and develop a framework for high integrity markets for nature.

Next steps

It is proposed that the above recommendations are refined and tested through a national programme of work, to be developed between now and AMP8. This is to be made up of a pipeline of demonstrators at scale, delivered locally and coordinated nationally. This programme of work should be delivered collaboratively by water companies, NGOs and regulators, working together with stakeholders from multiple sectors, to remove existing silos constraining blended investment in NbS and pave the way for these approaches to become mainstream for the long term.

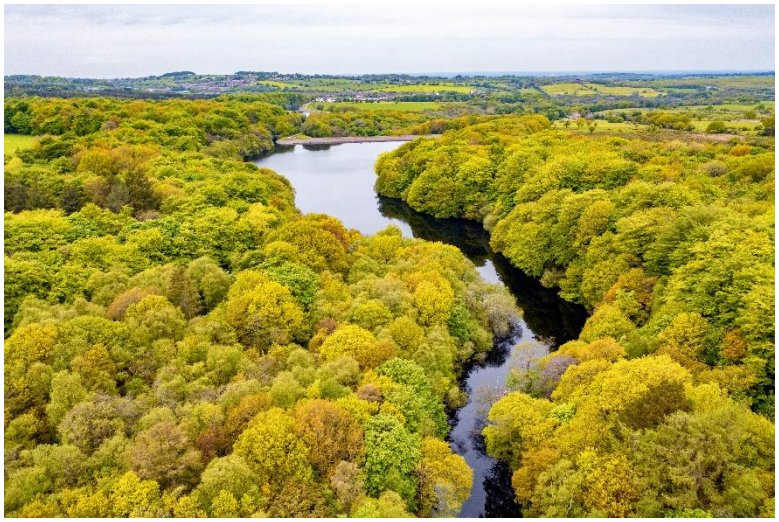
Objectives of proposed programme of work

- Share and consolidate learnings from individual ongoing projects to build and cross-pollinate collective knowledge from a practical perspective
- Use the learnings from these projects to refine, inform and embed the proposed recommendations, working with regulators, policymakers and other sectors to inform policy, deliver tangible actions on the ground and to enable a governance structure for markets to flourish
- Accelerate a pipeline of investible projects to be delivered through a markets-led approach and demonstrate the value of this approach

[1] **Buyers**: beneficiaries of ecosystem services who are willing to pay for them to be safeguarded, enhanced or restored; DEFRA (2013), Payments for Ecosystem Services: A Best Practice Guide

[2] **Sellers:** land and resource managers whose actions can potentially secure supply of the beneficial ecosystem services; DEFRA (2013), Payments for Ecosystem Services: A Best Practice Guide

Introduction



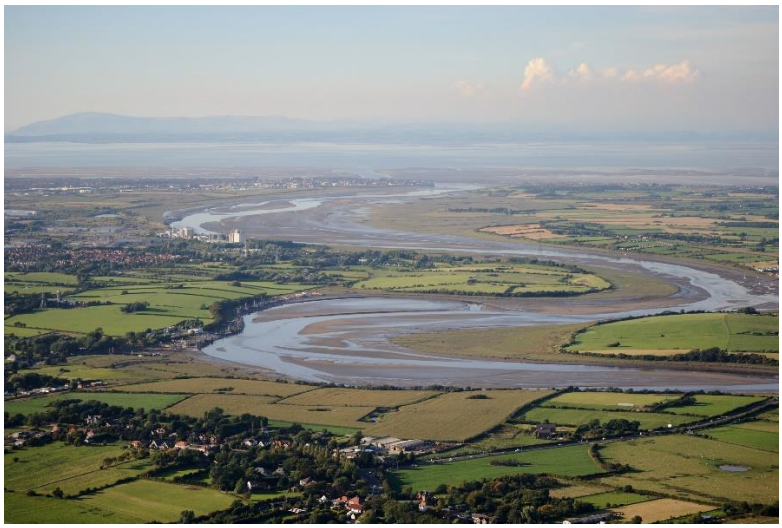
The escalating threats of the climate and biodiversity crises, and the requirements to meet the demands of a growing population in terms of water security, mean that there is an unprecedented need for coordinated action to achieving the needs of society and the environment. Only 14% of rivers across the UK currently meet 'good' ecological status in accordance with the Water Framework Directive, even though in AMP7 alone, water companies across England and Wales are investing about £5bn through the Water Industry National Environment Programme, to drive improvements in the natural environment.[3] However, this investment will only address a portion of the causes of poor water quality, whilst often incurring high costs in terms of capital and operational expenditure, as well as increasing energy, chemical and carbon impacts. This means that customers are receiving reduced value for money and holistic benefits are not achieved across society or the environment.

