

Challenges & Choices - Detailed submission

Blueprint for Water is a unique coalition of environmental, water efficiency, fisheries and recreational organisations, part of the wider environmental NGO coalition, Wildlife and Countryside Link. Blueprint members come together to form a powerful joint voice across a range of water-based issues.

This response is supported by the following organisations:

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- CHEM Trust
- Environmental Investigation Agency
- Freshwater Habitats Trust
- Friends of the Earth
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- The Mammal Society
- The Wildlife Trusts
- Whale and Dolphin Conservation
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- ZSL

The Water Story

Q1. The way we treat water today will shape all our futures. What changes can you make to improve the water we rely on?

To improve the way we treat water will require far better integration of water-related objectives into other policy areas such as agriculture, energy and land use planning. We must increasingly consider river systems as just that; systems, recognising the relationship of rivers with other parts of the freshwater environment, and the interrelationships between the multiple stresses that affect it. When considering how to deal with these pressures we must look for solutions that answer multiple issues; for example, dealing with flood flows also reduces pollutant-rich runoff, limits the transport of invasive species, and so on. We must not forget the connection between coastal and freshwaters.

In considering the ways in which we can better manage water and in building our own legislative and policy programmes post-Brexit, we can learn from the findings of the fitness check that assessed whether the EU Water Framework Directive (WFD) was fit for purpose. Our departure provides the opportunity to build on the solid foundation provided by the WFD

and to add in our own national approaches and priorities. We could clearly do more to secure the health of our water environment, such as around freshwater biodiversity, but in doing so we should draw upon the aspects of the Directive identified as being of particular importance; these include the principle of non-deterioration, the consideration of priority substances, and the Directive's monitoring requirements.

Freshwater biodiversity is in decline not just in the UK, but globally. International research confirms that tackling freshwater biodiversity loss (in line with national and international frameworks), requires prioritisation at a local level. For some parts of our water environment, current targets and frameworks (or their implementation) do not go far enough to protect the unique biodiversity that these habitats support; for example, chalk streams, waters designated as SSSIs and Natura 2000 sites, small waters such as ponds, ditch systems and small lakes that fall outside of the size thresholds for designation as WFD waterbodies all require action to improve their status that is not well promoted through the existing River Basin Management Planning framework.

RBMPs must be alive to the opportunities to deliver the additional actions needed to secure the future of these sites (regardless of whether they are articulated through revised waterbody targets, as actions embedded in the plans themselves, or contained in complementary frameworks such as the Nature Recovery Network). Similarly, they should be alive to opportunities to deliver against the wider objectives and targets set within the 25 Year Environment Plan; for example, improving soil health, expanding the use of natural flood management solutions, and improving biosecurity to protect and conserve nature

We must work collaboratively, considering how to realise the synergies between Public sector targets, and the ambitions of sectors outside of Government. Of particular importance will be the environmental ambitions of the Water Industry, and the transformation of the agricultural sector as it moves towards a more climate-smart future.

Overarching Challenge - The Climate and biodiversity crisis

Q2. What more can we do to tackle the impacts of climate change on the water environment and what additional resources (including evidence, targets, tools and additional mechanisms/measures) do we need to do this?

We need to accelerate the implementation of both strategic and specific actions to manage catchments in ways that reduce freshwater pollution, improve water quality and regulate the quantity and timing of flow. These interventions will both support nature's recovery, and help the freshwater environment become more resilient to the impacts of climate change. Nature-based solutions are increasingly recognised as an essential approach to water management and we must restore wetlands and rivers, including managing water flow patterns, in ways that promote ecosystem processes. Restoring and rewetting drained peatlands is a key nature-based solution to climate change, with the scope to lock up carbon, benefit biodiversity and enhance human well-being. Restoring wetlands and tidal marshes can protect coastal cities from storm surges and erosion. However nature-based solutions are too infrequently incorporated into strategic or project plans. For example, flood risk management projects are often conceived in isolation from the wider catchment, missing opportunities to integrate working with natural processes alongside traditional engineering solutions. The forthcoming publication of the National Flood and Coastal Erosion Risk Management Strategy for England, and changes to the Partnership Funding calculator that will make it easier to embed nature-based approaches into all flood schemes, must be

widely communicated to stakeholders and further changes to funding regimes implemented if it emerges that activity is still dissuaded by the disconnect between different funding regimes. Funding associated with RBMP delivery may play a complementary role to FCERM expenditure.

We need to increase public and private investment in nature-based solutions for climate-related water risks, such as extreme floods and droughts (as well as for solutions to challenges covered in other chapters; many solutions will be multi-functional). The water sector in particular has a role to play in terms of climate change mitigation: nature-based solutions to water treatment potentially offer significant advantages in terms of biodiversity, construction cost and energy use, and more effective measures to drive water efficiency will reduce greenhouse gas emissions associated with pumping and treating water. An increased focus on water efficiency is particularly important in light of the recently-published National Framework for Water Resources which identified that significant further widespread abstraction reductions will otherwise be needed in the future to maintain environmental flows in rivers. Water labelling, linked to enhanced water efficiency standards for new homes via Building Regulations, should be brought forward to help reduce abstraction demands.

Questions around liabilities related to natural flood management assets, uncertainty over funding streams for maintenance, and a lack of clarity over eligibility for environmental land management payments are issues which discourage some landowners from agreeing to the construction of NFM assets on their land. The forthcoming Environmental Land Management Scheme (ELM) should seek to provide clarity on relevant aspects of this, whilst at the same time prioritising water-sensitive land management options that do not suffer from the same funding complications; particularly improving soil management, which will benefit both the environment and the agricultural sector.

Water can only be managed sustainably if all water-users in the river basin work together: all public bodies, water companies, local communities, businesses, and land and water managers. This requires new governance structures that embed the value of water, carbon and nature into business planning. For the private sector, water is both a risk and an opportunity, whether for corporate headquarters, manufacturing facilities, supply chains, or in the fields where raw materials are grown. But businesses are also uniquely positioned to champion innovative solutions to freshwater challenges, demonstrating visionary leadership that secures water for the good of the business, people and nature. More businesses need to go beyond adopting water efficiency practices to becoming better water stewards.

To achieve the holistic collaboration of stakeholders described above requires multi-stakeholder engagement combined with spatial planning. Significant benefits could be realised by integrating / aligning river basin management planning with similar processes for planning and prioritising environmental land management and delivery under Local Nature Recovery Networks.

Q3. What can we do to address this biodiversity crisis and meet the 25 Year Environment Plan targets for wetlands, freshwater and coastal habitats and wildlife?

Relative to their size and extent, freshwater habitats are of exceptional importance for biodiversity. Taking just one example of this richness: ponds alone support populations of 10% of all priority species. Mechanisms must be put in place to ensure that water-dependent habitats (including running & standing waters from source to sea; and freshwater and estuarine /coastal wetland habitats) are recognised, and their protection and restoration prioritised, within the framework of the Local Nature Recovery Strategies that will be

developed to secure nature's recovery. To ensure this, guidance which is to be put in place by the Secretary of State should set out how Catchment Partnerships should be involved, and that local priorities, opportunities and data relating to the water environment (including from Catchment Plans) should be considered integral to the development of LNRS.

Habitat restoration and creation, planned and prioritised through a spatially mapped Nature Recovery Network (NRN) informed by the local knowledge of Catchment Partnerships, should then be funded by a combination of sources including WFD-focussed funding, Environmental Land Management payments from Government, the Water Industry & other sources, Flood Risk Management Funding and through developer-funded delivery of Biodiversity Net Gain. Together, this spatial planning and framework integration can deliver the "step change in how we plan and coordinate investment and action" that the biodiversity crisis demands.

As the in-channel opportunities to improve freshwater biodiversity are progressively realised, focus must shift to other freshwater habitats including lakes, estuaries and coastal waters, underpinned by a shift in focus that favours the restoration of natural processes as the most sustainable footing for biodiversity recovery. Both cost and technical feasibility have limited action in these waters to date; to counter this, natural ecosystem function should underpin a 'no-regrets' approach to restoration.

The restoration and recreation of wetlands, such as reedbeds, wet meadows and wet woodlands, will make a significant contribution to securing biodiversity, healthy functional ecosystems and the provision of ecosystem services, as well as being crucial to the protection and enhancement of rivers, lakes and other freshwater habitats. In particular, the ecological and ecosystem services value of floodplains need to be better recognised, and the potential risk to rivers and lakes if failing to undertake improvements to wetlands should be considered as part of the cost-benefit assessment for land-based enhancements.

The mapping of opportunities must also take account of benefits to the estuarine and in-shore coastal environment given the remit of River Basin Management Plans for transitional waters and extending out to 1 nautical mile offshore; not all Catchment Partnerships have included the coast when planning and prioritising projects, particularly in areas where coastal Partnerships are active; both must feed in to the spatial prioritisation via a Nature Recovery Network as this may alter the priority of land-based projects which also benefit the marine environment.

Measures to improve joint working between Coastal and Catchment Partnerships should be supported, including via the sharing of information so that Catchment Partnerships are clearer on the contributions that they could make to improving the state of estuarine and coastal waters by undertaking work further up the catchment. Funding criteria for catchment-based projects should include an assessment of whether they have incorporated actions which will contribute to improvements in the status of estuarine and coastal waterbodies or designated sites. Similarly actions in estuarine and coastal waterbodies should consider upstream benefits including the removal of barriers to the passage of migratory fish species, and the cessation of netting activity that currently impacts migration and breeding success.

The components of freshwater biodiversity not well catered for via the existing WFD-based framework should be the focus on freshwater targets developed through the Environment Bill and / or new Nature Strategy.

