CHEMTrust
Protecting humans and wildlife from harmful chemicals

Evidence

UK House of Commons Environmental Audit Committee inquiry into "*Water quality in rivers*"

Evidence from CHEM Trust, February 2021

Executive Summary

CHEM Trust, a charity that works at EU, UK and International levels to prevent synthetic chemicals from causing long term damage to wildlife or humans, welcomes the opportunity to contribute to this inquiry into water quality in rivers.

The key points that we make in our evidence include:

- Routine monitoring only shows the tip of the iceberg in terms of chemical pollution in UK rivers;
- Persistent chemicals are of particular concern for water quality in rivers;
- Chemical pollution is hindering the recovery of UK rivers' wildlife;
- Controlling pollution at source, including banning harmful chemicals in products, is the best way to prevent pollution of UK rivers;
- The most hazardous chemicals, especially very persistent chemicals such as PFAS, should be banned in all non-essential uses;
- Contamination from legacy pollutants should be remediated;
- Some regulatory gaps in chemical regulation need to be filled in order to efficiently protect UK rivers.

Introduction

1. CHEM Trust is a collaboration between CHEM Trust, a UK registered charity and CHEM Trust Europe eV, which is a charity based in Germany. Our overarching aim is to prevent synthetic chemicals from causing long term damage to wildlife or humans, by ensuring that chemicals which cause such harm are substituted with safer alternatives. For details of our work see https://chemtrust.org/policy/

Not one English river met the legal water quality standards

2. As mentioned in the call for evidence, 0% of the 4,679 rivers, lakes, estuaries and other surface water bodies in England received good chemical status in the latest assessment done by the Environment Agency (EA) in the context of the Water Framework Directive[1].

Legacy chemicals responsible for some of the failures

3. Some of the failures are related to the presence of legacy persistent pollutants at levels exceeding the environmental standards set by the Water Framework Directive. According to the EA 2021 river basin management plans[2], mercury, PFOS[3], and the brominated flame retardants PBDEs[4], are ubiquitous in the environment in England. PFOS and PBDEs are synthetic chemicals used in various industrial and consumer applications, that were phased out years ago and banned globally via the Stockholm Convention on persistent organic pollutants[5].

4. **Their presence, at levels exceeding environmental standards in English rivers years after their phase out, illustrates the specific issue posed by persistent chemicals.**

Persistent chemicals will be an issue for generations

5. By definition, persistent chemicals are chemicals that don't degrade easily in the natural environment. In some extreme cases, such as for PFAS chemicals, it will take centuries for these chemicals to degrade[6]. As a consequence, environmental exposure to persistent chemicals doesn't end once they have been phased out from the market; it continues for generations. Moreover, removing these contaminants from rivers - including the water column, sediments and biota - is extremely challenging.

Only the tip of the Iceberg – monitoring gaps

6. The latest EA assessment already paints a dire picture, however, it is an incomplete one. In 2016, 97% of the surface water bodies passed the chemical pollution test in England. Since 2016, new substances have been added to the assessment list, such as PFOS, a chemical from the PFAS family, and new standards have been developed for contaminants in aquatic wildlife[7]. Put simply, the 2019 assessment was more sensitive than the 2016 one, revealing what was under the radar before. However, even with the updated criteria, the current assessment still only looks at a very limited number of chemical contaminants, particularly when it comes to emerging chemicals of concern.

Unidentified PFAS

7. PFAS are a good example to illustrate this monitoring gap. PFOS mentioned above represents only the tip of the iceberg in terms of the PFAS family of chemicals. In the 2018 OECD assessment[8], over 4,700 PFAS were identified on the global market, and more recently, the US Environmental Protection Agency compiled a list of over 9,000 PFAS[9]. All PFAS chemicals are either very persistent or degrading into very persistent PFAS, hence their nickname the 'forever chemicals'. They are used in a large variety of applications,[10] including in consumer products such as cosmetics and textiles, which can lead to emissions into household wastewater.

8. A 2019 report from the Nordic Council of Ministers[11] gives an indication of what targeted monitoring might be missing in terms of PFAS. Total organic fluorine concentration, a proxy for total PFAS concentration, was measured in surface water samples from Nordic countries. The concentrations were compared with the sum concentration of 78 targeted PFAS, including PFOS. This study showed that a large

fraction of PFAS in the water environment is currently unidentified: *"The proportion of unidentified PFAS was similar in all samples and ranged between 83 and 98%"*. Considering the widespread contamination of English Rivers with PFOS[3], this is very concerning.