Therefore, the water industry and its regulators need to work with others across other sectors to address multiple challenges and deliver solutions that meet needs now, whilst being resilient to the needs of the future. This cannot be achieved using traditional approaches alone and there is a need to adopt more nature-based solutions (NbS), integrating them with technological and engineered solutions. To facilitate this, the regulatory processes need to better support water companies in addressing challenges in an integrated manner, and provide the opportunity to align activities with broader stakeholders to achieve better overall outcomes. Ensuring other sectors are also incentivised to participate in the solutions is key to delivering thriving markets, which will secure multi-sectorial contributions and outcome-focused targets, aiming to better support the industry in delivering greater value and multiple benefits.

Although a systemic transformation will require time and collaboration over the next few years, this paper highlights some of the steps that can be taken in time for the next Price Review (PR24), and to make a difference in AMP8. Building on existing experiences of successful delivery of NbS and lessons learnt therein, it aims at identifying and summarising the key barriers to large-scale implementation of NbS and propose recommendations to overcome these barriers.

[3] Defra and EA Press Release, June 2018

Barriers to scaling up NbS and what can be done to address them



NbS are ecosystem-based approaches defined by the International Union for Conservation of Nature (IUCN) as "actions to protect, sustainably manage, and restore natural or modified ecosystems that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits".[4] In the context of water management improvements, NbS is an umbrella term for a range of activities, including: source water protection, catchment management, natural flood management, wetlands protection and restoration, water harvesting, agricultural best management practices, afforestation, and sustainable drainage systems, amongst others. These activities enhance the natural water cycle through: modulating the flow of rainwater; creating environments to facilitate natural sedimentation, and filtering processes; allowing sediments and nutrients to remain in soils. In so doing they also create habitats to enhance biodiversity and enhance human well-being. Many of these approaches, like integrated water resources management and sustainable drainage systems, are well-documented and are not new.[5]

The breadth of interventions and the evidence base makes it impossible to adequately consider all types of NbS for improving water and securing better outcomes in one paper. Therefore, some case studies are summarised in Appendix 1, which demonstrate that, by working with others to deliver NbS, the water industry can meet its required objectives whilst delivering greater value. However, although gaining visibility in policy and decision-making, investment in NbS remains fragmented, with challenges precluding greater adoption by the water industry and others and restricting opportunities for collaborative working, particularly due to:

- **Lack of standardised approaches to NbS**
- **Lack of cost-effective monitoring and data collection**
- **The need for a balanced permitting regime for asset related NbS**
- **No clear incentives for buyers and sellers of ecosystem services to invest in and adopt NbS**
- **Underdeveloped framework for markets to be created and to thrive**

These challenges work together to widen the perception that NbS are high risk alternatives to tried and tested engineered technologies, despite technological lock-in constraining resilience in the long term.[6] NbS provide different ways to deliver improvements to the water environment, and as such, require approaches that are supportive to their implementation.