The anticipated renewed focus on species conservation is welcome, with the recovery of many declining freshwater and wetland species requiring action beyond that driven by WFD delivery alone. Species conservation projects offer opportunity for public engagement and

involvement, providing a valuable means of engaging stakeholders in freshwater biodiversity issues.

Whilst some species benefit from habitat-focussed work alone, others will require more significant interventions including the control of invasive non-native species (See Qs 11 – 13), or reintroductions. Whilst more resource-intensive, the wider biodiversity and ecosystem services benefits of these approaches (e.g. reduced predation of salmonids by mink when removed to benefit water vole, improved water quality and moderation of flood peaks in rivers downstream of beaver sites) should be used in their justification.

The reduction of damaging abstraction is necessary to recover biodiversity of both river systems and wetlands. The proposals set out in the Environment Bill are a welcome start, but faster action is needed both via licence modification (and potentially with voluntary approaches playing a part where changes cannot be brought in sooner), and greater action on water efficiency in order to reduce abstraction needs.

We also welcome the proposed renewed focus on small waters such as ponds and headwaters (discussed in Q4) which house a disproportionately high portion of freshwater biodiversity given their size, and on the control of diffuse water pollution impacting upon specially protected sites (Q19 & 20).

Connectivity is a key attribute required for healthy, functioning ecosystems. The prioritisation of projects or proposals mapped through a NRN could be used to enhance connectivity, both directly (e.g. fish passage projects which improve physical connectivity, and enhancements to lateral connectivity by reconnecting rivers with their floodplains) as well as by considering the *quality* of connected habitats. For example, a river restoration project may be more valuable if it links upstream and downstream areas which have already been restored, as it increases the area of connected *high-quality* habitat.

Shifts in wider land management practices will also make a major contribution, given the impacts of agricultural land management on the freshwater environment. Achieving a shift to more sustainable land use and management will require much greater uptake of Catchment Sensitive Farming approaches, with regulatory requirements better enforced, and further voluntary approaches supported by advice, guidance and appropriate funding. To complement the current focus of CSF and similar initiatives on water *quantity*, this will include a drive to increase soil organic matter to reduce vulnerability to drought, and consideration of paludiculture principles to help agriculture adapt to wetter conditions. The Nature Recovery Network should also have a key role in identifying the most critical places where land use change can play a key part in biodiversity recovery, as well as in the provision of ecosystem services like flood mitigation.

Continued support to Catchment Partnerships, including both longer-term funding settlements and ongoing technical and policy support through the national Working Groups, will be required if we are to see the realisation of the full suite of benefits that CaBA can deliver. It is still a relatively young movement and needs this continued nurturing in the near-term if it is to continue to grow and to place itself on a more secure footing. The sharing of best practice could be further encouraged within the movement through the establishment of schemes similar to the Floodplain Meadows Ambassador programme, where officers are trained and supported and then share their learning with others in their localities; such a scheme could help to establish greater joint working between partnerships, and encourage collaboration on issues which are common across groups.

Q4. Environmental targets can generate action and provide a strong signal of intent. Could additional statutory targets contribute to improving the water environment? If so, what types of targets should be considered?

WFD targets have, despite the slow rate of achievement, been valuable in driving action. Some aspects of improving our freshwater environment are not well promoted through WFD targets and would benefit from additional statutory backing. In particular, small waters are a valuable component of the freshwater biodiversity resource which largely fall outside of the WFD monitored network and can be overlooked in terms of funding and delivery, so targets promoting their protection, restoration and re-creation would be beneficial. The Nature Recovery Network (Q3) should be used both to identify areas where the creation and restoration of small waters should be undertaken, and to incentivise delivery, acting as a guide for all funders (from Grant-making Trusts to statutory schemes like ELM) who should favour proposals that are in line with the NRN maps and plans.

The equivalent of good status should be defined for a range of small waters including ponds, small lakes and headwater streams, and targets should be used to inform a catchment-scale Programme of Measures that could be delivered in parallel to that for WFD targets.

Additional bespoke targets for chalk rivers would also be beneficial to drive local action. These could learn from locally-agreed aspirational targets such as on the River Itchen in Hampshire with regards to mayfly diversity, or from work done to establish CSMG targets for designated sites, which may have wider applicability.

A target to rectify connectivity would also be valuable, given the large proportion of rivers that are partly or wholly disconnected from their floodplains. The restoration of functioning floodplains would support wider habitat and species recovery ambitions; for example, on salmonid fish, and could also link to ambitions for nature-based solutions to flood and drought management.

These targets could be set through the Environment Bill and embedded in the forthcoming Nature Strategy, and opportunities for delivery should be identified through spatially-mapped Local Nature Recovery Strategies. They would support achievement of many of the aspirations of the 25 Year Environment Plan

Challenge 1: Flows & levels

Q5. What can be done to address the challenge of changing water levels and flows?

Initiatives that reduce water waste at the community level (such as Southern Water's community initiative) should be developed in partnership by water companies & stakeholders and championed by the water industry. The value of such initiatives lies not only in the water saved, but also in the educational / behavioural change impacts.

Temporary Use Bans (previously 'hosepipe bans') should be reviewed to increase their effectiveness, and their use as part of a sustainable water management regime should not be penalised.

Ofwat should play a more active role in driving change within the Water Industry, acting in line with an enhanced environmental duty requiring them to contribute to the achievement of any relevant environmental targets set under the forthcoming Environment Act 2020.

Other businesses should also play a more active role, particularly food & beverage retailers, via their influence over the supply chain. Given the business risks that water supply and water pollution issues pose, more active water stewardship makes sound business sense, and should be encouraged via the sharing of best practice across both the retail sector ('top down') and amongst catchment practitioners ('bottom up').

Beyond this, reducing water usage requires policy change (government initiatives / regulation / financial support) to drive / champion action, underpinned by better water labelling, and initiatives to increase public awareness around water saving approaches (e.g. leaky loos, water efficient appliances, water saving initiatives such as rainwater harvesting). These measures are necessary to drive change in existing housing stock and other existing buildings, in combination with enhanced Building Regulations to ensure that ambitious water-saving is achieved via new development.

Regional Water Resources Planning will help to embed an outcome-focussed approach to water resources management, for example with Water Resources East considering the needs of the water industry, other abstractors and the environment. This is welcomed and will support the identification & development of local solutions such as water storage and sharing, at a Catchment level.

Where Water Level Management Planning relying on voluntary approaches to meet the water level requirements of protected sites has failed, alternative measures including incentivisation, and enforcement where appropriate, should be considered.

It is important to factor in the interaction between low flows and other pressures during decision making. For example, nutrient and pollutant dilution is limited by low flows, physical habitat in poor condition is less able to cope with low flows, etc. These compounding factors support the case for holistic action.

Q6. The abstraction plan, referenced in the changes to water levels and flows narrative, explains our current and future approach for managing water abstraction. What else do we need to do to meet the challenges of climate change and growth while balancing the needs of abstractors and the environment?

As the climate continues to change, adaptation to achieve long term sustainable land use and land management will need to be addressed. For example, the growing of particularly water-hungry crops in the south and south east may no longer be sustainable.

The Environment Bill, when adopted, will create the ability to remove or change environmentally-damaging abstraction licences without the need to pay compensation. This power is extremely welcome but with changes affecting only licences modified after 2028, Blueprint are advocating for an amendment to the Bill to enable action to be taken sooner. In the absence of this, voluntary measures akin to the Water Industry's 'Abstraction Incentive Mechanism' should be employed in the interim.

Q7. What kind of a water flow environment do we want? Should we maintain statutory minimum water flow and level standards universally across England as we do now, or go further in some places based on environmental risk?

We need to go further if we are to re-establish a 'good' water environment, including by factoring in adaptation to a future climate. Using novel technology or nature-based solutions (e.g. biodiversity-rich storage reservoirs for irrigation) will play a part. The need to go further in some places should be prioritised based on ecological evidence and should also be considered in a catchment context rather than considering only the needs of specific sites, since water flows and levels through such sites cannot be managed in isolation.

Challenge 2: Chemicals in the water environment

8. What can be done to address the challenge of chemicals in the water environment?

The consultation acknowledges that with an increase in population and therefore consumption and production, as well as climate change, driving an increase in use of pesticides, the emissions of certain chemicals to the water environment will inevitably increase. It is vital to prevent chemicals from polluting water sources and groundwater in order to protect ecosystems and the quality of drinking water, and because it is time-consuming and costly to treat contaminated water.

Our recommendations are detailed more thoroughly in our response to Q9, however our overarching recommendation is that the onus needs to fall on regulating the chemicals that are in products; i.e. restricting chemicals of concern and replacing them with safer alternatives, through the approach employed by REACH (the Registration, Evaluation, Authorisation & restriction of CHemicals).

Chemicals in the water environment originate from a number of sources, including from domestic, industrial, and agricultural sources. Our views on agricultural sources are addressed in Challenge 7, so here we focus primarily on industrial chemicals used in consumer products.

The results from the [Chemical Investigation Programme Phase 2](#) (CIP2) suggested that the most dominant source of chemicals were diffuse and mostly from households. CIP2 also determined that *"the picture might be summarised as predominantly one of 'problem substances' rather than 'problem discharges'."*

The CIP report suggested that chemicals such as Polybrominated diphenyl ethers (Flame retardants, PBDEs), DEHP (a toxic Phthalate), Tributyltin (TBT, an antifoulant) and triclosan (an antibacterial) were all reporting downward trends. These chemicals have all been heavily regulated, meaning that this observation demonstrates the impact of regulating chemicals, supporting our statement that chemicals in products need regulating and that it will not be possible to address the challenge of chemicals in the water environment without restricting certain chemical classes in certain uses. Only by linking elements of the WFD with regulatory control of substances of very high concern can the intended protection of water bodies / aquatic ecosystems and water supplies be achieved.

