

LINK Parliamentary Briefing: The chemical pollution crisis: a growing problem with achievable solutions

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Scottish
Environment
LINK

Summary for MSPs

Scottish Environment LINK is the forum for Scotland's voluntary environment community, with 42 member bodies representing a broad spectrum of environmental interests with the common goal of contributing to a more environmentally sustainable society.

Chemicals are fundamental to both modern society and our economy and chemical innovation has the potential to tackle many large-scale societal problems, from the development of modern medicines to climate change mitigation and improved product recyclability. However, our reliance on, and mismanagement of, harmful chemicals continues to damage fragile ecosystems and the health of the Scottish public. **With the UK chemical strategy currently in development, we now have a unique opportunity to reduce chemical pollution and create a healthier environment, whilst simultaneously driving Scotland towards a modern, sustainable, and circular economy, promoting world-leading innovation in green chemistry.**

LINK members call on the Scottish Government to:

- **Establish a chemical pollution task force** to coordinate Scotland's input into the UK's chemical strategy.
- Champion strong health and environmental protections within the UK chemical strategy by ensuring that the EU **ban on all non-essential uses of PFAS** is replicated within the UK strategy, and by supporting the ['12 Key Asks'](#) jointly developed by UK health and environmental NGO's.

LINK members urge the Scottish Parliament to:

- Ensure chemical policy integration across all relevant decision-making in Scotland, including the new **Circular Economy Bill**.
- Ensure an **effective and transparent monitoring and alert system for emerging contaminants** with a mechanism to propose restrictions to UK REACH.
- **Support pro-active food retailers** and prevent regrettable substitution from plastic to PFAS, by implementing a ban on the manufacture and sale of food-packaging containing intentionally added per- and poly-fluorinated alkyl substances (PFAS) by the end of 2022.
- **Remain aligned with EU ambitions** to remove endocrine disruptors from consumer products by implementing a ban on the addition of bisphenols to thermal papers including till receipts by 2022 enabling their safe recycling under Circular Economy bill.
- **Introduce thresholds for a wider range of contaminants in wastewater sludge** intended for agricultural use, reflecting modern sludge composition, and including both microplastics and PFAS.

Scotland has a strong track record of leading the UK towards greener policy, for example through its single-use plastic legislation and early declaration of the climate emergency. We therefore urge MSPs to take forward these recommendations in the year of COP26 to ensure Scotland plays a leading role in combating the growing chemical pollution crisis.

A current and growing crisis

The fate of Scotland's environment and the safety of the products we use, reuse and recycle is currently being decided in a new, UK-wide, chemical strategy. This strategy will define how we deal with the current chemical pollution crisis and the nature and climate emergency, how we transition to a green and circular economy, and will determine the state of the environment we leave for future generations.

Scotland's environment, population health, and economic ambitions are heavily impacted by chemical pollution. Legacy chemicals, years after restrictions have been implemented, continue to impact our wildlife¹; endocrine disruptors, known to impact fertility, brain development and cancer incidence, are being added to cosmetics, food packaging and even the till receipts we collect with every purchase^{2,3}; and the undisclosed chemical content of consumer products is creating a barrier to safe reuse and recycling.

Meanwhile, the production and use of hazardous chemicals continues to grow. Global chemical production is predicted to triple by 2050⁴, and with 75% of chemicals produced across the EU currently classified as hazardous to health and/or the environment⁵, immediate action is needed to protect Scotland from this growing chemical pollution crisis. Growth in chemical use and production must not lead to a growth in pollution.

The development of the post-Brexit UK chemical strategy, the establishment of UK REACH and Scotland's ambition for a green recovery, creates a unique and exciting opportunity to redefine our chemical future, protecting health and environment whilst enabling a safe and effective circular economy.

The Scottish environment is increasingly impacted by chemical pollution, but right now, we're only seeing the tip of the iceberg.

Chemical pollutants enter the Scottish environment through a wide variety of both point and diffuse sources, contaminating air, soils and freshwaters, where they are easily transported to fragile marine ecosystems.