Addressing these challenges requires action to build understanding, capacity and drive uptake by addressing issues around cost, risk and time frames. To achieve this, it will be necessary to share demonstration projects, knowledge and data as 'proof of concept', which can boost overall confidence. Therefore, to maximise the opportunities through PR24 and AMP8, the key barriers to wider implementation of NbS are highlighted in the table on the following pages, as well as recommendations for overcoming these barriers.

[4] CEM work on nature-based solutions | IUCN

[5] Nature-based solutions and water security - GSDRC

[6] Seto et al. (2016): *Carbon Lock-in: Types, Causes and Policy Implications*

Issue	Why is this a barrier?	Recommended solutions
Limited standardised approaches to NbS	There are no standardised approaches to how NbS, and the ecosystem service benefits therein, are assessed, delivered, maintained and reported on. This makes it difficult to demonstrate the value of what is being delivered. Which in turn, leads to lack of clarity for regulators to accept delivery, creating uncertainty and low credibility, leading to failure to attract investment at scale, particularly for delivery of regulatory outcomes. It is also difficult to understand how the true value of a solution will be captured during optioneering and planning stages, resulting in a significant amount of upfront effort and negotiation being needed. This can be a barrier to companies seeking out NbS opportunities.	**1. Create NbS approaches across a range of outcomes. Develop standardisation, validation and verification of how NbS are assessed, delivered, maintained and reported on. Create accredited units for the ecosystem services provided by NbS, based on the Woodland Carbon Code model.** **Benefits of this solution** Clear standards, (as well as high quality data and accreditation processes), are critical for accelerating and enabling investment, because: • They provide confidence that funds are being spent in the right way to deliver improvements at greater value to customers • Build consistency in the assessment of NbS and benefits provided • Provide certainty, predictability and lower costs and complexity Furthermore, these tradeable services shouldn't be mutually exclusive where they can demonstrate added value. This approach should be based on the Woodland Carbon Code, which is the quality assurance standard for woodland creation projects in the UK, and generates independently verified carbon units. **Next steps (as part of a programme of work)** • Create an inventory of existing NbS across the country, to include application, physical characteristics, enhancement provided, operational requirements • Generate standard codes of practice • Identify gaps in knowledge and share best practice
Limited cost-effective, coordinated, monitoring and data collection	Catchment-wide data management is declining, fragmented, and often outdated, due to limitations in funding and lack of widespread standardisation. Where good data exists, such as for peatland restoration for example, it tends to be collected on a scheme-by-scheme basis, focusing on the implementation period rather than on long-term impacts against outcomes. This results in significant gaps in robust evidence base, leading to burdensome monitoring requirements at project scale, when proposing NbS to meet regulatory obligations. In many cases, the required level of monitoring can be costly and difficult to scale up beyond project level, therefore making them unaffordable.	**2. Develop and embed the Catchment Monitoring Cooperative, a national framework for the governance and standardisation of catchment monitoring, sharing and management of data.** **Benefits of this solution** Having a standardised and consistent framework will create better, shareable and more joined-up data. This will enable greater understanding of risks and inform appropriate responses, as well as building better evidence on the performance of NbS. Standardisation will also reduce the need for intensive and costly monitoring because it is a more efficient way to build an evidence base and creates trust in the process by which data is obtained and solutions are delivered, reducing cost barriers to NbS and making them more deliverable. National, consistent data will also ensure all water companies can engage in NbS and catchment management, and make efficiency comparisons more representative. **Next steps (as part of a programme of work)** • Support development and demonstration of the Catchment Monitoring Cooperative starting in January 2022 • Assess lessons learnt from Catchment Monitoring Cooperative demonstration and work with partners to embed at national scale