The upcoming chemical strategy will be vital in clearly defining goals to reduce emissions of hazardous chemicals in the environment and it is vital that the chemical strategy addresses the issues of pollution related to both legacy and emerging chemicals.

In terms of persistent pollutants specifically, we must learn from previous lessons to prevent persistent pollutants entering the water environment. A reduction plan on very persistent chemicals is urgently required within the chemical strategy that should cover all very

persistent chemicals, beyond just Persistent Organic Pollutants (POPs) as defined by the Stockholm Convention (we have included more detail in our answer to Q9).

The above points demonstrate that it is of high importance that the UK remains part of REACH in order to achieve our ambitions of protecting aquatic ecosystems and water supplies; this will prove to be much more cost effective and will prevent unnecessary work, time and money being spent on system duplication.

9. Do you support the Environment Agency's proposed strategic approach to managing chemicals as referenced in the Chemicals in the Water Environment challenge document? If not, what changes would you make?

The actions listed to manage chemicals in the water environment are good in principle but will be insufficient to achieve the outlined aims if levels of concern are inappropriately defined.

The need to prioritise chemicals of concern for monitoring is understandable; in practice it is not realistic to analyse all samples collected (biota, water column and sediments) for the hundreds of different chemicals that could be present. However, by looking only for a few priority substances there is a risk of missing other hazardous or problematic chemicals. Moreover, chemicals are added to the list of priority substances extremely slowly compared to the pace at which new chemical substances are being put on the market. In that regard, we welcome the development of an early warning system that should allow this bias to be corrected and fill the gaps from routine monitoring programs. Consideration should therefore be given to prioritising emerging chemicals for monitoring.

The rationale adopted by the EA to prioritise chemicals of concern for localised or national actions is described as a risk-based approach, where chemicals represent a risk if they are present in the water column or biota above a certain threshold which has been defined by expert committees. However, this approach has a number of shortcomings that we list below, followed by our recommendations on what should be done to achieve greater prevention of chemical pollution in water.

- 1. Threshold values are only available for a limited range of substances and a limited number of matrices:** Determining thresholds for all the synthetic substances present in the freshwater environment is a mammoth task and illusory as the appropriate data to derive such thresholds are lacking for hundreds of synthetic substances. Therefore, thresholds are established only for a selected range of priority substances. In practice, priority substances are mostly substances which have been studied for many years (including legacy chemicals which are already highly regulated). Such an approach doesn't allow us to assess if a risk is emerging from less studied substances.
- 2. Threshold values change over time:** Often new scientific evidence arises indicating that threshold values in use (Environmental Quality Standards) have been underestimated and need revision. This means that levels of risk will rise over time, not necessarily due to increased exposure, but because of a new assessment of the hazard of a specific substance. Where current risk is being underestimated, necessary actions are being delayed for years or even decades, and this is particularly concerning when it comes to highly persistent chemicals (see below).
- 3. Some substances are non-threshold:** for some chemicals, particularly Endocrine Disrupting Chemicals (EDCs), genotoxic, carcinogenic, Persistent,

Bioaccumulative and Toxic (PBT) chemicals, and very Persistent/very Bioaccumulative (vPvB) chemicals, where the effects are serious and irreversible, the uncertainties in the risk assessment are very high and it is doubtful if a protective safe level of exposure exists. Therefore, a threshold approach is not acceptable for these types of substances. All remaining emissions should be minimised (the approach taken by REACH for PBTs), and an assessment that remaining exposure levels are 'safe' would be misleading.

- 4. Thresholds are derived only for individual substances:** Risk assessment based on exposure to single substances is not representative of real-life exposure to chemicals. Organisms and people are co-exposed to many synthetic substances (e.g. industrial chemicals, pesticides and pharmaceuticals with endocrine disrupting properties). Many of these chemicals will have additive action at specific endpoints. The international [EU-funded project SOLUTIONS](#) reported that the WFD currently ignores any risks associated with chemical mixtures even though "*evidence is mounting that chemicals can produce joint toxicity even when combined at levels that singly do not pose risks*" ([Kortenkamp et al., 2019](#)). This approach therefore likely underestimate risks; Blueprint member CHEM Trust has long argued for the use of additional mixture assessment factors to address these additional uncertainties.

Conclusion: The definition of 'of concern' is critical, and a purely 'standards-based' approach is likely to be underestimating the risk posed to wildlife and people by the full range of hazardous chemicals and mixtures present in water and drinking water. It may also delay the necessary action that should be taken to achieve the aims of the strategic approach set out by EA. A series of recommendations to ensure the approach is preventive enough are set out below:

Recommendation 1: Adopt a grouping approach in risk management: In the absence of adequate data to derive safe thresholds for a wide range of substances present in the water environment, the approach we recommend is to use grouping of chemicals with similar structures. Chemicals with a similar structure should be assumed to have the toxicological properties as harmful as those of the most toxic known substance in the [group](#). Moreover, we suggest that the development of group thresholds should have priority over single substance risk assessments.

Recommendation 2: Account for chemical mixture occurrence and effect in monitoring and risk assessment: There are many knowledge gaps regarding mixture toxicity, and as for single substances, deriving environmental standards for every possible mixture is illusory. However, an integrated approach based on chemical monitoring + mixture modelling + effect-based methods (see [Brack et al., 2019](#)) + ecological monitoring (e.g. population trends; species traits trends) is recommended to develop a better understanding of the impact of real-world chemical mixture pollution on the water environment and to inform risk management actions ([Altenburger et al., 2019](#); [Brack et al., 2019](#)). Detailed recommendations have been published in the context of the [EU-funded project SOLUTIONS](#) and are described in this [blog](#).

Recommendation 3: All very persistent chemicals should be considered non-threshold substances and 'of concern': As very persistent chemicals accumulate in the environment, any threshold will be exceeded at some point should emissions continue. Levels of persistent chemicals in the environment will

then remain above the threshold for many years, even if emissions are stopped (see PFOS, PCBs, PBDE etc.) ([Cousins et al., 2019](#)).

Lessons from the past are telling us that there is no time to wait. Indeed, for several reasons, harmful persistent chemical pollutants still represent a threat to people and wildlife long after their uses have been banned: they persist in the environment for a very long time; it is extremely challenging to remove them once they are out there; and emissions never fully cease as many of these chemicals are locked in products currently in use meaning that low-level emissions will continue for many decades until total destruction of these products (e.g. banned flame retardants in sofas). Hence, the very persistent chemicals of today [will be the legacy chemicals of tomorrow](#).

Currently there is a gap in the regulatory framework regarding very persistent chemicals. In the Stockholm Convention, a chemical can be identified as a POP if it is: persistent, bioaccumulative, toxic and has potential for long range transport. Currently there are 29 POPs listed in the Stockholm Convention, and studies have estimated that over 1,000 substances could meet the POP criteria. However, there are over 4,500 chemicals in the PFAS family of highly persistent chemicals alone, (Per- and polyfluorinated alkyl substances) indicating that the number of very persistent substances in the environment might in reality be much higher.

Moreover, several recent studies have brought to the attention that persistent chemicals, which are not bioaccumulative, but are highly mobile in water, are posing a threat to drinking water quality and more broadly to the aquatic environment. Chemicals with these properties are not covered by the current regulatory frameworks, but proposals have been developed to add new PMT and vPvM criteria to REACH ([Arp and Hale, 2019](#); [Neuman and Schlieber, 2019](#)). Preventive actions should be taken to avoid irreversible contamination of water bodies and drinking water by these chemicals - starting with the introduction of relevant risk management tools to enable that.

We call for an urgent action plan on very persistent chemicals (beyond the definition of POPs according to the Stockholm Convention) to be developed in the context of the upcoming chemical strategy developed by Defra. The data on very persistent chemicals in the water environment from decades of monitoring performed by the EA represent enough evidence to support this call for action. Further monitoring performed by the EA should gather evidence on the fate and pathways of emerging very persistent chemicals to inform management and regulatory measures that should be taken to stop their build-up in water and drinking water.

Recommendation 4: An efficient alert system in place to trigger action:

Monitoring acts as the alert system, and the alarm can be triggered only if chemicals are being monitored. We see the development of an early warning system by the EA as very positive and would like to stress that the following groups of chemicals detected in monitoring should instantly 'trigger the alarm' and therefore prompt action based on the presence of individual substances or mixtures: EDCs, CMRs, PBTs and vPvB, PMTs and vPvM, chemicals listed as [SVHC in REACH](#) and chemicals on the [SIN List](#) developed by ChemSec. These chemicals should be phased out as a priority from products and all uses leading to environmental releases.

Additionally, chemical monitoring and biological/ecological monitoring should be integrated to facilitate diagnosis regarding the impact of chemical pollution on ecological health ([Altenburger et al., 2019](#)).

Sampling concerns: We are also concerned that the strategy outlined in the Chemicals in the Water Environment challenge document does not detail the Agency's plans for sampling. Population growth and the predicted increase in chemical use is expected to result in an increase in chemicals released into the environment. In addition, due to climate change, *'heavier rainfall will wash more chemicals into our rivers and streams'*, while *'in drier spells, less dilution will be available in rivers meaning concentrations of some chemicals will increase'*. Over the past few years the number of samples and sample sites tested by the Environment Agency has [decreased](#). We are therefore concerned that the current sampling approach is not sufficient to effectively monitor chemical pollution that will occur as a result of the increase in chemical use and more extreme weather events.

Q10. What balance do you think is needed between current chemical use, investing in end-of-pipe wastewater treatment options and modifying consumer use and behaviour?

