Written evidence submitted by Fidra

Executive Summary

Evidence has been provided in this response to answer nine of the inquiry questions.

• What are the best indicators for river water quality that could be used as targets being developed under the Environment Bill?

Fidra support the use of additional statutory targets that are measured and enforced. These targets should extend their remit to full groups of environmental pollutants in the water environment

• How could drainage and sewage management plans, introduced by the Environment Bill, play a role in reduced sewer discharges?

Plans should include all bodies involved in drainage and not those just managing sewage, and must ensure individual drainage and sewage systems are able to prevent such overflows, through assessment of the system's capacity and the current and future demands on them.

• How adequate are the monitoring and reporting requirements around water company discharges? How can technology improve and assist with transparency and enforcement?

To ensure monitoring is both effective and relevant, requires either clearer knowledge of what chemicals are in use in the UK (through greater chemical transparency), so that monitoring can be targeted at the most relevant species.

• What is the impact of plastic pollution and other materials on drainage and water quality in rivers and what should be done to mitigate it?

Plastic pollutants have been shown to leach chemical additives into the environment, and adsorb persistent organic pollutants, as well as having impacts on wildlife through entanglement and ingestion. Preventing plastic and chemical pollution at source is the most effective way to reduce impacts on water quality.

• How can consumers be persuaded to change their behaviour to minimise pollution?

We must not rely on consumer behaviour to reduce these pathways, but move to avoiding harmful product design.

• What is the required investment level needed to minimise storm overflows vs the scope for sustainable drainage and nature-based solutions?

There must be a focus on future-proofing against climate extremes.

• Should local authorities and highways agencies be given a duty to prevent pollution to watercourses without prior treatment?

Yes, but they need to be resourced to do this.

• How effective is Ofwat's remit and regulation of water companies? Does it facilitate sufficient investment in improvements to water quality, including sustainable drainage systems and nature-based solutions such as constructed wetlands?

The rules and stringent design standards set by Ofwat need adaptation in order encourage the water industry to invest in developing new technologies and driving innovation

• Is adequate investment being made in adapting water treatment systems to future climate change?

To help tackle the current and future impacts of climate change we must work to reduce the pressures on the water environment to build more resilient landscapes and ecosystems.

About Fidra and reason for submitting

Fidra is an environmental charity working to reduce the burden of pollution on the environment. Fidra works with the public, industry and governments to deliver solutions which support sustainable societies and healthy ecosystems. We use best available science to identify and understand environmental issues, developing pragmatic solutions through inclusive dialogue.

Several of Fidra's projects address threats to the water quality of our rivers. Fidra's Cotton Bud Project highlighted sewage related debris entering our rivers and seas. Our Pitch-In project focuses on microplastic granules (usually rubber crumb) lost from 3G artificial pitches that can reach our waterways. The Great Nurdle Hunt project aims to stop the loss of pre-production plastic pellets (nurdles) using citizen science and collaborative dialogue with industry and decision makers. The Best Fishes project aims to reduce impacts of Scottish salmon farming on our freshwater, estuarine and coastal environments.

Additional projects look at the chemical pollutants per- and polyfluorinated alkyl substances (PFAS), bisphenols and flame retardants, all of which are known to impact river water quality and freshwater biota. Our work focuses primarily on reducing chemical and plastic use at source, avoiding unnecessary use in consumer products and increasing transparency throughout supply chains.

Fidra is a SCIO and Scottish Registered Charity SC043895.

Inquiry Response

1. WHAT ARE THE BEST INDICATORS FOR RIVER WATER QUALITY THAT COULD BE USED AS TARGETS BEING DEVELOPED UNDER THE ENVIRONMENT BILL?

To address the biodiversity crisis and meet the 25 Year Environment Plan targets the UK must achieve and exceed measures in the River Basin Management Plans (RBMPs) and Water Framework Directive (WFD). This requires addressing threats from plastic and chemical pollution, and ensuring RBMPs are effective, supported and have regular performance reviews. Whilst achieving current Water Quality measures in RBMPs and the WFD are important first steps, there are new and emerging threats to water quality not currently captured in their targets. Having missed the UN's 2020 biodiversity targets, a

precautionary approach is needed with targets set for a wider range of plastic and chemical pollutants in our rivers.