Persistent and mobile chemicals monitoring gap

9. Routine monitoring assessments mostly account for substances known as Persistent, Bioaccumulative and Toxic (PBT) and overlook substances that are Persistent, Mobile and Toxic (PMT). 'Fat-loving' PBT substances, such as PCBs, accumulate within the food chain; whereas 'water-loving' PMT substances, such as many PFAS[12], accumulate in water.

10. A recent study[13] looked at 57 Persistent and Mobile substances (PM) in European surface water selected for their likelihood of high emissions. Of these 57 PM substances, 43 were detected, including 23 which have never been reported before, with some present in all samples.

11. The monitoring gap, illustrated by the PFAS and PM examples, is a barrier to the regulation of synthetic chemicals polluting the water environment.

Impact of chemical pollution on freshwater biodiversity and ecosystems

Legacy chemical pollutants hindering the recovery of rivers

12. Past regulatory actions such as the *1991 European Urban Wastewater Treatment Directive* had a positive impact on UK rivers water quality. Several freshwater species, which showed significant decline until the mid-1990s due to chemical pollution, are now recovering, such as the otter and the Atlantic salmon[14]. However, legacy persistent organic pollutants (POPs) such as PCBs, PBDEs and PFOS, which are still present in UK rivers above currently estimated toxicity thresholds, are hindering the recovery of freshwater wildlife populations. This is particularly true for areas with a greater urban cover[15], where invertebrate communities present only 60% of the macroinvertebrate families found in the non-urban catchments[16].

13. A recent study[15] performed on a network of rivers in South Wales between 2016 and 2017 showed how chemical pollution from POPs is impacting entire river ecosystems. The most highly contaminated urban sites were characterised by reduced diversity, simplified food web structure, and reductions in the abundance of prey important for apex predators such as the Eurasian dipper. Even if the study looked at legacy POPs, the authors warn it cannot be ruled out that the adverse effects could result from a combination effect of a wider range of legacy and emerging pollutants present in the environment.

14. However, we know very little about trends and impacts of emerging contaminants.

Toxicity of rubber-tyre components

15. Road run-off has been identified as a major source of river pollution in urban areas in the UK[17,18]. It carries hundreds of pollutants, including rubber crumbs from car tyres and toxic substances such as benzothiazoles[19,20].

16. A study published in 2021[21] corelated mass die-off of certain fish populations in the U.S. to degradation products of a chemical which is ubiquitous in car tyres. 6PPD-quinone, the substance identified by scientists as the acute toxic component, is a degradation product of the substance 6PPD which is use widely as a preservative in rubber-tyre.

Limited solutions

Limits of end of pipe solutions

17. Waste Water Treatment Plants (WWTP) are limited in their capacity to filter out chemical contaminants. In the case of persistent and mobile chemicals for instance, classic water treatments, including carbon activated filters, are poorly efficient[22]. Moreover, even if some of the chemical contaminants are extracted from the water, this raises the question of how to treat the contaminated sludge. Sludge is routinely applied to agricultural fields as fertiliser, re-releasing the contaminants into the environment.

18. In addition, **the cost of upgrading filtration systems in WWTP could be transferred to household water bills, meaning that the burden is carried by taxpayers, which is contrary to the Polluter Pays Principle**.

Limits of consumer behaviour change

19. 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).

20. There are hundreds of synthetic chemicals in everyday products[23] that consumers may not be aware of. Information about chemicals of concern in products is not easily accessible, and the average consumer does not possess the level of knowledge needed to avoid all of them. In addition, informed consumers may struggle to find affordable alternatives.

21. 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[24]. However, promoting best practice at the level of municipalities and companies could have a significant impact. See the recommendations put forward by the NonHazCity project for municipalities and for companies.

22. The responsibility to prevent chemical pollution must lie with regulatory bodies and enforcement agencies, and not the individual consumer.

Control at source

23. **The best way to address chemical pollution in rivers is to prevent pollutants, including microplastics, from entering the water environment.** This is also the position[25] of the European Federation of National Associations of Water Services EurEau.