There should be a significant emphasis on reducing the use of hazardous chemicals, supplemented with end-of-pipe wastewater treatment options to address emissions from previous uses. Consumers should be provided with information on the chemicals in the products they use, but modifying consumer use and behaviour should not be relied upon to address chemical pollution. Production of chemicals is predicted to increase rapidly over the next couple of decades and must also be addressed.

Reducing the use of hazardous chemicals via regulation should be the primary method to reduce chemical pollution in the water environment (see Q8-Q9).

While the priority is to reduce chemical emissions at the source, end-of-pipe wastewater treatment options are also needed to address emissions from previous uses of chemicals, such as banned flame retardant chemicals that were used in furniture. End-of-pipe wastewater treatment options should not be relied on as the primary method, however, as they are very expensive and not fully effective for certain chemicals. Upgrading wastewater treatment technologies to make them more efficient might be necessary, however system upgrades are likely to have a higher carbon footprint. In this regard, reduction at source via regulation is also a better way to remain in keeping with the UK Climate Change Act requirements to reduce our carbon footprint, while still addressing the need to reduce hazardous chemicals entering the water environment. Nature-based solutions (e.g. phytoremediation) which could also provide carbon sequestration should be explored more and we are pleased to see this mentioned in the consultation document.

Moreover, the fate of sludge produced in the wastewater treatment plants is currently problematic. We are very concerned about the use of sludge that may contain hazardous chemicals as fertiliser in agriculture (e.g. page 28 of the Chemicals Challenge document notes that *"Chemicals ranging from different metals, personal care products, pharmaceuticals, and POPs, such as flame retardants, are all found in the materials that are spread to land"*). There is an urgency to address this issue and we are therefore glad that a special strategy is being put together on contaminated sludge.

Changes to consumer behaviour should be a very small part of the strategy to reduce chemical pollution in the water environment. Avoiding the emission of chemicals in our daily lives is only realistically possible for a small range of chemicals (for example consumers may be able to safely dispose of unused pharmaceuticals, or other products that clearly contain

hazardous chemicals such as paints and solvents). However, there are hundreds of synthetic chemicals in everyday products, such as fluorinated chemicals in non-stick frying pans, waterproof clothing or make-up, that consumers may not be aware of. Information about chemicals in products is not easily accessible, and the average consumer would not possess the level of knowledge needed to avoid all of these chemicals. In addition, informed consumers may struggle to find affordable alternatives. The [NonHazCity project](#) conducted in the Baltic Sea region experimented with ways to increase awareness among the general public on hazardous chemicals and to promote best practice at home. Their [report](#) demonstrates the limitations of such an approach. The responsibility to prevent chemical pollution must lie with regulatory bodies and enforcement agencies, and not the individual consumer.

However, promoting best practice at the level of municipalities and companies could have a significant impact. See recommendations put forward by The NonHazCity project for [municipalities](#) and for [companies](#).

Challenge 3: Invasive non-native species

Q11. What can be done to address invasive non-native species?

We suggest five key actions which would help to address the impacts caused by invasive non-native species (INNS).

1. Account for INNS management within RBMP cost-benefit assessments: Invasive non-native species are recognised as one of the top five threats to global biodiversity (IBPES, 2019). Although they are not strictly a criterion of assessment within the WFD and therefore are not in themselves sufficient to lead to failure under the WFD, INNS have the potential to negatively impact the ecology of a water body such as by decreasing fish populations or altering flora compositions. Therefore, INNS have the potential to impact the overall ecological status of a large number of water bodies. Some 43% of Improvement Programmes for England's Natura 2000 sites (IPENS) highlight issues with INNS, and they present an [increasing risk to the favourable condition of protected sites](#) and species assemblages, with potentially-invasive non-native species being recorded at 90% of SACs and 96% of SPAs across all habitat types.

Despite this, the wider benefits of INNS management in supporting the aims of Protected Area legislation, the Water Framework Directive and wider biodiversity conservation are not well reflected within RBMPs. To address the major threat that INNS pose to water bodies achieving or maintaining good ecological status under the WFD, the impacts of INNS and the benefits of management must be made more apparent within RBMPs. This should include clearer information for stakeholders about where funding opportunities are available through RBMPs to support INNS management that is assisting in the maintenance ('no deterioration') or improvement of ecological status under the WFD.

2. Manage invasive non-native species at the catchment scale: Historic management of INNS has often been ad-hoc, uncoordinated and undertaken without due consideration of a site's location within its wider catchment. For example, INNS management has been undertaken lower in a river catchment without recognising there are populations of the INNS upstream. This presents a non-strategic approach to management as the INNS spread downstream to re-invade the treated site. Similarly, trapping of American signal crayfish (*Pacifastacus leniusculus*) is based on an outdated postcode system rather than considering

the management of the species at a catchment scale. This contrasts with other stressors on aquatic environments which are managed at the catchment scale.

To bring INNS management in line with other aquatic management approaches, INNS distribution and management should be integrated into RBMPs, bringing together stakeholders to encourage a **more coordinated, catchment-based approach to INNS management**. This will improve the ability to identify priority areas on which to focus INNS management, respond rapidly to contain new invasions, and encourage partnership working between LAGs, government agencies and recreational groups. To ensure effective partnership working, it is imperative that these partnerships are adequately funded, on a multi-year timeframe, to enable groups such as LAGs to effectively plan and deliver their work. This includes funding to support after-care and the restoration of native assemblages after INNS have been removed ([Bucharova, A., and F. Krahulec \(2019\) Native seed addition as an effective tool for post-invasion restoration, Basic and Applied Ecology, doi:](#)) Allocating funding for post-invasion restoration into all INNS management projects will support the 'no deterioration' target under the WFD by increasing the resilience of the ecosystem and reducing the risk of treated habitat being invaded by other INNS (Pearson, D.E., Y.K. Ortega, J.B. Runyon and J.L. Butler (2016) *Secondary invasion: the bane of weed management, Biological Conservation, 197: 8-17*)

A key part of improved catchment-level management of INNS will be the engagement of landowners in all elements of INNS work; prevention, surveillance and early eradication and long-term management. Effective management of INNS at a catchment-scale must therefore engage landowners and encourage coordinated action and partnership working with their LAGs and other stakeholders. An opportunity to support the implementation of a strategic, coherent approach to INNS management is the inclusion of INNS as a public benefit in the Environmental Land Management Scheme (ELM) under the Agricultural Bill. Measures should be provided both at a local and catchment scale, that help to manage and control INNS and assist in the restoration of habitats following treatment as well as the provision of 'Check, Clean, Dry' materials in key locations. This will provide multiple benefits, preventing the deterioration in status of WFD sites through reductions in bank erosion, improved water quality and potentially lower risk of flooding (Harvey, G.L., T.P. Moorhouse, N.J. Clifford, A.J. Henshaw, M.F. Johnson, D.W. Macdonald, I. Reid and S.P Rice (2011) *Evaluating the role of invasive aquatic species as drivers of fine sediment-related river management problems: the case of the signal crayfish (Pacifastacus leniusculus). Progress in Physical Geography, 35: 517-533*) as well reducing the direct impact of INNS on aquatic and riparian biodiversity. RBMPs should consider the INNS information and regional INNS priorities outlined in the five Regional Invasive Management Plans (RIMPs) under the EU RAPID LIFE project (2017-2020) and incorporate the actions outlined in the Boating and Angling Pathway Action Plans.

3. Raise awareness and encourage good biosecurity: To minimise the further spread of INNS and protect sites from a deterioration in WFD status, greater efforts are required to enhance biosecurity and increase awareness of INNS. The EA 'encourage communities, LAGs and Catchment Partnerships to raise awareness of good biosecurity and understand the impacts of INNS on their local environment and how they can help'. To achieve this, a substantial increase in funding is required to facilitate wider efforts to raise awareness amongst the general public and to produce further communication materials for other key groups such as gardeners and pet owners.

The GB Non-Native Species Secretariat should work closely with stakeholders to ensure materials are relevant to the target group and to disseminate materials to Catchment Partnerships. This would also assist in the recommendation of the EAC to create a citizen army of 1.3 million people to help identify INNS and respond to biosecurity outbreaks.

4. Improve the disconnection between WFD delivery and Catchment Partnerships The WFD covers waters from the uplands through to estuarine and coastal waters. However, many Catchment Partnerships have a focus on rivers and there has been limited consideration of estuary and coastline systems. For example, Chinese mitten crab (*Eicheir sinensis*) is present in estuarine areas but its impacts within RBMPs are often overlooked. Management efforts within these areas should be viewed at the same catchment scale to ensure a coordinated response and minimise their spread upstream. The need to facilitate greater join-up between Coastal and Catchment Partnerships has been highlighted in other sections of this consultation response and collaboration around INNS is a further area where this is necessary.

5. Inclusion of INNS and biosecurity in all planning responses: RBMPs and Catchment Partnerships present an opportunity to increase awareness of INNS and biosecurity within their Local Authority planning departments. A greater emphasis on INNS and their impacts within RBMPs could encourage local authorities to require developers to manage INNS as part of the 'net gain' aspect of their applications. Clear mention of INNS within RBMPs will also help local authorities engage more effectively on this subject with Catchment Partnerships that have better knowledge of INNS and their management.

The EA should also include wording on INNS and biosecurity in all responses to planning applications for activity being undertaken in the water or on the water bank. This should include links to biosecurity and INNS identification pages and a requirement for the contractor to produce and implement a biosecurity plan before undertaking the work. Although contractors are obliged to consider INNS when they are working in a site where INNS are present, applications should recognise that contractors may be travelling to undertake the new project after working at another site with INNS. Through consideration of INNS at the planning stage this will help to reduce the risk of INNS being accidentally spread between catchments on machinery and clothing.

Q12. How would you promote Check, Clean, Dry to all recreational users of water, including those who are not in clubs or attend events?