Fidra support the use of additional statutory targets that are measured and enforced. These targets should extend their remit to full groups of environmental pollutants in the water environment, such as total per- and polyfluorinated alkyl substances (PFAS), to prevent regrettable substitution.

Targets could also be set around long term and widespread environmental monitoring, and sharing this data to ensure new and emerging threats are identified and addressed. National and international targets should be set to address plastic pollution. Recognising that plastic pollution is a global problem requiring a global solution, we would like to see international collaboration on plastic pollution problems, such as the proposed United Nations global plastic treaty[1].

To support biodiversity, outcome-focused targets are needed to ensure species and habitats benefit. A Global Biodiversity Framework under the Convention on Biological Diversity with protection and restoration targets for rivers can be translated into specific national targets.

2. HOW COULD DRAINAGE AND SEWAGE MANAGEMENT PLANS, INTRODUCED BY THE ENVIRONMENT BILL, PLAY A ROLE IN REDUCED SEWER DISCHARGES?

To be truly effective, drainage and sewage management plans should include all bodies involved in drainage, and not just those managing sewage. In the case of Combined Sewer Overflows (CSOs), increased volumes of water in drains due to storm events cause untreated sewage to enter the environment. This provides a route for chemical and plastic pollution into our waterways[2]. Plans must ensure individual drainage and sewage systems are able to prevent such overflows, through assessment of the system's capacity and the current and future demands on them. Effective regulation of plans is needed to ensure capacity is not exceeded.

3. HOW ADEQUATE ARE THE MONITORING AND REPORTING REQUIREMENTS AROUND WATER COMPANY DISCHARGES? HOW CAN TECHNOLOGY IMPROVE AND ASSIST WITH TRANSPARENCY AND ENFORCEMENT?

Current monitoring of discharges through the Chemicals Investigation Programmes and under the WFD focuses on a number of legacy chemicals, already subject to bans and restrictions. Taking the example of PFAS, restricted chemicals have been quickly replaced with alternatives from the same group, often with very similar negative environmental impacts. To ensure monitoring is both effective and relevant, requires either clearer knowledge of what chemicals are in use in the UK (through greater chemical transparency), so that monitoring can be targeted at the most relevant species, or an analytical approach that gives a cumulative measurement of total PFAS. As a group of over 5000 chemicals, monitoring total PFAS, rather than continually keeping pace with changing industry use, is a much more realistic and feasible option.

Another issue that could be addressed by a group-based monitoring approach is bio-transformation. Whilst PFOS and PFOA are now restricted for use, other non-regulated forms of PFAS can breakdown to these end products in the environment. This also highlights that source reduction initiatives should not be limited to PFOS and PFOA alone, the full list of precursors needs to be regulated.

4. WHAT IS THE IMPACT OF PLASTIC POLLUTION AND OTHER MATERIALS ON DRAINAGE AND WATER QUALITY IN RIVERS AND WHAT SHOULD BE DONE TO MITIGATE IT?

Macroplastic impacts river species through entanglement and ingestion, ultimately degrading to secondary microplastic which is associated with leaching and adsorbing toxic chemicals, and biological contaminants[3].

Primary microplastic found in rivers includes plastic pellets from industry and rubber infill from artificial sports pitches. Industrial pellets have been shown to leach chemical additives into the environment, and adsorb persistent organic pollutants [4] [5] [6]. Lost infill can cause significant localized pollution of nearby ecosystems including soils and rivers[7], with micro-rubber particles and associated leachate shown to significantly impact life in water environments[8]. Microplastic pollution is near impossible to clean up once released. Even microplastic captured in sewage treatment is often released directly to the environment via spreading sewage sludge [9]. Such processes need regulated closely to prevent further pollution.