24. This includes regulatory actions to ban the most hazardous chemicals currently in use, and actions to remediate sites contaminated with legacy chemical pollutants.

For chemicals in use – ban the most hazardous chemicals in all non-essential uses

25. The results from the Chemical Investigation Programme Phase 2 (CIP2)[26] carried out by the UK water industry suggested that the main sources of pollution were not from a single point but mainly released from households. The CIPs have also pointed out that chemicals which have been heavily regulated, such as the flame retardants PBDEs, the phthalate DEHP, the antifoulant Tributyltin and the antibacterial triclosan, were all reporting downward trends[2].

26. This observation demonstrates the effectiveness of regulating chemicals to reduce pollution. As expressed in our joint response[27] to the Environmental Agency consultation Challenges & Choices, it will not be possible to address the challenges of synthetic chemicals in the water environment without restricting the use of chemicals of concern in products.

27. Very persistent chemicals, such as PFAS, are being used in a plethora of consumer products. These includes cosmetics[28] that are rinsed-off down the drain in the shower, leading to the contamination of rivers and the ocean for many generations. This issue is no different from the plastic microbeads issue, which was addressed by a ban[29] on the sale of rinse-off cosmetics and personal care products containing microbeads in England and Scotland in 2018.

28. A ban[30] on all non-essential uses of PFAS chemicals is currently being considered at the European level under the European chemical regulation REACH. This is the way forward to address pollution from hazardous chemicals and very persistent chemicals in particular.

29. A similar ban should be considered under the new UK chemical regulation system UK REACH.

For legacy chemicals – Identify and remediate contaminated sites

30. But restricting the use of hazardous chemicals is not enough to lower the burden in the water environment. Legacy pollutants can still leak into the water environment from contamination hot spots. A recent investigation from ENDs Report[31] listed over a thousand old landfills containing hazardous waste and hundreds more sites with the waste categorised as 'unknown' by the EA. And they estimated that "*around 746 toxic dumps are located close (around 500m) to water bodies".* Legacy chemicals can also leak from former industrial sites or areas where they've been used extensively such as location where Fire-Fighting Foams containing PFAS have been used.

31. Identifying the sites contaminated with legacy pollutants[32] and remediating them should be a priority to prevent further build-up of these hazardous chemicals in UK wildlife and the environment and minimise the risk of chemical contamination in our water as set out in the Government 25-Year Environment Plan.

Regulatory gaps

Persistent and mobile chemicals

32. To facilitate the regulation of chemicals of concern, some regulatory gaps have to be filled, in particular regarding persistent and very persistent chemicals. In the current REACH regulation, transposed as UK REACH in the UK, persistent chemicals are usually regulated under combined categories of PBT for persistent and bioaccumulative and toxic and/or vPvB for very persistent and very bioaccumulative. This mean that chemicals which are persistent or very persistent, but not bioaccumulative, such as many short chain PFAS, fall through the net of the current regulatory framework.

33. Recently, however, certain very persistent and mobile PFAS have been identified as substances of very high concern (SVHCs) under REACH, giving rise to an equivalent level of concern on a case-by-case basis[33]. **Adding PMT (for persistent and mobile and toxic) and vPvM (for very persistent and very mobile) criteria to UK REACH would facilitate the regulation of these types of chemicals which are of particular concern for aquatic environments.** EurEau has also been calling[22] for the

implementation of such criteria. The European Commission committed to implement such criteria under REACH in its October 2020 Chemicals Strategy for Sustainability[34]. A proposal for PMT and vPvM criteria under REACH was put forward by the German Environment Agency in 2019[35].

Grouping

34. In order to speed up the regulation of harmful chemicals and avoid regrettable substitution, a grouping approach should be adopted in the chemical regulation UK REACH and other relevant legal acts.

35. Regrettable substitution is when a banned or restricted substance is replaced by a substance of the same chemical family that is likely to be similarly problematic[36]. Cases of regrettable substitution have been reported for PFAS. For example, PFOA was replaced by short chain PFAS HFPO-DA (also known as GenX), which is now identified as substances of very high concern[37].