In some cases, harmful substances that are already banned or restricted continue to enter Scotland's waterways at worryingly high concentrations. For example, the recent Chemical Investigation Programme (CIP2) found harmful levels of PFOS, a persistent organic pollutant restricted under the Stockholm convention since 2009, in effluent entering rivers from water treatment works across Scotland's central belt⁶. The limited scope of this monitoring, which considers only two PFAS in a group of >4700 harmful and persistent substances, means sources are difficult to identify and control, whilst the inaccessibility of data creates delays during which pollution continues unabated. Mismanagement

¹ DESFORGES, J.-P. et al. Predicting global killer whale population collapse from PCB pollution. *Science*, v. 361, n. 6409, p. 1373, 2018. Available at: < <http://science.sciencemag.org/content/361/6409/1373.abstract> >.

² CHEMTRUST. Hormone Disrupting Chemicals (or Endocrine Disrupting Chemicals, EDCs) – a FAQ. Available at: < <https://chemtrust.org/hormone-disrupting-chemicals-edcs-faq/> >.

³ FIDRA. **Bisphenols in our receipts**. 2021. Available at: < <https://www.fidra.org.uk/projects/bisphenols/> >.

⁴ EEA. **Chemicals in Europe: understanding impacts on human health and the environment**. 2016.

⁵ EUROSTAT. Disponível em: < <http://appsso.eurostat.ec.europa.eu/nui/submitViewTableAction.do> >.

⁶ SALVIDGE, R. **Locations of high PFAS concentrations in wastewater and rivers revealed**. *ENDS Report* 2021.

and overuse of pharmaceuticals, designed to improve our health and quality of life, are also escaping wastewater treatment resulting in growing concentrations in Scottish freshwaters. More than 630 pharmaceutical compounds have been identified in fresh and marine systems worldwide, with limited, but growing, evidence of harmful impacts on wildlife⁷.

We contaminate the natural environment and the food we eat with wide-spread use of harmful pesticides, both on land and in Scotland's growing aquaculture sector. Many pesticides in use in the UK are already classified as human carcinogens and endocrine disruptors⁸, whilst the open net structure of Scotland's fish farms fails to contain chemical treatments⁹. Current understanding of the effects of exposure to this cocktail of contaminants remains limited and unaccounted for in regulatory controls.

Contaminants are spread directly onto soils in the form of sewage sludge, due to insufficient monitoring and removal during the treatment process. These can include pharmaceuticals¹⁰, per- and poly fluorinated alkyl substances (PFAS), flame retardants, PCBs, bisphenols and other endocrine disrupting chemicals¹¹.

The plastic pollution washing up on Scotland's shorelines contains a wide range of hazardous substances, and when broken down to microplastic forms, acts as a sponge, passively collecting chemicals onto its surface and magnifying toxicity to wildlife¹².

We clean ourselves, our clothes and our homes with products that when washed down the drain, release a range of toxic and sometimes persistent chemicals into our environment. The stain resistant treatments on our clothing and our furnishings contain chemicals that will persist in the environment for thousands of years¹³. Combined with chemical flame retardants used in electronics and furnishings, landfill sites have become hotspots for an unidentifiable mix of current and legacy chemicals, increasingly vulnerable to the impacts of climate-induced flooding.

Understanding the extent of Scotland's pollution problem is a vital first step in moving towards a non-toxic future. This requires long-term investment in monitoring, open access to environmental data, and greater transparency throughout supply chains to aid identification of new and emerging chemical risks.

Chemical pollution is fuelling the biodiversity crisis

Despite 30 years of global restrictions, orcas, commonly referred to as killer whales, remain under threat of extinction from reproductive damage caused by PCBs, one of the original 12 groups of chemicals banned under the Stockholm Convention on Persistent Organic Pollutants (POPs). No calves have been recorded in Scotland's West Coast Community, one of the most highly PCB-contaminated

⁷ NIEMI, L. Pharmaceuticals in the environment: Introduction and cross-sector partnership addressing the issue in Scotland. SPICe 2020.

⁸ PAN. Health effects of pesticides. Available at: < <https://www.pan-uk.org/health-effects-of-pesticides> >.

⁹ FIDRA. <https://www.bestfishes.org.uk/>.

¹⁰ CUNDILL, A. et al. **Review of the Storage and Spreading of Sewage Sludge on Land in Scotland**. SEPA 2016.