Remediation for chemical pollution is also often impossible once in the environment, showing a need to focus on reducing both plastic and chemical pollution at source. Producers must ensure chemicals in products are not only safe for use, but safe should they reach the environment, and be held responsible for contamination caused by their products, even if those products were not used as expected. We must not rely on consumer behaviour to reduce these pathways, but move to avoiding harmful chemicals in product design.

4.1. Preventing Pollution from Packaging

Preventing plastic pollution at source is the most effective way to reduce its impact on water quality. Current commitments to dealing with this issue are insufficient. Misguided innovation is creating new products claiming to deal with the plastic pollution crisis. From so-called 'biodegradable' plastics that break down to microplastics in the environment[10], 'compostable' food and drink containers that are not yet compatible with waste infrastructure[11] to paper, board and compostable packaging that contains persistent chemical pollutants[12].

Of particular concern is the use of PFAS in products marketed as 'sustainable'. Our recent report, "Forever chemicals in the food aisle", found concentrations of PFAS more than 300 times the current limit in Denmark, in moulded fibre compostable takeaway boxes marketed as environmentally friendly. Although PFAS pollution is widespread across the UK[13], no effective environment remediation exists at the scale required to protect our freshwaters, so action must focus on reducing sources.

4.2. Reduce, Reuse, Recycle

Following the principles of the waste hierarchy, reducing plastic consumption and single-use items should be priorities. We should promote circular approaches, prioritising sustainable, non-toxic, reusable products. For example, encouraging a switch away from single-use expanded polystyrene (EPS) fish boxes, to alternative systems such as reusable bulk bins, could remove a large proportion of the 22 million (approximately 7500 tonnes) EPS fish boxes currently used within the UK annually[14].

4.3. Extended Producer Responsibility

We urge creation of a robust Extended Producer Responsibility scheme, as a minimum following the requirements of the 'Single Use Plastic directive' (EU Directive 9012/904), in line with the polluter pays principle. The scheme should ensure producers of plastic products internalise full lifecycle costs of items they place on the market.

4.4. Nurdles

The raw material of the plastics industries, known as nurdles or plastic pellets, is a major microplastic source. UK pellet losses could amount to 1000 tonnes (35 tanker loads) annually[15]. Our project 'The Great Nurdle Hunt' highlights continued pellet pollution across the UK.

Our work focusses on ensuring best practice is in place for companies handling plastic pellets. Our vision of a 'Supply Chain Approach' would mean companies in the plastics supply chain can demand and supply evidence of best practice through independent audits. We are working with other NGOs to contribute expertise, including setting out expectations of essential elements required to ensure that standards and certification schemes are effective, transparent, accountable and reach the full supply chain. We are part of a pellet loss steering group with the Scottish Government, NGOs and industry representatives working to develop a trial to this approach[16]. Parallel work has begun to create a publicly available standard (PAS) for companies to check compliance with best practice. The UK government have already accepted limitations of current voluntary schemes and are committed to learning from recommendations set out by the Scottish government steering group[17].

While preventing plastic pollution from source is the preferred course of action, this must be underpinned by effective laws, industry compliance and strong enforcement when spills do occur.

4.5. 3G Synthetic Turf

3G artificial turf for sports is a significant source of primary microplastic pollution. Small granulated material, the 'performance infill', is used to support plastic 'grass' filaments to create a playing surface. In the majority of pitches constructed across Europe (>90%), the infill used is Styrene Butadiene Rubber (SBR), from ground up disused car tyres; the equivalent of 12,200 tyres are 'recycled' to fill one artificial turf field[18]. SBR and other plastic infills are a significant source of microplastic to the environment. Current estimates of loss range from between 250-750kg annually per pitch[19], to an estimated 1.5 – 5 tonnes per pitch[20]. Pathways of loss include migration of infill during play and maintenance activities,

via drainage systems and through player transport. In the UK pitches are consistently topped up with infill (typically 3% of total) each year. Research suggests infill top-up rates are a good proxy for infill-losses for pitches over 4 years old[21].