1. Further engagement of a variety of groups in Catchment Partnerships: LAGs and recreational groups have run a series of **awareness-raising events** to increase the general public's awareness of INNS and biosecurity. For example, the New Forest Non-Native Plants Project have run well-attended awareness raising events for anglers, river keepers, and water bailiffs to promote the Check Clean Dry (CCD) campaign. Similar events should be run for other sectors, either running workshops for key target groups, engaging them in Catchment Partnerships, or running stalls at popular shows, events or fairs. This includes **engagement of local outdoor retailers** that provide equipment to recreational users to encourage retailers to promote CCD in their stores, online, or to include CCD on their packaging or on till receipts.

Changing behaviours to make biosecurity part of the everyday routine requires adoption of biosecurity from a young age. Organisations such as LAGs and recreational groups that **engage with young audiences** such as Scouts and Guides should be encouraged to educate young groups through the creation of INNS badges and provide opportunities for volunteering to undertake INNS work as part of the Duke of Edinburgh Award Scheme.

INNS and biosecurity should be added to the primary and secondary school curriculum and demonstrated on all field trips including residential trips to field study centres. Educating and

engaging young individuals would ensure that the next generation of recreational users are aware of good practice and ensure it is embedded at an early age as well as presenting an avenue to engage their parents in the issue. In the long-term this would reduce the risk of INNS being spread between different catchments.

2. Provision of funding to install wash down facilities and display CCD materials at high-risk locations: To ensure no deterioration of WFD status, **funding should be provided to support the installation of wash down facilities** at high-risk sites that contain either highly impactful INNS or at locations that are at substantial risk from invasion. This will simultaneously protect water bodies from invasion and act as education facilities to promote best practice to all users visiting that location. This could include popular recreational water bodies, sites that frequently host national or international competitions, or Natura 2000 sites protected for rare native species, or species assemblages. Directing all users of these sites through the wash down facilities on their entry to the site accompanied with educational messaging would help to reach and embed biosecurity practice to visitors. Where possible, these wash downs should include the provision of hot water as this has been shown to be more effective in inducing mortality in INNS than cold water.

To complement the wash downs, **CCD information should be placed at popular recreational waterbodies, viewpoints and walking spots.** This could include entry and exit points of national parks, and at popular view/scenic points, bird hides and wildlife reserves, making use of existing information boards or using other techniques such as QR codes where more intrusive signage may not be appropriate. Catchment Partnerships can help to identify key locations and resources should be provided to assist in the installation of signs, posters or other resources.

3. Greater use of recreational sport celebrities and major sporting events to promote the campaign: Sport ambassadors have huge followings on social media and have the potential to reach wider and/or different audiences to those that are engaged by representative bodies and environmental groups. Engaging celebrities with the CCD campaign and getting them to promote and demonstrate good biosecurity through their media channels would help to endorse biosecurity to new individuals and normalise biosecurity behaviour within the sport.

Similarly, although recreational users may not be attending competitions in person, someone interested in the sport may watch large national or international events online. Including the CCD materials at these events, and/or having it discussed in the live coverage presents an opportunity to reach large numbers of individuals that partake in that activity. Funding through the RBMPs should be provided to support the installation of CCD signs and the production of materials to display at these events.

Q13. Are there any barriers stopping you adopting good biosecurity when you are in or near water?

The short time frame between site visits: Environmental officers and volunteers can check and clean their boots between visits, however, they frequently do not have sufficient time to dry boots between sites which they visit daily during the summer months. In these instances, some opt to have two pairs of equipment, but alternating between days can still be an inadequate time frame for equipment to dry properly.

Size of the equipment: For some aspects of work, large machines and boats are required. This can include boats, Aquatractors and water pumps and pipes. These pieces of

equipment cannot be cleaned on site without the presence of a wash down facility and present a hard task to clean and dry between trips, especially in hard-to-reach areas

Challenge 4 Physical Modifications

Q14. What can be done to address the physical modification of our rivers and coasts?

Existing work to identify and remove unnecessary/defunct structures, and enforcement to deal with unconsented works, must continue. This work must be adequately funded. Some stakeholders report finding the consenting process for structure removal difficult to navigate, and may benefit from enhanced guidance or training webinars.

There are currently few options available to remove or reduce the impact of non-defunct structures, including many which are EA-owned - structures such as gauging weirs can have extreme impacts upon natural flow regimes and research and the sharing of best practice around the options available to modify or replace such structures would be beneficial.

Preference must be given to schemes which utilise nature based solutions / natural flood management wherever possible; it will not always be possible to adapt to climate change and the pressure to implement hard engineering solutions in order to attempt to do so must be resisted; we must instead think in terms of mitigating the impacts of a changing climate, and select solutions which work *with* nature. Working with natural processes is now more readily considered by many Risk Management Authorities but there remain questions which concern some stakeholders, such as around long-term maintenance, liabilities and so on, which would benefit from resolution. As our understanding of such techniques grows, findings must be widely communicated amongst RMAs, particularly Local Authorities & Internal Drainage Boards, to ensure that all involved in flood risk management are able to draw upon techniques that work with natural processes in the widest sense, considering for example not just leaky dams, but measures such as soil health.

Where new structures are required, their impact upon freshwater ecology can be reduced by requiring the installation of fish passage measures (rather than only 'making provision for' them), as is already the case for European Eel.

Q15. Giving more space for rivers and coasts to move and adjust naturally will regenerate habitat, improve wildlife and help us adapt to climate change. What can you and others do to support these changes?

Spatial planning must prevent development on floodplains, and measures to ensure sustainable land use (e.g. arable reversion) and management (e.g. crop rotations) will be necessary to support our adaptation to the effects of climate change, helping to restore the functionality of some floodplains. High proportions of rivers are disconnected from their floodplain by embankments and flow control structures, limiting the scope of those floodplains to hold water during high flows and contributing to downstream flooding issues. This loss of connectivity must be reversed.

Mapping of priority (NERC section 41) wetland habitats which identifies existing areas of good-quality habitat as well as opportunities for restoration, should be drawn upon to identify areas where habitat restoration or recreation will be valuable to support biodiversity delivery as well as creating functional floodplains / coastal habitats that can play a role in flood and

coastal erosion risk management. The available mapping must be more actively promoted to deliverers including RMAs and Catchment Partnerships.

Challenge 5: Plastics pollution

Q16. What can be done to address plastics pollution in the water environment?

Globally, 2,248 species of plants, animals and [microbes](#) are known to interact with aquatic plastic pollution. Impacts are increasingly documented and range from deleterious interactions with macroplastics (>5mm), to the sinister and less understood impacts of microplastics (<5mm). Macroplastics can be used as a nesting material by some [birds](#), and cause widespread mortality through entanglement in [species](#), such as sharks, rays, cetaceans and pelagic fish. Microplastics are arguably an even higher cause for concern, with impacts ranging from decreased reproductive and locomotive ability to toxin transfer and likely impacts on the planktonic carbon pump. Microplastics are readily ingested by many animals, from [crabs](#) to [sea cucumbers](#), [plankton](#) to [barnacles](#), and [fish](#) through to [whales](#).

Such pollution can have consequences for us too, when plastic enters the food chain, occurring both via marine life and terrestrial systems. The additives, oligomers and residual monomers present in plastic are often endocrine disruptors, neurotoxins, and potential carcinogens. Furthermore, a growing body of evidence demonstrates that these toxic chemicals are transferred along marine food chains. This has been experimentally demonstrated for (i) [zooplankton to zooplankton](#), (ii) [bivalve molluscs to crabs](#), (iii) [fish to marine mammals](#), and (iv) [phytoplankton to zooplankton to fish](#).

As much as 80% of this harmful plastic in the oceans originates as [litter in rivers](#), and now contaminates [farmland](#), [bottled water](#), [tap water](#), [beer and table salt](#), as well as existing atmospherically in [particulate form](#). With production of plastic packaging forecast to quadruple by 2050, the need for 'gold standard' legislation on plastic pollution is more urgent than ever. The EA should therefore be lending its weight to support actions and targets that focus on reducing pollution at source, raising public awareness and cleaning up existing pollution where possible. These should include:

An 'all in' deposit return scheme that collects drinks containers of all sizes and materials. According to Earthwatch, plastic bottles are the biggest source of plastic pollution in rivers; and 700,000 bottles are [littered every day](#). Introducing a deposit return scheme could drastically reduce that figure.

An extended producer responsibility scheme that is built to reduce waste and increase resource efficiency. Designed to incentivise full lifecycle improvements in products and packaging, an EPR scheme should help facilitate reuse during the design stage, rather than focusing on end-of-life solutions that provide only a band aid solution.

Supporting the extension of a ban on single-use items of all materials, including plastic, which pollute our waterways. The proposed ban on single use plastic such as stirrers, straws and cotton buds is an urgent necessity but it does not go far enough to reduce plastic pollution. Philip Dunne MP, Chair of the Environmental Audit Committee has said it is "very disappointing" that the Government has delayed the ban. He has said whilst it is completely understood that the response to coronavirus should dominate Government resources currently, "it is crucial that the pandemic does not threaten progress being made with

relatively straightforward steps to leave the environment in a [better state than we found it.](#)" The Environment Agency should obtain a cast-iron commitment from DEFRA that the ban will be introduced as soon as possible.

Other items such as single use cutlery, sachets, balloons and more are also causing severe damage to wildlife and habitats in both the freshwater and marine environment.

Reducing plastic waste in our waters will also require more education of the public and human behaviour change. Research is required regarding what triggers or techniques can be used to stop people discarding plastic waste into the environment, and to move away from our over reliance on disposable plastic items. A series of public awareness campaigns to link terrestrial activity to the impacts of plastic pollution in freshwater and marine habitats should also be explored. This could include greater support to the '[Yellow Fish](#)' scheme to highlight the connectivity of different habitats, supporting beach cleans and urban beach cleans for more built up areas, as well as building on the stark images seen in Blue Planet to highlight some of the harmful impacts plastic has had on wildlife around the UK.