¹¹ SOCIETY, M. C. **Sewage sludge: Why we need to stop pollution at source** 2021.

¹² VERLA, A. W. et al. Microplastic-toxic chemical interaction: a review study on quantified levels, mechanism and implication. *SN Applied Sciences*, v. 1, n. 11, p. 1400, 2019/10/15 2019. ISSN 2523-3971. Available at: < <https://doi.org/10.1007/s42452-019-1352-0> >.

¹³ FIDRA. www.pfasfree.org.uk.

orca populations in the world, since monitoring began in the 1990s¹⁴. Until recently, a group of chemicals called PBDEs were widely used as flame retardants in the electric goods and furniture that filled our homes. These toxic and persistent pollutants continue to seep into our environment long after product disposal, impacting public health and the environment and accumulating along food chains, right up to the iconic gannet populations in the Firth of Forth¹⁵. Liver cancer prevalence in North Sea flatfish exceeds 20%, linked to pollution from cadmium and organic pollutants¹⁶. And the list of legacy impacts goes on, with pesticides such as DDT, dieldrin and lindane still likely to be accumulating in the tissues of wildlife, long after restrictions have been implemented¹⁷.

While there may be limited actions we can take to remedy the mistakes of our past, there are lessons we can learn to avoid repetition in the future. UK farmland biodiversity is falling, driven by changing agricultural practices and increased pesticide use. A third of UK pollinators are now in decline¹⁸, bird populations have more than halved since 1970, arable wildflowers are one of the most threatened groups of plants in the UK, and pesticides are being recorded in UK freshwaters at levels known to cause harm to aquatic life¹⁹. With clear legislation and improved agricultural practises, the trajectory of chemical-induced biodiversity loss can be changed.

To protect Scotland's wildlife from the burden of chemical pollution, we recommend phasing out the most hazardous chemicals from pesticides, and from consumer products for all non-essential uses, ensuring a stringent approval process for new pesticides, and a minimum requirement to align with EU standards for environmental protections.

Chemical pollution is undermining nature's ability to adapt to and mitigate against the climate emergency

Chemical pollution is intrinsically linked to the climate crisis and the impacts that it has on both humans and wildlife. Despite major reductions in direct energy use over the last 30 years, the chemical industry remains a major contributor to UK carbon emissions²⁰. Chemical exposure can reduce nature's resilience to the climate crisis through the impact of multiple stressors, with populations already weakened by the impact of chemical pollution more vulnerable to changing climatic conditions²¹.

¹⁴ TRUST, H. W. A. D. <https://hwtdt.org>. Accessed: 2021.

¹⁵ CROSSE, J. D. et al. Long term trends in PBDE concentrations in gannet (*Morus bassanus*) eggs from two UK colonies. **Environmental Pollution**, v. 161, p. 93-100, 2012/02/01/ 2012. ISSN 0269-7491. Available at: < <http://www.sciencedirect.com/science/article/pii/S0269749111005628> >.

¹⁶ LERBOURS, A. et al. Genetic Alterations and Cancer Formation in a European Flatfish at Sites of Different Contaminant Burdens. **Environmental Science & Technology**, v. 48, n. 17, p. 10448-10455, 2014/09/02 2014. ISSN 0013-936X. Available at: < <https://doi.org/10.1021/es502591p> >.

¹⁷ LERBOURS, A. et al. Genetic Alterations and Cancer Formation in a European Flatfish at Sites of Different Contaminant Burdens. **Environmental Science & Technology**, v. 48, n. 17, p. 10448-10455, 2014/09/02 2014. ISSN 0013-936X. Available at: < <https://doi.org/10.1021/es502591p> >.

¹⁸ POWNEY, G. D. et al. Widespread losses of pollinating insects in Britain. **Nature Communications**, v. 10, n. 1, p. 1018, 2019/03/26 2019. ISSN 2041-1723. Available at: < <https://doi.org/10.1038/s41467-019-08974-9> >.