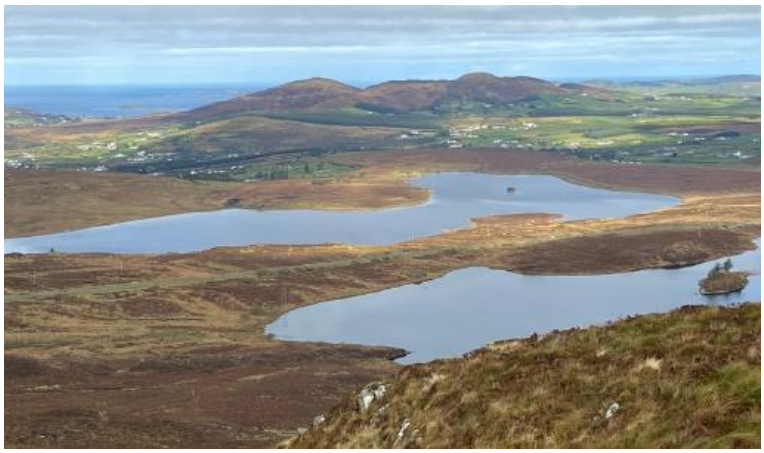
Issue	Why is this a barrier?	Recommended solutions
The need for a balanced permitting regime for asset related NbS	Requirements for wastewater quality are focused on permitted discharges from individual treatment works. This is strongly biased towards the certainty of engineered solutions, which can be carbon-intensive, result in technological lock-in and less cost-efficient as standards tighten and upgrades are needed. Engineered solutions are also not comparable to NbS when it comes to offering multiple benefits, and can be less resilient to climate change. Nevertheless, NbS are not currently incentivised and therefore tend to be dismissed as potential options for achieving environmental requirements. New permitting approaches have been considered, such as for catchment nutrient balancing, which can better enable implementation of NbS. However, consensus around targets can be hard to reach, due to requirements for 'fall back' engineered options, costly monitoring and changes in regulatory goalposts. This in turn can lead to burdensome negotiations at scheme level, and therefore to costs that outweigh benefits. Furthermore, the current economic regulation creates financial risks for NbS, which are seen as operational expenditure within a single price review (AMP) cycle, rather than acknowledging them as part of long-term investment and incorporating them into the regulated asset base.	**3. Create a permitting framework for wastewater treatment related NbS, that incentivises their uptake and recognises the different nature of their operation and the wider benefits.** **Benefits of this solution** A framework will provide consistency and clarity of the regulatory standpoint concerning NbS for wastewater treatment, as well as simplifying negotiations. This will incentivise a greater uptake by the industry, making solutions more cost-effective, delivering multiple benefits and greater value for customers. An effective permitting framework can also enable water companies to collaborate with others and engage more effectively with market-led approaches in order to meet their regulatory obligations. **Next steps (as part of a programme of work)** • Work with regulators and others to assess effectiveness of permitting approaches at generating greater long-term resilience and greater value for customers, society and the environment

Issue	Why is this a barrier?	Recommended solutions
Limited regulatory or financial incentives to drive buyers and sellers of ecosystem services to engage in markets	Currently, there is no consistent enforcement of the polluter pays principle, which leads to an imbalance of risk-sharing between regulators, water companies and other direct beneficiaries of NbS such as the agricultural sector, and biases interventions towards more engineered and carbon-intensive options. This creates a passive approach to delivering obligations, where these are not adequately enforced, preventing greater collaboration towards delivering environmental improvements at scale, therefore limiting the benefits to society as a whole. Furthermore, some of the additional societal benefits provided by NbS, such as health and well-being or long-term flood resilience, do not have a clear societal 'owner' or 'customer/beneficiary' to fund these benefits. Finally, another key pressure is access to land. In the UK land is limited and a premium, and is coming under strain. Without access to available land, NbS solutions, particularly those that offer multiple benefits, cannot be suitably unlocked.	**4. Create financial models that drive buyers and sellers of ecosystem services provided by NbS to market-led approaches, including through equitable enforcement of the polluter pays principle, and economic incentives for wider societal benefits. Review the economic regulation framework (TOTEX assessment and outcome deliver incentives in particular) to see how NbS could better be incentivised.** **Benefits of this solution** This creates an environment where the risk of taking new approaches is incentivised and shared equitably across interested parties, in order to meet regulatory obligations and beyond. Moving towards 'beneficiary pays' models will attract greater collaboration, because it focuses on the rewards (the 'carrot') of delivering NbS, such as the multiple benefits and revenue generation, rather than on the risks and penalties of failing to deliver obligations (the 'stick'). This should incentivise people to engage with markets and reduces the 'wait and see if others will sort it' attitude. For example: more equitable enforcement of the polluter pays principle will incentivise 'polluters' to engage with markets, because they become beneficiaries of the improvements as they look to support the delivery of their obligations. Greater engagement, and creating mechanisms to pay for broader societal benefits more effectively, especially where land is at a premium, increases the potential for multiple partners and opportunities for co-funding of multiple benefits, increasing in turn the adoption of NbS. **Next steps (as part of a programme of work)** • Consolidate learnings from existing investible projects • Use learnings to refine and inform what mechanisms need to look like, and demonstrate at scale