To tackle the plastic already in the environment, measures such as water sensitive urban design (WSUD) and increased implementation of SuDS must be flagged for new developments, and should be incorporated into planning regulations, recognising the role that these measures play in filtration.

Develop initiatives with stakeholders including the fishing and shipping industries. This should include promoting the [Fishing for Litter](#) initiative and working with the IMO to further develop and deliver its action plan on marine plastic litter from ships through improving systems for the reporting and recovery of lost fishing gear, improved port reception facilities and the marking of fishing gear to help determine ownership and better direct mitigation efforts. Additionally, the EA should be cooperating with multi-stakeholder initiatives such as the Global Ghost Gear Initiative, to which the UK government is a signatory, to embed efforts to prevent, mitigate and recover lost fishing gear in the environment by working with fishing stakeholders to implement best gear management practices across the supply chain.

Recognising that plastic pollution is a global problem requiring a global solution, support a global agreement on plastics. While the aquatic environment is often the end point for poorly managed plastics, solutions are required further upstream to effectively 'turn off the tap,' and while action at a national level is critical, the problem is inherently transboundary and requires global coordination. Fundamentally, in order to transition towards circularity, we need caps on virgin plastic production in order to ensure the waste stream is manageable in the UK and overseas.

The above measures would provide the right policy mix of advice, incentives, regulation and enforcement needed to work coherently. These measures should then be included in a 'Roadmap', showing how the range of policy mechanisms will be used and reviewed to support environmental objectives for the sector in a systematic way over time.

Q17. What actions should the Environment Agency take to reduce plastic pollution?

Research led by Bangor University and Friends of the Earth found that microplastics were present in all UK inland waters tested, highlighting the need for widespread monitoring of inland water systems in the UK. Microplastics should be added to the list of pollutants regularly monitored in inland waters, requiring agreement of an accurate, repeatable,

reportable method for microplastic quantification. The full consequences microplastics are having on organisms, ecosystems and human health are not yet fully understood. Yet, in alignment with the [Precautionary Principle](#) (Rio Principle 15), a lack of scientific understanding of the issue is not an excuse for inaction. Indeed, where there are threats of serious and irreversible environmental and societal damage, a lack of certainty surrounding the issue should elicit policy responses that would accommodate for a worst-case scenario.

When considering action to prevent or remediate plastics pollution, the impact upon receptor sites such as coastal habitats including seagrass beds should consider the full range of impacts including the impact upon species using these habitats for key parts of their life cycles (e.g. fish nurseries) and the impact upon the carbon uptake potential of what is increasingly being recognised as a key part of our 'blue carbon' sequestration infrastructure.

The EA should consider convening 'producer responsibility groups' to encourage collaboration and best practice adoption amongst the business sectors that are a key source of plastic pollution, and should ensure that they consider the benefits of collaborations with other sectors where a multi-sectoral approach would be beneficial to pollution prevention / monitoring / clean-up. It is essential to ensure industry optimises plastic reduction on both a manufacturing and consumer level. The reduction of plastic entering rivers via washing machines needs innovation and attention, for example.

This also highlights a broader point – plastics and microplastics have indeed risen up the agenda, but little is being done with regards to regulating the myriad of toxic chemicals such as BPA that are present in up to [74% of everyday plastic products](#). Furthermore, there are likely a range of other chemicals or mixtures of chemicals that are not currently being monitored or reported on, meaning that we know little of their extent or impacts. We should continue to work on the identification and control of chemicals with our European neighbours post EU-exit, drawing on expert guidance, and must consider how to best deal with issues not covered under the remit of REACH.

As the main producers and exporters of plastic waste to countries that do not have the capacity to manage it, developed countries have a primary responsibility to address the unsustainable and poorly regulated waste trade. As the accredited competent authority for England, the EA have a responsibility to join the call for enacting stronger legislation on the international waste trade and collaborate with enforcement agencies and other stakeholders to expose and prosecute illegal shipments wherever possible. The Conservative manifesto pledged to ban plastic waste exports to non-OECD countries, but Turkey has already overtaken countries like China, Malaysia, Thailand, and Vietnam and become the main destination for UK plastic waste. It's no secret that Turkey has very limited infrastructure and capacity to deal with the plastic waste crossing into their borders in an environmentally and socially responsible manner. As such, from a policy perspective, the UK needs firmer legislation and regulation on the waste trade. We need a holistic suite of measures to phase down waste exports focused on addressing the key drivers of the problem: unsustainable growth and consumption of packaging, a lack of domestic recycling and reprocessing infrastructure, and limited end-markets for secondary materials.

The EA also have a responsibility to bolster efforts to tackle unnecessary and avoidable plastic pellet loss (also known as 'pre-production pellets' or 'nurdles'). Around 230,000 tonnes are lost to the oceans annually¹, constituting the second largest source of marine plastic pollution; and initiatives such as the Great Global Nurdle Hunt continue to expose just how significant and ongoing pellet pollution is in the UK. Currently, the mitigation measures for minimising unintentional releases are largely based on Operation Clean Sweep (OCS) – a voluntary, industry led initiative. However, the one-off sign-up as opposed to annual memberships, low uptake across the supply chain, the lack of independent auditing or

reporting on implementation of the guidelines means that little is known about the effectiveness of OCS across the plastic industry. The magnitude of pellet emissions to the environment is a clear indication that the voluntary approach has not been adequately implemented and that regulation is needed. An [EU Commission](#) – funded report found that a supply chain accreditation system is by far the most impactful, most cost effective and least administratively burdensome means of minimizing pellet loss due to poor operational practices. Such a system could reduce emissions by up to 95%, is already familiar to larger companies and suppliers, and has extra-territorial benefits due to the global nature of the plastics supply chain. This approach is laid out in [a policy briefing](#) by the Rethink Plastic Alliance.

In this vein, there are several actions that the EA should take to further tackle this major source of microplastic pollution. Firstly, EA should improve its messaging on OCS. There is widespread agreement among industry, NGO and decision makers that OCS is not sufficient to ensure zero loss of pellets, and this has been highlighted in the British-Irish Council commitment to take further action. Though the toolkit can be useful to provide companies guidance on improving their best practice measures, EA should bring clarity to its messaging around OCS to recognise that it is not alone sufficient to verify that a company is correctly implementing best practice and is not proof of zero pellet loss. Moreover, in the context of ongoing work to improve upon OCS and commitment by UK Government to take recommendations on a supply chain approach into account, the EA should take initial action to ensure efficient incorporation of these solutions when they come into place. This could include working to improve understandings of potential pollution hotspots in England by mapping plastic raw material handling sites, becoming involved with the creation of the Publicly Available Standard through the review process, and ensuring awareness raising and training in best practice principles for inspectors that visit plastic manufacturing sites.

Lastly, as our response to Q16 states, the EA should support greater ambition for domestic legislation currently under development (e.g. EPR, DRS, SUP ban), explore public awareness campaigns and work with stakeholders to develop and deliver additional projects that can clean up existing pollution streams.

Challenge 6: Pollution from abandoned mines

Q18. What can be done to address pollution from abandoned mines?

Few full-scale treatment scheme case studies for **metal mines** are operational; the science to support remediation is in its infancy, and needs further R&D support. Many mine sites are remote, so innovative techniques need to be applied to develop treatment schemes which are passive, or which can be powered by locally-generated renewable energy.

Pollution from point source discharges is easier to deal with than diffuse sources, and remediation techniques are easier to apply, although adequate land space is needed for treatment systems to be installed. This can be challenging where mine sites are designated, however the case of Force Crag Mine situated on National Trust land provides one example of how positive enhancement for nature conservation through the mine remediation works has made the site more resilient. Further research will enhance the efficiency of point source treatment schemes enabling innovation and design of treatment systems that require smaller footprints. These could incorporate the use of renewables, including water power where appropriate, to aid and assist treatment systems.

Dealing with metal pollution from diffuse sources (spoil heaps) is more challenging, and R&D programmes must develop remedial solutions that are cost effective and sensitive to the historical nature of many abandoned mine sites. Future changes in climate will likely result in more mobilisation of metal wastes - either as soluble/particulate metals during high rainfall events, or from slippage and scour erosion during storm events which could have significant downstream impact. Assessment of the future stability of waste heaps at metal mine sites should be a requirement and one that landowners could assist with. Growing understanding of the scale of metal loadings from such sites should be supported through funding as should trialling remediation techniques and growing case study sites.

Uncontrolled discharges brought about by deterioration of underground mine workings is a real concern, particularly associated with metal mines where concentrations of hazardous elements present a risk to human and river health. Fuller understanding of internal mine workings should be obtained by working with national organisations such as NAMHO and local mining heritage groups. In the Lake District, a mining heritage group works closely with the statutory agencies and land owners to ensure local knowledge of such sites is well understood and in some cases this enables remediation or mitigation works to be carried out which lessen the likelihood of a discharge event. Establishing relations and working arrangements with such groups should be encouraged.

The science behind the treatment of **coal mine** discharges is better understood, with works undertaken successfully at several sites. Impacts from coal wastes (spoil) remains an issue however (e.g. National Trust land at Durham Coast), with harmful pollution still occurring at a substantive scale. For coal mines, support and funding to deal with large-scale impacts from former mining activity remains the main requirement to enable works which reduce both environmental impacts and hazards to human health.

Challenge 7: Pollution from agriculture and rural areas-

Q19. What can be done to address pollution from agriculture and rural areas?