¹⁹ SHARDLOW, M. **Neonicotinoid Insecticides in British Freshwaters: 2016 Water Framework Directive Watch List Monitoring Results and Recommendations**. 2017

²⁰ DEPARTMENT FOR BUSINESS ENERGY & INDUSTRIAL STRATEGY. **Chemicals Sector Joint Industry - Government Industrial Decarbonisation and Energy Efficiency Roadmap Action Plan**. 2017

²¹ NOYES, P. D.; LEMA, S. C. Forecasting the impacts of chemical pollution and climate change interactions on the health of wildlife. **Current Zoology**, v. 61, n. 4, p. 669-689, 2015. ISSN 1674-5507. Available at: < <https://doi.org/10.1093/czoolo/61.4.669> >. Accessed: 7/2/2021.

Equally, climate change can also impact the sensitivity and susceptibility of organisms to chemical exposures. Increased flooding can release toxic substances previously contained within landfills, changing hydrological pathways and soil conditions re-release substances previously sequestered²², and increased temperatures encourage volatilisation and airborne transport pathways²³.

At an ecosystem level, we've seen the carbon sequestration potential of peatlands across Northern England destroyed by atmospheric deposition of industrial pollutants, and the slow recovery following regulatory controls²⁴. With Scotland's strong ambitions for nature-based climate solutions, we must act now to protect our ecosystems from further chemical pollution and future-proof their sequestration potential.

To future-proof Scotland's adaptation and mitigation potential, and to ensure we maximise the potential climate benefits of chemical innovation without exacerbating pollution levels, we must move towards greater chemical policy integration. The impacts of chemical use should be included in all relevant decision-making.

Chemical pollution represents a barrier to a safe and effective circular economy

Harmful chemicals create a barrier to the circular economy by limiting the reuse capacity of products, creating a chemical exposure risk for workers in the recycling sector and undermining confidence in the safety of secondary materials. Our risk-based approach to chemical management creates a system where hazardous chemicals that are approved for use in one product, are later identified in the recycled content of secondary products where the risk of ingestion and exposure is much higher. For example, the use of recycled plastic has led to the discovery of flame retardants approved for use in electronics turning up in kitchen utensils and cutlery, alongside high levels of endocrine disrupting phthalates in children's toys²⁵.

Persistent PFAS are added in high concentrations to food packaging currently marketed as compostable and sustainable alternatives to plastic²⁶, contaminating compost and providing a direct pathway for these hazardous chemicals into food crops and the wider environment. The unnecessary addition of bisphenols to till receipts prevents recycling. For example, they can contaminate the recycled paper content of pizza boxes²⁷, or the paper pulp that could otherwise provide important organic matter for agricultural use²⁸. And the undisclosed chemical content of the 600,000 mattresses

²² DEPARTMENT FOR BUSINESS ENERGY & INDUSTRIAL STRATEGY. **Chemicals Sector Joint Industry - Government Industrial Decarbonisation and Energy Efficiency Roadmap Action Plan**. 2017

²³ GROUP, U. A. W. **Climate change and POPs; predicting the impacts**. 2011

²⁴ EVANS, C.; WOODIN, S.; LINDSAY, R. **IUCN UK Committee Peatland Programme Briefing Note No. 13: Atmospheric Pollution**. 2016

²⁵ STRAKOVÁ, J.; DIGANGI, J.; JENSEN, G. K. **Toxic Loophole: Recycling Hazardous Waster into New Products**: Arnika 2018.

²⁶ DINSMORE, K. J. **Forever chemicals in the food aisle: PFAS content of UK supermarket and takeaway food packaging**. Fidra. 2020

²⁷ ROSENMAI, A. K. et al. An effect-directed strategy for characterizing emerging chemicals in food contact materials made from paper and board. **Food and Chemical Toxicology**, v. 106, p. 250-259, 2017/08/01/ 2017. ISSN 0278-6915. Available at: < <https://www.sciencedirect.com/science/article/pii/S0278691517302971> >.

²⁸ FIDRA. **Bisphenols in our receipts**. 2021. Available at: < <https://www.fidra.org.uk/projects/bisphenols/> >.

disposed of across Scotland every year²⁹, makes safe recycling, and the identification of banned substances, almost impossible.

To ensure chemical use and management that drives, rather than hinders, a prosperous circular economy, and to prevent harmful substances becoming 'locked in' to inappropriate secondary uses, we must prioritise chemical transparency and traceability.