Current end-of-waste guidelines for tyres suggest 'Steps should….where practical, contain all loose tyre-derived rubber materials using appropriate barrier methods.' However physical barriers to loss are not incorporated as standard on pitches. To address this, alternatives to artificial turf and microplastic infill need to be used in future, and in the meantime measures to keep infill in place on existing pitches are needed.

Once a pitch has reached its end of life, typically between 7-10 years, its materials can become sources of pollution if stored or disposed of inappropriately. With an estimated 491 pitches as of 2012 rising to 700 in England by 2020[22], the number of pitches reaching the end of their life is increasing rapidly. Pitch removal and storage should be in line with quality control criteria. Stockpiling across Europe has been shown to be a source of microplastic loss[23]. Other 'recycling' services tend to separate out component parts for uses as kennel lining and landscaping[24]. This older material is likely to disintegrate over time, creating finer powders that are more easily dispersed by the wind and water and more likely to be emitted[25]. Stockpiles of such waste material can lead to similar issues to tyre stockpiles[26].

Options to significantly reduce or entirely avoid the use of loose microplastic from artificial pitches include using alternatives to SBR rubber crumb such as cork and olive stones, and non-infill pitches. The European Chemicals Agency is considering including performance infill in their broader restriction on microplastic ingredients, which, if implemented, could lead to a phase out of microplastic infill on pitches across the European Union[27]. The Scottish Government along with SEPA are also seeking options to reduce microplastic pollution from 3G pitches[28].

4.6. Formaldehyde

Formalin, an aqueous solution of formaldehyde, is a commonly used disinfectant in livestock farming and aquaculture. Despite its rapid degradation in water, concerns remain over its impacts on aquaculture target species and the wider aquatic environment[29]. The Environmental Quality Standards (EQS) set for formaldehyde in freshwater environments are classified as 'non-statutory', and so are not believed to be monitored or enforced[30]. Publicly available data on formalin use is limited.

In addition to the potential for direct harm to fish and other species, formalin reduces dissolved oxygen levels within a given waterbody[31 32]. Oxygen deficiency can inflict severe stress on aquatic species, and in severe cases, may result in changes to entire ecosystem structures and function[33]. As rising global temperatures threaten an increased frequency and intensity of anoxic conditions in aquatic environments[34], the additional pressure inflicted by use of formalin treatments should be given serious consideration.

Fidra believes that information on all chemicals used in livestock farming and aquaculture, including quantities, frequency of use and methods of regulation and enforcement should be made easily accessible to the public. Statutory EQS values should be provided for

formaldehyde, as well as methanol, a common stabilising agent of formalin, and hydrogen peroxide, a popular alternative treatment.

5. HOW CAN CONSUMERS BE PERSUADED TO CHANGE THEIR BEHAVIOUR TO MINIMISE POLLUTION?

Consumer behaviour can play a role in reducing pollution, for example recycling can be incentivised through deposit return schemes, which can reduce litter. However, consumers often lack the information necessary to minimise pollution. There is often no information about the plastic and chemical content of products at the point of sale or available on disposal, making use and disposal problematic. Fidra's Cotton Bud Project highlighted the problems of relying on wastewater treatment and consumer behaviour to prevent pollution. Plastic stemmed cotton buds were consistently in the top 10 litter items on UK beaches despite campaigns to encourage consumers to bin not flush, while filters at sewage treatment plants were not removing these items. The effective solution advocated by Fidra was for a switch to less harmful materials i.e. paper.

Changing materials and chemicals in products is often a more effective and efficient solution to pollution than behaviour change or end of pipe treatment. Consumers are not informed of chemicals used in producing the food they eat, chemical pollutants like endocrine disrupters such as bisphenols in plastic and paper, or persistent chemicals like PFAS in clothing and food packaging, and consumers have no choice but to use furniture with flame retardants. These chemicals are present in wastewater due to consumer and industrial use. Chemicals such as bisphenol are ingested or transferred through the skin then metabolised ending up in wastewater[35]. Many of these chemicals are detected in our rivers due to their appearance in domestic and industrial wastewater, sewage effluent and its subsequent agricultural application and associated run off[36]. Often people do not have the information or choices available to change their behaviour, and where disposal advice is given or toxicity listed, consumer trust often overrides the warning (e.g. hazard symbols on cleaning products). The most effective way to prevent pollution is through sustainable chemical use in industry and all steps of the supply chain. Alongside this we need to develop legislation to manage chemical use, with regulatory limits on chemicals to prevent pollution. These actions should allow for uses and methods of disposal beyond those initially intended, and not assume that appropriate consumer behaviour will occur.