Issue	Why is this a barrier?	Recommended solutions
Under-developed framework for markets to be created and to thrive	A lack of structure that enables markets for nature means that investment is currently fragmented, not aligned at local scale with wider planning and limited to ad-hoc examples. This results in limited collective learning and sharing of information and best practice, which leads to uncertainty and risk-aversion around the effectiveness and benefits of delivering NbS. This problem is further exacerbated by inconsistent place-based governance, planning and coordination.	**5. Test and adopt the recommendations from Financing UK Nature Recovery[7] coalition, to create a framework to establish high integrity markets for nature.** **Benefits of this solution** Establishing a national framework creates a standardised mechanism to allow markets for NbS to flourish. By agreeing the principles for this framework now (during AMP7), water companies and others can work with regulators, other sectors and policymakers to demonstrate how the framework can be applied in practice. In order to achieve this, a national scheme of coordinated pilots and demonstrators needs to be delivered. This would be possible through the creation of a regulatory sandbox focused on NbS, which would create the conditions to enable testing all the above five recommendations and innovative concepts in a well-monitored governance regime, with licence to modify and inform on conventional permitting regulations, in order to generate understanding of the long-term ability of NbS to deliver against outcomes. Valuable lessons can be learned to inform how market mechanisms for NbS will become mainstream beyond AMP8. Demonstrators should link to place-based governance, planning frameworks and long-term trading, to support continuous investment in the long run. For example, using Environment Land Management (ELM), base operating expenditure and capital maintenance ('Botex') and voluntary disclosures like TCFD (Taskforce on Climate-related Financial Disclosures) and TNFD (Taskforce on Nature-related Financial Disclosures), to create demand, ensure markets are sustainable in the long term, and to support ongoing operation and maintenance of NbS. Creating markets that provide the ability to procure the outcomes desired in a standardised and accredited way, should also mitigate the issue of water companies' performance score preventing access to innovation, creating a more even-playing field. A standardised approach to NbS market entry would drive a more consistent approach across the industry. In turn, this will enable Ofwat to assess value for money for NbS more effectively, using market-driven values, rather than individual company-led schemes. **Next steps (as part of a programme of work)** • Accelerate a pipeline of investible projects to demonstrate the value of proposed framework • Formulate the testing parameters, timescales and success criteria