Chemical pollution impacts the health of current and future generations

The World Health Organisation concluded the disease burden preventable through sound management and reduction of chemicals in the environment was 1.6 million lives and 45 million disability-adjusted life years (DALYs), in 2016³⁰. Occupational cancers are now the primary cause of work-related deaths in industrialised societies, with more than 100,000 deaths a year linked to exposure to carcinogens in the workplace, costing between €270 and €610 billion a year across the EU-28²⁹.

The health impacts of chemical pollution are not evenly distributed across society. Exposure to chemicals has been linked to socioeconomic group³¹, women globally are impacted more by hazardous chemicals than men³², and the developmental impacts of chemical exposure are often exaggerated in infants and young children. Even future generations are at risk from the chemicals we use today. This can be through chemical persistence in the environment, as substances such as PFAS continue to build around us rather than degrade over time, or through changes in gene expression that pass exposure impacts from one generation to the next.

The complexity of our continual exposure to a cocktail of chemical contaminants, starting before a child is even born, makes it extremely difficult to accurately define a causal link between an illness and a particular environmental contaminant. We must therefore ensure that we do not confuse absence of evidence with absence of harm.

To protect the wellbeing of Scottish people, both now and in the future, we must employ a precautionary approach to chemical management, focused on the impacts on vulnerable populations and sensitive developmental windows (e.g. prenatal, early childhood). We must also strengthen environmental risk assessment to account for breakdown products and chemical interactions.

²⁹ ETUI. **The cost of occupational cancer in the EU-28**. 2017

³⁰ PRÜSS-ÜSTÜN, A. **Preventing disease through healthy environments : a global assessment of the burden of disease from environmental risks / A Prüss-Ustün, J Wolf, C Corvalán, R Bos and M Neira**. Geneva, Switzerland: World Health Organization, 2016.

³¹ GANZLEBEN, C.; KAZMIERCZAK, A. Leaving no one behind - understanding environmental inequality in Europe. **Environmental health : a global access science source**, v. 19, n. 1, p. 57-57, 2020. ISSN 1476-069X. Available at: < <https://pubmed.ncbi.nlm.nih.gov/32460849> >. Available at: < <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7251658/> >.

³² BROSCHÉ, S. **Women, Chemicals and the SDGs**: IPEN 2021.

A new role for Scotland – key asks and opportunities

Now is the opportunity for Scotland to influence the UK's chemical strategy, to ensure it paves the way for green innovation and sustainable economic growth, and that it upholds Scotland's environmental principles and standards. As the UK develops its own chemical management systems and structures, Scotland must be prepared to take on the role previously filled by EU member states, nominating restrictions, ensuring enforcement and championing the ambition for environmental protection. To achieve this, we propose the following actions from the Scottish Government linked to the UK chemical strategy:

- Establish a chemical pollution task force to coordinate Scotland's input into the UK's chemical strategy.
- Champion strong health and environmental protections within the UK chemical strategy by ensuring that the EU ban on all non-essential uses of PFAS is replicated within the UK strategy, and by supporting the '[12 Key Asks](#)' jointly developed by UK health and environmental NGO's¹.

Scotland has a strong track record of leading the UK towards greener policy, for example through its single-use plastic legislation and early declaration of the climate emergency. We therefore propose the following actions to ensure Scotland plays a leading role in combating the growing chemical pollution crisis.

- Ensure chemical policy integration across all relevant decision-making in Scotland, including the new Circular Economy Bill.
- Ensure an effective and transparent monitoring and alert system for emerging contaminants with a mechanism to propose restrictions to UK REACH.
- Support pro-active food retailers and prevent regrettable substitution from plastic to PFAS, by implementing a ban on the manufacture and sale of food-packaging containing intentionally added per- and poly-fluorinated alkyl substances (PFAS) by the end of 2022.
- Remain aligned with EU ambitions to remove endocrine disrupters from consumer products by implementing a ban on the addition of bisphenols to thermal papers including till receipts by 2022 enabling their safe recycling under Circular Economy bill.
- Introduce thresholds for a wider range of contaminants in wastewater sludge intended for agricultural use, reflecting modern sludge composition, and including both microplastics and PFAS.

This response is supported by the following LINK member organisations:

Badenoch and Strathspey Conservation Group
Buglife Scotland
Fidra
Froglife
Plantlife Scotland
Scottish Wildlife Trust

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