Similarly in the case of plastic pollution we do not believe a focus on end user behaviour leads to effective long-term solutions. Even where litter is the proximal cause of pollution, responsibility is shared with businesses producing products and broader structural problems lead to littering, requiring a robust Extended Producer Responsibility scheme to ensure costs are distributed fairly. It also important to recognise the UK plastic waste is polluting rivers worldwide. To date, the UK has relied on the export of plastic waste to deal with the increasing amounts produced, without clear oversight of how much is recycled, and ultimately pushing the responsibility of waste created in the UK onto countries with fewer environmental restrictions, leading to increased pollution in those countries[37].

6. WHAT IS THE REQUIRED INVESTMENT LEVEL NEEDED TO MINIMISE STORM OVERFLOWS VS THE SCOPE FOR SUSTAINABLE DRAINAGE AND NATURE-BASED SOLUTIONS?

There are multiple benefits to nature-based solutions, but the current drainage network is not fit for purpose and pressure will only increase with predicted changes to climate[38]. There must be a focus on future-proofing against climate extremes. Monitoring is needed of outfalls from storm overflows and the frequency at which they are in action. The development of sustainable drainage is essential[39], including creating space for biodiversity such as rain gardens and green roofs on transport infrastructure[40].

7. SHOULD LOCAL AUTHORITIES AND HIGHWAYS AGENCIES BE GIVEN A DUTY TO PREVENT POLLUTION TO WATERCOURSES WITHOUT PRIOR TREATMENT?

Yes, but they need to be resourced to do this. Local authorities should be considering the impact of rivers during planning, and during installation and maintenance of facilities they own. For example a number of local authorise have supported the installation of 3G artificial pitches, however measures are not routinely put in place to prevent the loss of microplastic from these pitches, leaving local rivers vulnerable to pollution[41].

Another way local authorities can have a direct impact is in the provision of public transport infrastructure. Bus stops and transport hubs have the potential to incorporate features to help reduce urban run off and create space for nature such as green roof bus stops[42].

8. HOW EFFECTIVE IS OFWAT'S REMIT AND REGULATION OF WATER COMPANIES? DOES IT FACILITATE SUFFICIENT INVESTMENT IN IMPROVEMENTS TO WATER QUALITY, INCLUDING SUSTAINABLE DRAINAGE SYSTEMS AND NATURE-BASED SOLUTIONS SUCH AS CONSTRUCTED WETLANDS?

The rules and stringent design standards set by Ofwat need adaptation in order encourage the water industry to invest in developing new technologies and driving innovation, from nature-based solutions to increased digital technology[43]. Stringent regulations, effective enforcement and fines at a level that are put into operating costs can all be used to drive such changes.

9. IS ADEQUATE INVESTMENT BEING MADE IN ADAPTING WATER TREATMENT SYSTEMS TO FUTURE CLIMATE CHANGE?

To help tackle the current and future impacts of climate change we must work to reduce the pressures on the water environment to build more resilient landscapes and ecosystems. This includes reducing plastic waste, minimizing chemical pollution and supporting the environment in rural and urban areas so that we can all benefit from the health, wellbeing and ecosystems services healthy environments provide.

Adaption to climate change for water utilities will need careful consideration of factors in addition to the increased risks of drought and flooding changes. Lower water levels due to drought could lead to increased concentrations of chemical and plastic pollutants in water bodies. In contrast increased flooding could lead to more widespread loss of chemical and plastic pollutants to the environment. While adaptation and mitigation strategies are clearly

being developed, they need to be ambitious and ensure they are implemented as soon as possible.

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