[7] Financing UK Nature Recovery Coalition – Draft Recommendations

Conclusion and next steps



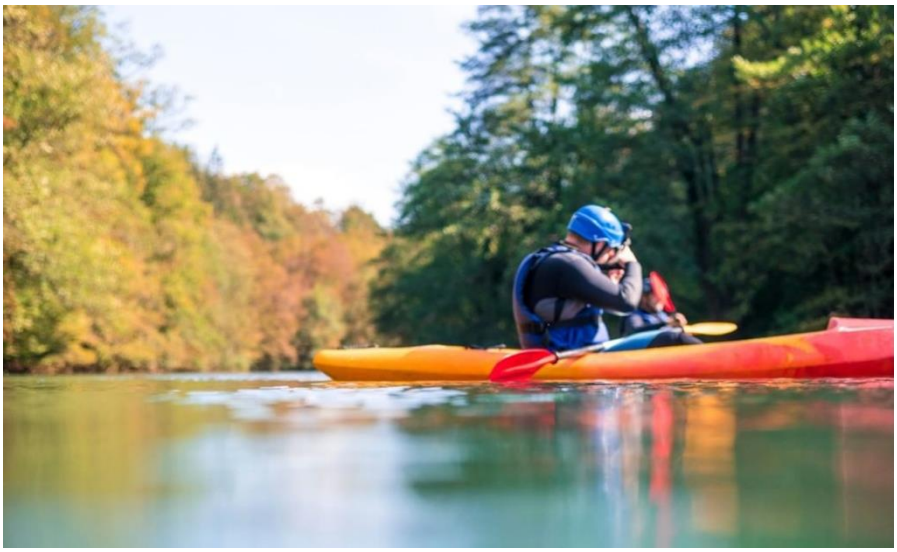
Nature-based solutions can play a key role in making the water environment more resilient to current and future threats, in a way that delivers multiple benefits to customers, society and the environment. However, there are barriers preventing implementation in an impactful way. If the recommendations set out by this paper to address those barriers are put in place, they can facilitate the water industry to act as a catalyst to: promote greater collaboration, attract more diversified and larger investment sources and drive wider adoption of NbS.

It is therefore proposed that the recommendations are tested and delivered through a programme of work, made up of work packages and demonstrators at scale, delivered locally and coordinated nationally. The work packages should include: consolidating existing practices and testing new ways of working, looking at how different financial mechanisms fit together, delivery on the ground through a demonstrable investment portfolio. This work should be delivered by the water industry working together with regulators, NGOs and others, bringing multiple sectors together to remove existing silos, paving the way for NbS to become mainstream for the long term.

Objectives of proposed programme of work

- Share and consolidate learnings from individual ongoing projects to build and cross-pollinate collective knowledge from a practical perspective
- Use these learnings to help refine, inform and embed the proposed recommendations, working with regulators, policymakers and other sectors to inform policy, deliver tangible actions on the ground and to enable a governance structure for markets to flourish
- Accelerate a pipeline of investible projects to be delivered through a markets-led approach and demonstrate the value of this approach

