



CHEMTrust

Protecting humans and wildlife
from harmful chemicals

Briefing

Environment Agency – Challenges & Choices consultation
Chemicals in the water environment
CHEM Trust and MCS comments

April 2020

1. Introduction

The Environment Agency launched the [Challenges & Choices](#) consultation in October 2019, seeking views on the challenges UK waters face and the choices and changes needed to help tackle those challenges.

The [Blueprint for Water Group](#) from Wildlife and Countryside Link submitted a [joint response](#) to the Environment Agency in April 2020, signed by 23 UK NGOs.

CHEM Trust and the Marine Conservation Society wrote the comments for the challenge 2: Chemicals in the water environments which are being reproduced in section 2.

Our key recommendations are:

- Reducing the use of hazardous chemicals via regulation should be the primary method to reduce chemical pollution in the water environment;
- The UK should remain part of the European chemical regulation REACH in order to achieve our ambitions of protecting aquatic ecosystems and water supplies;
- A grouping approach should be adopted in risk management;
- Chemical mixture occurrence and effect should be accounted for in monitoring and risk assessment;
- All very persistent chemicals should be considered non-threshold substances and ‘of concern’;
- An action plan on very persistent chemicals should be developed in the context of the upcoming UK Chemical Strategy;
- An efficient alert system should be in place to trigger action (e.g. a monitoring system covering all substances of high concern and capable of identifying substances of emerging concern).

CHEM Trust is looking forward to seeing the results of the consultation and our recommendations being reflected in the government actions to address the issue of chemical pollution in water.

2. Comments to challenge 2: Chemicals in the water environment

The consultation had a set of three questions (Q8, Q9 and Q10) for the challenge on chemicals in the water. The questions and our comments are reproduced here:

Q8. 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 in consumption and production, and also in pesticides use, the emissions of certain chemicals to the water environment will inevitably increase, further exacerbated by climate change. 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 sources 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 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. Thus 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 (Water Framework directive) 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 UK 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 UK 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 vital 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.

Q9. 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’* (Challenges and Choice consultation 2019, [Challenge 2](#)). 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](#).

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