36. Regulating hazardous chemicals more often via a grouping approach, rather than by regulating each substance one by one (or by using only too narrow groups), would prevent regrettable substitution. In its 2020 Chemicals Strategy for Sustainability[34], the European Commission committed to gradually adopt a grouping approach to assess and regulate chemicals.

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References

[1] EA, Catchment Data Explorer. https://environment.data.gov.uk/catchment-planning/

[2] EA, 2019. 2021 river basin management plans. https://consult.environment-agency.gov.uk/environment-and-business/challenges-and-choices/user_uploads/chemicals-in-the-water-environment-challenge-rbmp-2021-2.pdf

[3] EA, 2019. Perfluorooctane sulfonate (PFOS) and related substances: sources, pathways and environmental data. https://consult.environment-agency.gov.uk/environment-and-business/challenges-and-choices/user_uploads/perfluorooctane-sulfonate-and-related-substances-pressure-rbmp-2021.pdf

[4] EA, 2019. Polybrominated diphenyl ethers (PBDEs): sources, pathways and environmental data. https://consult.environment-agency.gov.uk/++preview++/environment-and-business/challenges-and-choices/user_uploads/polybrominated-diphenyl-ethers-pressure-rbmp-2021.pdf

[5] http://www.pops.int/

[6] CHEM Trust, 2019. PFAS – the 'forever chemicals', Invisible threats from persistent chemicals. https://chemtrust.org/wp-content/uploads/PFAS_Brief_CHEMTrust_2019.pdf

[7] European Commission. Priority substances under the Water Framework Directive. https://ec.europa.eu/environment/water/water-dangersub/pri_substances.htm

[8] OECD, 2018. Toward a new comprehensive global database of per-and polyfluoroalkyl substances (PFASs): summary report on updating the OECD 2007 list of per-and polyfluoroalkyl substances (PFASs). Series on Risk Management No. 39 http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=ENV-JM-MONO(2018)7&doclanguage=en

[9] EPA. PFAS Master List of PFAS Substances (Version 2). Assessed 26/01/2021. https://comptox.epa.gov/dashboard/chemical_lists/pfasmaster

[10] Glüge et al., 2020. An overview of the uses of per-and polyfluoroalkyl substances (PFAS). Environmental Science: Processes & Impacts, 22(12), pp.2345-2373. https://doi.org/10.1039/D0EM00291G

[11] Kärrman et al., 2019. PFASs in the Nordic environment - Screening of Poly- and Perfluoroalkyl Substances (PFASs) and Extractable Organic Fluorine (EOF) in the Nordic Environment. Copenhagen: Nordisk Ministerråd, 2019, p. 153. TemaNord, ISSN 0908-6692; 2019:515 http://dx.doi.org/10.6027/TN2019-515

[12] Hale et al., 2020. Persistent, mobile and toxic (PMT) and very persistent and very mobile (vPvM) substances pose an equivalent level of concern to persistent, bioaccumulative and toxic (PBT) and very persistent and very bioaccumulative (vPvB) substances under REACH. *Environmental Sciences Europe*, *32*(1), pp.1-15. https://doi.org/10.1186/s12302-020-00440-4

[13] Schulze et al., 2019. Occurrence of emerging persistent and mobile organic contaminants in European water samples. *Water research*, *153*, pp.80-90. https://doi.org/10.1016/j.watres.2019.01.008

[14] Mawle and Milner, 2008. The return of Salmon to cleaner rivers - England and Wales. In: Mills, D. (Ed.), Salmon at the Edge. Blackwell Publishing, Oxford, UK, pp. 186e199.

[15] Windsor et al., 2019. Persistent contaminants as potential constraints on the recovery of urban river food webs from gross pollution. *Water research*, *163*, p.114858. https://doi.org/10.1016/j.watres.2019.114858

[16] Vaughan and Ormerod, 2012. Large-scale, long-term trends in British river macroinvertebrates. *Global Change Biology*, 18(7), pp.2184-2194. https://doi.org/10.1111/j.1365-2486.2012.02662.x

[17] Greater London Authority, 2019. Road Runoff Water Quality Study. Executive summary. https://www.london.gov.uk/sites/default/files/road_runoff_water_quality_study_exec_summary_dec_19.pdf