Benefits of delivering the recommendations through a programme of work approach

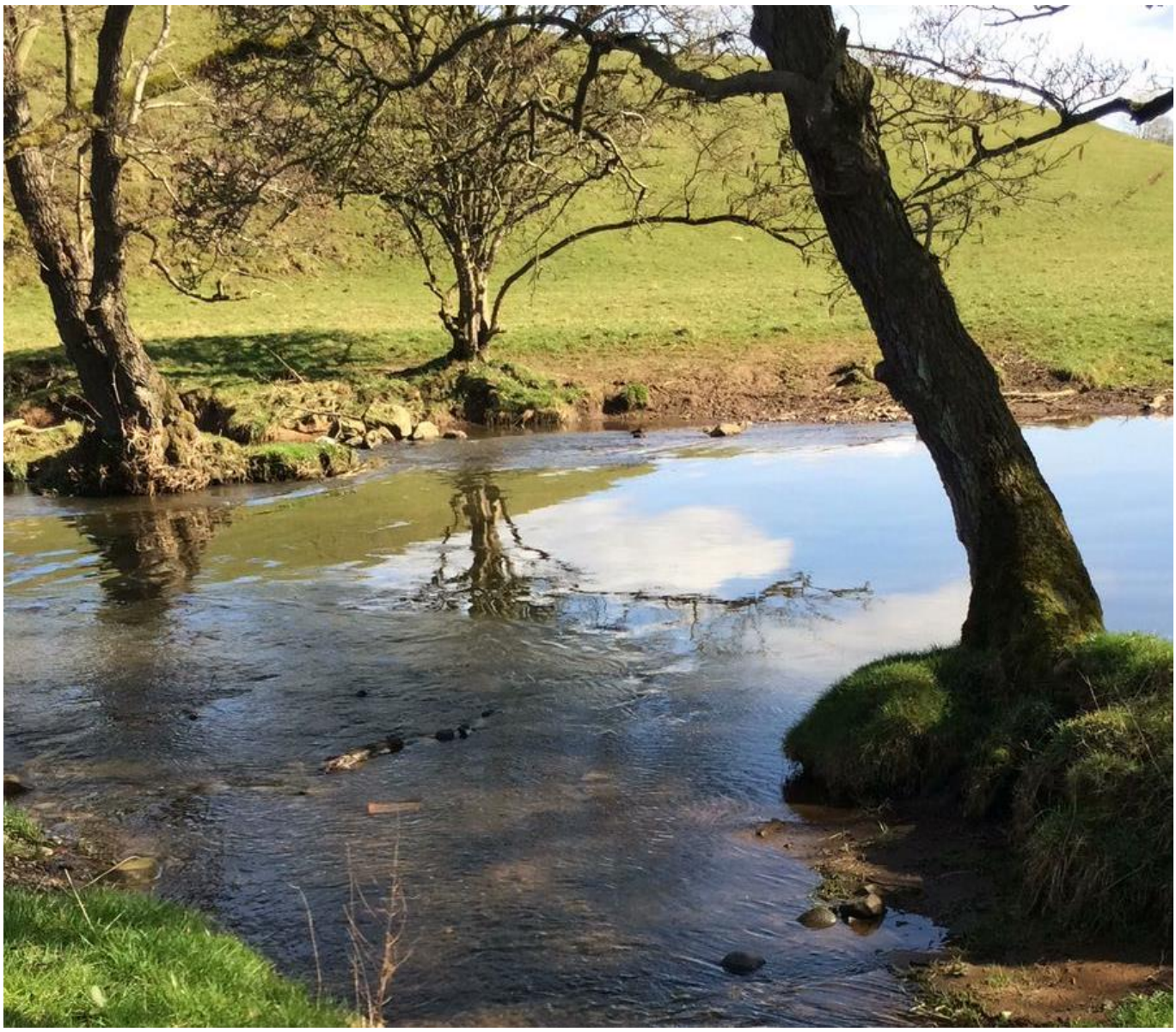


- It brings together on-the-ground experiences from existing projects with the top-down, strategic recommendations, joining up theory and practice to accelerate action
- It is an efficient way to deliver SMART and tangible objectives
- Demonstrators are a good way to employ 'sandbox' approaches, allowing collaborators to test new concepts and to 'fail fast and learn faster', in a collaborative and joined-up way. This enables acceleration of a successful outcome, in this case, the delivery of large-scale investment for nature