The right policy mix is required – advice, incentives, regulation and enforcement need to work coherently. A ‘Roadmap’ should be developed, showing how the range of policy mechanisms will be used to support environmental objectives for the sector in a systematic way over time.

A clearly defined set of basic environmental rules across all farmland is required. This would create a level playing field for farmers and create a baseline on which to build future agri-environment schemes. The full suite of EU based environmental regulations and standards need to be secured into English law and the current regulatory framework needs to be updated to fill gaps (e.g. those arising from the removal of cross compliance) and to support new priorities (e.g. soil health,) recognised as critical in light of future climate pressures

A regulatory framework akin to that proposed by IEEP in their [report](#) titled ‘Risks and opportunities of a [post-EU environmental regulatory](#) regime for agriculture in England’ is required.

As part of this approach, all exempt slurry storage facilities must be brought into the Water Resources (Control of Pollution) Silage, Slurry and Agricultural Fuel Oil (SSAFO) regulations 1991. As we transition to a new regulatory and incentive system, there is a case for providing transitional and time limited financial support in the form of soft loans to help

farmers to achieve higher standards, recognising that such support may be required for those investments which are particularly costly.

Advice is also critical to help farmers and land managers manage the change ahead and for the successful implementation of basic rules and environmental incentives. Examples from SEPA have shown that advice is critical to compliance with regulation. Such advice needs to include why better slurry management is necessary from a regulatory point of view, but also how it can benefit the environment, and their business, by, for example, reducing the risk of bovine TB [transmission](#). The provision of advisory support is currently heavily reliant on the charitable sector, and adequate resourcing is required.

Current non-compliance is widespread, leading to environmental harm and costs to society. The EA have reduced enforcement capacity (farms can expect a 1 in 200 year chance of being inspected) and there has been a [57% cut in EA](#) funding from 2010-2019

There is [evidence](#) to suggest that voluntary action by farmers alone will not come close to dealing with the scale of the problem. The farm regulatory visits undertaken in the Axe catchment show that after a decade of advisory visits, the catchment continued to decline and there was no significant improvement in farming practices.

The objectives of environmental regulation applying to farming [are not being met](#). The system needs to be urgently changed to address its shortfalls and resources put in place for on the ground enforcement, advice and incentives.

A WWF report titled 'Saving the Earth - A Sustainable Future for Soils and Water' estimated the costs in England of following a similar enforcement approach to that of SEPA in Scotland are approximately £5.8m per year. An increase in resourcing for monitoring and compliance will be needed to increase compliance with existing requirements and to accompany any new regulations; the government should recognise the significant cost savings overall associated with investing in enforcement.

The private sector has a very important role in recognising and remedying the impacts of supply chains. Supermarkets have huge potential to influence their supply chains by strengthening standards, driving awareness of the issues and promoting good practice on farm. In addition, the private sector could play a role in influencing customers by driving positive environmental behaviour.

WWF are calling for a mandatory Due Diligence obligation for business, which would require them to identify environmental risks and actual impact within their operations and supply chains, and assess how to mitigate these risks and impacts. The company should publish a due diligence plan and report on the effectiveness of progress made under it.

There is an increasing opportunity to leverage private sector funds to co-finance public sector subsidies for changing land management practices and land use. Significant possibility exists within the water industry, where water companies want to invest in protecting raw water resources through catchment management, and many companies are trialling a range of approaches including product substitution, reverse auctions and payment by results. But there are other sectors which derive benefits from the land that may be prepared to engage, including food/drinks supply chains, energy, transportation, insurance and housing developers / construction firms. There is an opportunity to develop a funding base through private sector payments for the delivery of ecosystem services, and examples from outside of the water industry are already emerging, such as in south Hampshire where nitrate neutrality is a requirement for development in order to protect the Solent SAC, and

Hampshire & Isle of Wight Wildlife Trust are securing [changes in land management to reduce nitrate losses](#), funded by developer contributions.

Private sector standards may also play a part. There is a role for earned recognition with compliant farms being rewarded with fewer inspections. As it currently stands it is unlikely that private sector standards can act as a proxy for complying with regulations as some standards fall short of what is required by the law and their core role is not in applying government policy. There may also be [tensions](#) between the desire to build the brand and levels of farm participation, with the commitment to rigorous inspection and compliance with standards. However, there may be a substantive role for assurance schemes in taking responsibility for the oversight and promotion of non-regulatory standards. It may be helpful to establish a well-founded set of common metrics for all assurance schemes; In his role as Secretary of State for the Environment, Michael Gove stated that despite the positive role of current assurance schemes “there is no single, scaled, measure of how a farmer or food producer performs against a sensible basket of indicators, taking account of such things as soil health, control of pollution, contribution to water quality as well as animal welfare”

Q20. How can we support the farming sector to excel at innovative solutions which benefit both productivity and the environment? What should these solutions look like?

A new Environmental Land Management Scheme should identify suitable options that fund farmers to genuinely deliver for nature, using the Tests & Trials process to explore options. Measures specific to floodplain management would be valuable to deliver biodiversity, water quality and flood risk management benefits in a coherent way.

Farmer clusters should continue to be supported via an equivalent of the facilitation fund, as a means of promoting innovative thinking and joint working. Collaboration based on catchment geography will be of particular benefit to the water environment, and should be used, for example, to incentivise strategic Natural Flood Management measures, which will be more impactful if approached at a catchment scale .

Adequate funding for innovation and research is required, and should be centrally coordinated, perhaps via the establishment of a body equivalent to UKWIR for the water industry.

A greater focus on soil health is needed to benefit both productivity and the environment; water running off farmland carrying soil and agrochemicals is a major threat to production and has significant impacts upon the freshwater environment. Measures focussing on increasing the organic content of soil will form a valuable part of the solution here.

Challenge 8: Pollution from towns, cities and transport

Q21. What can be done to address pollution from towns, cities and transport?

For new development, the prioritisation for development of brownfield land that does not have high environmental, amenity or heritage value would support investment in sites to decontaminate land that could otherwise leach pollutants into our waterways so long as there are robust measures to assess biodiversity value of brownfield sites. It is important that approaches to remediate sites ensure that any pollutants do not spread.

Spatial planning for urban areas and transport infrastructure needs a sequential approach and should ensure water is given weight. New development must be evaluated across a catchment area, not in isolation, for linkages or bottlenecks within the system that result in pollution from inappropriate management.

For existing developments, NOx emissions from urban areas and transport are a major source of atmospheric nitrogen deposition onto freshwater bodies and the Clean Air Strategy 2019 actions must be delivered as a priority to reduce these emissions.

Evidence suggests that misconnections are a significant problem, particularly in urban areas. Often caused by inexpert plumbing, better awareness amongst householders and trades is required to prevent their creation, and initiatives like the 'Outfall Safaris' developed by the Crane Valley Partnership can be effectively delivered by Catchment Partnerships to identify and rectify existing misconnections.

Q22. How can sustainable drainage systems and green infrastructure be most effectively used to tackle pollution from urban areas? What challenges are there to using them?

Impacts on water quality from a new development should be considered in the early stages of the design process and a greater emphasis on high quality design, both of buildings and places, is needed.

Quantitative assessment and modelling of approaches could support the development of effective sustainable drainage systems, reducing pollution by ensuring that green and blue infrastructure are effectively integrated into new developments.

Biodiversity net gain could also play a role where the replaced/restored habitat helps to regulate water flow. However, net gain must be additional to current requirements to deliver green and blue infrastructure.

Measures such as green infrastructure, Water Sensitive Urban Design and SuDS must be made mandatory in land use planning. Green and blue infrastructure should be integrated through planning policy and mandatory in all greenfield development and brownfield redevelopments, recognising the role that these measures play in improving water quality as well as providing multiple benefits around biodiversity, greenspace, air quality and health & well-being.

Effective monitoring and enforcement is necessary to ensure the impact of development is minimised.

Challenge 9: Pollution from water industry wastewater

Q23. What can be done to address pollution from water industry wastewater?

Inadequate sewerage systems place our environment at risk today and in the future. With the challenges to the drainage and wastewater system we face due to future housing growth and climate change there is an urgent need to formalise and standardise how we plan properly for the future. Blueprint support mandatory drainage and wastewater management

plans & welcome the framework requiring the creation of a Drainage & Wastewater Management Plan (DWMP) for each of the wastewater areas served by water companies in England and Wales. These plans will be invaluable in establishing a strategic and collaborative approach to managing wastewater and in securing the investment necessary in wastewater management through the Price Review and Asset Management Plan (AMP) process.

With regards to nutrient management, significant improvements in discharges from large wastewater treatment works (WwTWs) have taken place over the past 20-30 years, largely as a result of investment to meet the requirements of EU Directives (Urban Waste Water Treatment, Bathing Waters, Water Framework Directive). These investments have been made possible through successive AMP rounds.

Tighter controls on discharges have led to significant reductions in nutrient levels particularly in larger river systems. However, in many areas nutrient levels remain significantly above ecologically meaningful thresholds with the result that ecological recovery has not taken place.

Current data on reasons for waterbodies failing to meet good status indicate that phosphorus pollution, P, remains a significant issue (55% of waterbodies are failing due to P). We have seen a shift in focus from point sources of P to addressing diffuse sources (typically seen as agricultural in origin) perhaps reflecting a belief that water industry sources have been dealt with. We believe that a more joined up and integrated approach is needed to all forms of pollution. Point sources such as wastewater treatment works represent a relatively constant source of 'bioavailable' P throughout the year and hence remain a concern as they operate during the period when ecological impacts are most likely (e.g. algal blooms). Similarly agricultural sources may typically have had limited impact at the time of year when they have been most prevalent (being washed in to rivers by winter rains) as uptake of these excess nutrients by aquatic plants will be limited outside of the growing season, however as weather patterns shift, more intensive rainfall in summer may mean that the impact of agricultural nutrients (as opposed to simply sediments) may become increasingly significant.