[18] WaterBriefing, 2018. Urban and transport run-off significant contributors to water quality failures. https://www.waterbriefing.org/home/water-issues/item/15357-to-heal-our-rivers-we-must-start-looking-in-the-right-places

[19] Liao et al., 2018. A review of environmental occurrence, fate, exposure, and toxicity of benzothiazoles. *Environmental science & technology*, 52(9), pp.5007-5026. https://doi.org/10.1021/acs.est.7b05493

[20] Asheim et al., 2019. Benzotriazoles, benzothiazoles and trace elements in an urban road setting in Trondheim, Norway: Re-visiting the chemical markers of traffic pollution. *Science of The Total Environment*, *649*, pp.703-711. https://doi.org/10.1016/j.scitotenv.2018.08.299

[21] Tian et al., 2021. A ubiquitous tire rubber–derived chemical induces acute mortality in coho salmon. *Science*, *371*(6525), pp.185-189. https://doi.org/10.1126/science.abd6951

[22] EurEau, 2019. Moving Forward on PMT and vPvM Substances. 13p https://www.eureau.org/resources/briefing-notes/3934-briefing-note-on-moving-forward-on-pmt-and-vpvm-substances/file

[23] EAC, 2019. Toxic Chemicals in Everyday Life. HC 1805 https://publications.parliament.uk/pa/cm201719/cmselect/cmenvaud/1805/1805.pdf

[24] NonHazCity, 2018. Hazardous substance reduction potentials in private households. https://thinkbefore.eu/wp-content/uploads/2020/07/Report_D5.6_CC2018_final_LoRes.pdf

[25] EurEau, 2019. Addressing micropollutants: a holistic approach. https://www.eureau.org/resources/position-papers/3828-the-holistic-approach-to-addressing-micropollutants-2019-update-of-source-control/file

[26] UKWIR, 2017. The Chemical Investigations Programme Phase 2, 2015-2020 – Initial Findings. https://ukwir.org/the-chemicals-investigation-programme-phase-2,-2015-2020

[27] CHEM Trust, 2020. Environment Agency – Challenges & Choices consultation. Chemicals in the water environment. CHEM Trust and MCS comments. https://chemtrust.org/wp-content/uploads/JointNGOresponse_EAconsultation_April2020.pdf

[28] MCS, 2020. MCS calls for ban of 'forever chemicals' lurking in bathroom cabinets. https://www.mcsuk.org/news/pfas

[29] GOV.UK, 2018. World leading microbeads ban comes into force. https://www.gov.uk/government/news/world-leading-microbeads-ban-comes-into-force

[30] CHEM Trust, 2020. Why a PFAS group restriction is crucial: lessons from human biomonitoring data. https://chemtrust.org/pfas-group-restriction/

[31] ENDSReport, 2021. EXCLUSIVE: Locations of hundreds of buried toxic landfills revealed. https://www.endsreport.com/article/1704599/exclusive-locations-hundreds-buried-toxic-landfills-revealed

[32] ENDSReport, 2021. A poisonous legacy: PCBs and the killer whale apocalypse. https://www.endsreport.com/article/1698166/poisonous-legacy-pcbs-killer-whale-apocalypse

[33] CHEM Trust, 2019. Identification of HFPO-DA and PFBS as substances of very high concern (SVHC). https://chemtrust.org/wp-content/uploads/CHEM-Trust_PFAS-consultations-responses_November-2019_updated-Jan2020.pdf

[34] EC, 2020. Chemicals strategy for Sustainability towards a Toxic-Free Environment. https://ec.europa.eu/environment/strategy/chemicals-strategy_en

[35] UBA, 2019. Protecting the sources of our drinking water: The criteria for identifying persistent, mobile and toxic (PMT) substances and very persistent and very mobile (vPvM) substances under EU Regulation REACH (EC) No 1907/2006. https://www.umweltbundesamt.de/publikationen/protecting-the-sources-of-our-drinking-water-the

[36] CHEM Trust, 2018. From BPA to BPZ: a toxic soup? How companies switch from a known hazardous chemical to one with similar properties, and how regulators could stop them. 46p. https://chemtrust.org/toxicsoup/

[37] CHEM Trust, 2019. Action on 'GenX': Another 'forever chemical' added to the EU list of substances of very high concern. https://chemtrust.org/genx/