Appendix 1: Case studies

Case study	Summary	Key benefits
Norfolk Wetlands	The wetland treatment site at Ingoldisthorpe in Norfolk, is the first of its kind in England and has been created by Anglian Water in partnership with the Norfolk Rivers Trust. The site works as a natural treatment plant for millions of litres of water a day, where effluent water passes through the wetland to be further filtered and cleaned before returning to the river. This additional, natural filtering process further improves water quality, benefiting the whole of the river, a spring-fed chalk stream. Aside from having a practical purpose it is a huge biodiversity asset attracting breeding birds, amphibians, bats, water voles to the local environment.	• In addition to removing ammonia and phosphorus, Anglian Water is monitoring the wetland to see if it removes nutrients such as nitrates and substances such as metals and microplastics • More sustainable solution to drive customer savings and reduce carbon • Biodiversity benefits
Petteril CNB	United Utilities (UU) WFD requirements in the River Petteril to reduce phosphorus pollution from four wastewater treatment plants was disproportionately expensive to customers and failed to address wider issues in the catchment, like the agricultural contribution to nutrient pollution, exacerbated by flooding events. By working with the EA and others through a Catchment Steering Group, UU piloted the catchment nutrient balancing approach (CNB), offsetting some of its fair share nutrient targets with catchment and farm interventions, using the LENS approach to co-fund measures with Nestle, resulting in further savings for customers and delivery of wider natural capital benefits.	• 7000 kg/yr sediment (P source) • 1900 kg/yr nitrates • 500 kg/yr nitrous oxide • Lowest costs (~£7m capital efficiencies across AMP6/7) • £120k match funding • ~£350k/yr of co-investment from Nestle
Poole Harbour nitrogen reduction	In a successful trial in Poole Harbour, Wessex Water paid farmers for land management interventions to reduce nitrogen pollution, through a purpose-built online reverse auction platform (EnTrade), thereby avoiding the cost of building a new water treatment plant. This supported the water company to meet nutrient neutrality, biodiversity net gain, net zero carbon and flood risk management objectives.	To date, EnTrade has created £3.4M in contracts to support projects on ~3,000 ha and eliminated ~150 tonnes of nitrogen. The scheme continues to grow.
Rainscape Llanelli (SuDS)	RainScape is Welsh Water's approach to managing surface water and reducing sewer flooding by separating rainwater from the existing system, slowing down the rate it enters the network and by redirecting it to local rivers and watercourses, and in some cases, removing it completely. It combines sustainable drainage with engineered solutions to reduce sewer flooding and pollution and creates greener, cleaner communities.	• £115m invested over 8 years • 9,761 trees planted and 14 basins created • 52 planters and 13,390m kerb drainage installed • 41 properties removed from flood risk register and 1.5 million m^3 of rainwater no longer pumped and treated each year
Upstream Thinking	Upstream Thinking (UST) is South West Water's (SWW) innovative and award-winning catchment management programme (2010-current), focused on protecting surface and groundwater resources from detrimental landscape impacts and on developing the natural capital stock of their catchments. The range of pollutants reduced includes farming-derived nutrients, pesticides, faecal coliforms, sediment, dissolved organic carbon (DOC) and new emerging issues such as veterinary medicines and antibiotics. Since starting UST, SWW have consistently met and exceeded their environmental responsibilities and the requirements of the WINEP.	• Key achievements during 2010-15: • £3.2m invested resulted in 2,083ha of peatland restored and 416,600t of carbon stored, with £2m match funding • Allocated 180 capital grants totalling £2.2m and 7 project awards • 1,700 farms visited, with UST farmers' bottom line increased by up to £20,000

Case study	Summary	Key benefits
Wyre NFM	This project aims to attract investment in natural flood management (NFM) to enhance catchment resilience and deliver added benefits such as carbon reduction, biodiversity and improved water quality, using modelling and existing evidence to quantify benefits and pinpoint key areas in the catchment for delivering NFM. A financial governance structure based on a special purpose vehicle (SPV) is created to: • Broker a deal with land managers or 'sellers' to change land usage • Seek repayment commitments from blended 'buyers' (United Utilities, EA, local authority, FloodRe, Woodland Trust), who are looking to buy the NFM benefits but cannot individually justify the required upfront investment • Secure upfront capital from private and financial investors and pay back investment with added profit	• ~£1.5m of upfront capital secured to reduce peak flow and improve catchment resilience by up to 10% • Increased water storage ~70ha • 32,000 trees planted, with potential to sequester c.16,000 tCO2/100 years • ~15ha of peat re-wetting (restoration) to reduce GHG emissions and sequester carbon • Risk-sharing between buyers and investors (outcome-based payment) • Revenue generated for sellers to change land use and sustain costs of NFM



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