As part of the more integrated approach to managing pollution, greater attention needs to be given to the impact of smaller point sources both regulated (smaller WwTWs) and unregulated (e.g. septic tanks). These small discharges are typically seen as irrelevant when viewed at the catchment scale but can have a significant cumulative impact as well as a localised impact. Standing waters, wetlands and smaller waterbodies are particularly vulnerable to these cumulative and localised impacts.

A challenge for smaller WwTWs is that it is often difficult to achieve consistent standards of nutrient removal and so, to enable permit compliance, less stringent limits (permitting greater nutrient release) or simply descriptive (rather than numeric) consent standards are set. A more intelligent approach to consenting, possibly combined with green technologies such as treatment wetlands, could encourage a higher level of nutrient removal to be attained the majority of the time without the risk of breaching consent conditions when performance dips.

Future approaches need to take a more integrated approach across different pollution sources (point and diffuse, large and small) and encourage innovation by the water industry as well as those developing and providing small private treatment works. The development of Drainage & Wastewater Management Plans provides the ideal opportunity for this.

We are concerned about the cocktail of chemicals and other materials (e.g. microplastics) which find their way into the water environment. Water industry discharges are a significant source of many of these chemicals which have their origin in domestic wastewater as well as

other sources. There is further scope here for raising awareness among the public and manufacturers to address the problem at source. The issue of such residual chemicals in sludge from WwTWs is discussed under Challenge 2, Chemicals.

Combined Sewer Overflows remain a significant issue for many of our freshwaters and coastal waters. These need to be addressed as a matter of urgency; the need to monitor the performance of storm overflows was set out by Government in 2013, with the expectation that the majority be monitored by 2020. CSOs and other storm overflows discharging into rivers were then prioritised for event duration monitoring under an [Assessment Framework](#) in order that EDM could be brought in by the Water Industry during the Asset Management Programme 2015–20 (AMP6). Where EDM has identified frequent spills, water companies should commit to rectifying contributing maintenance issues within a year of identification, and where design is at fault, remedial action should be taken for all environmentally-damaging CSOs and those non-compliant under the Urban Wastewater Treatment Regulations, where it is cost beneficial to do so, during AMP7. Where complete resolution is not cost-beneficial, water companies should be required to implement any individual components of a scheme which are cost beneficial as stand-alone items, recognising that these may reduce the frequency or extent of spills even if they do not remove them completely.

We welcome the commitment of many water companies in their Business Plans to further increase Event Duration Monitoring of these overflows during AMP7, and would like to see a) greater communication of EDM results to stakeholders, particularly in areas where swimming or water-sports are prevalent, and b) proposals brought forward through a proposed Private Members Bill which would see greater action taken to reduce reliance upon CSO operation. Nature-based solutions including SuDS should be specifically considered as part of any CSO impact-reduction programmes.

The Water Resources Management Planning process has resulted in the development of sophisticated approaches to modelling future growth and climate scenarios and their impacts on water availability. Innovative visualisation tools have also been developed to help stakeholders understand the problems and comment on potential solutions and trade-offs. Similar tools could be developed for DWMPs.

Q24. What opportunities exist for water companies to collaborate with other sectors and organisations on measures to improve the water environment?

The DWMP framework identifies the need for collaborative planning. Local knowledge will help to inform effective plans, such as by identifying areas where misconnections are common or CSOs overspill frequently. Where such knowledge does not already exist, collaboration may be valuable in helping to obtain it; for example through the establishment of Citizen Science initiatives.

There will also be crossover with the development of Local Nature Recovery Strategies; priorities for the restoration of freshwater biodiversity will be set out within these, informed by Catchment Plans and local knowledge, and may be useful in informing water industry plans; for example by identifying where opportunities may exist for the creation of multifunctional urban greenspaces that provide for biodiversity and rainwater / surface water capture, or where treatment wetlands at WwTWs could also provide habitat for important freshwater species. Indeed, LNRSs may help to identify where nature-based solutions to water industry issues could best be located to provide the greatest added benefits.

Catchment partnership working

Q25. How can local partnerships become more inclusive and representative of all of the stakeholders within their catchments?

- Included in Q 26

Q26. How can local partnerships achieve a better balance of public and private funding to support and sustain their environmental work?

This year's CaBA Benefits report highlights that during 2018/19, for every £1 directly invested by Government, CaBA partnerships have raised £3.3 from non-Governmental funders. They have shown a year-on-year increase in their engagement with Water Industry, Local Authorities and Businesses, and as well as funding partnership delivery, some have begun to provide direct funding for partnership hosts.

However, the expectation upon these partnerships is not matched by the level of support made available. It must be recognised that Catchment Partnerships, where well supported, are best placed to achieve some elements of water management. They are effective at securing collaboration and galvanising local action, but they are not a replacement for government investment in areas such as regulation and enforcement, and whilst voluntary approaches may be successful in places, policy and regulation must still provide the 'teeth' to support the efforts of local collaborative partnerships.

The short-term nature of funding available to partnerships for core costs limits their scope to do more. A longer term, strategic approach to the funding of CaBA would address the challenge of job security faced by those working for host organisations, with the loss of staff being a significant risk to the movement which results in the loss of skills and relationships. Importantly it may also limit the scope to secure private sector investment since the private sector are unlikely to commit significant long-term funding without the certainty that the partnership and the approach have wider financial and other backing.

Such an approach to funding would also enable the various CaBA Working Groups to continue with their role of championing CaBA to a range of key stakeholders. The Urban Water group, for example, has engaged more than 60 differing Local Authorities over the last 2 years. In short, therefore, greater funding for CaBA in the mid-term will help drive the already substantial gains in diversity and leveraging of funds realised to date, and will support the Partnerships in their continuing journey to a more secure and sustainable financial footing.

Who pays?

Q27. How should the step change in protecting and improving the water environment be funded and who should pay? Are there any barriers to doing this?

A barrier to effective protection of the water environment is the low level of compliance with baseline regulation in the land management sector. The regulation of land management should be 'regularised', ensuring that government oversight of land management matches the level expected for other sectors. This would improve standards of practice and reduce risks and harms in an efficient manner.

The decline in government spending on regulatory activity can be linked to the deterioration of water quality in many areas, and can be seen as a significant contributor towards the failure to achieve compliance with a range of national targets and with the objectives of the suite of environmental regulation designed to protect our water environment. Neither advice, incentives nor regulation delivered in isolation of the others will generate the desired environmental improvements in water quality and adequate investment in regulatory enforcement must be made if we are to see our freshwater environment recover and to provide the range of ecosystem services that society can benefit from.

We support the creation of a properly funded, well-coordinated and streamlined advice service that adheres to a set of clearly defined objectives set at a local level, integrating effectively with regional/national goals. This is critical to help farmers and land managers manage the change ahead, and to create a culture where they understand what is required, and why, for the successful implementation of basic rules and environmental incentives. There needs to be a strong link between incentives/advice (from accredited providers) and knowledgeable enforcement (with visits and monitoring undertaken by qualified inspectors). The major obstacle to effective compliance with existing regulation is the lack of funding for enforcement. Government should recognise the significant cost savings associated with investing in enforcement.

For rural pollution, we support a move over time toward the 'Five P' approach to regulation – where the 'potential polluter pays to prevent pollution'. We support this because strict application of the polluter pays principle is problematic in some circumstances, such as around the cost of improving slurry storage. In such situations, financial assistance for meeting the current baseline should be offered as loans. However, polluters should not be paid to meet the regulatory baseline, and a future Environmental Land Management Scheme should ensure that all land managers meet basic standards of practice and are then rewarded for efforts beyond this level.

Beyond regulation and enforcement, where the cost burden should largely lie with the polluter, the benefits of a healthy freshwater environment are received by all, so should to some extent be funded by all. This means that government funding (via both direct funding through Defra bodies, and through a future land management scheme), and water industry investment (funded by customer bills) remain legitimate and key sources of investment. Other logical funding sources include developer contributions related to biodiversity net gain and green infrastructure provision, business investment through water stewardship or biodiversity commitments, green finance, and flood funds from sources including Local Authorities, Local Economic Partnerships, and local beneficiaries. Investment from the third sector, including via grant giving bodies, will also play an important role. The challenge is how to bring all of this together, so Government must ensure both the *availability* of funding, and mechanisms that enable the alignment of delivery under diff schemes.

We have illustrated in Challenges 1 & 9 some of the contributions that the Water Industry can and does make to securing improvements to the freshwater environment. The Price Review process, underpinned by the WINEP (Water Industry National Environment Programme) provide a valuable means of prioritising and funding environmental improvements. Government, Ofwat and other regulators can support and encourage further delivery by ensuring that companies can fund this work as a core element of their business plans. Cost Benefit Analysis must adequately account for the wider benefits of environmental enhancements and of nature-based solutions, such as treatment wetlands, and must ensure that due weight is given to customers' desire for environmental delivery, even where this may not be the lowest-cost option in the short term. Long-term resilience and sustainability must be better factored into decision-making.

To conclude, the complexities of the freshwater environment mean that the spatially planned framework of the Nature Recovery Network will be valuable for identifying where priorities align, and can therefore be used as a framework for the pooling of funding to deliver benefits which would not have been affordable without collaboration. It should direct the co-investment of WFD-focussed funding, Environmental Land Management payments from Government, Water Industry and other sources, Flood Risk Management Funding and developer -funding for the delivery of Biodiversity Net Gain, amongst other sources, to ensure the strategic and cost-effective enhancement of freshwater biodiversity and the water environment, for the benefit of nature and society.
