TOXIC TIDES: CONFRONTING THE CHEMICAL CRISIS

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SURFRIDER FOUNDATION

UNRAVELLING THE THREATS OF CHEMICAL POLLUTION ON THE OCEAN AND HUMAN HEALTH

GENERAL COMMENT

Our health and quality of life are intrinsically dependent on the state of our aquatic and marine environments. Not only are they home to a rich biodiversity but they also provide humans with essential ecosystem services, including food, recreation, a source of wellbeing, climate regulation, biomimicry and even carbon sequestration. Yet this vital equilibrium between environmental and human health is constantly threatened by several sources of anthropogenic pressure, among which chemical pollution has been a growing cause for concern.

Because of the toxicity of some of these substances, chemical pollution poses a threat to the functioning of marine ecosystems. They also constitute a serious sanitary threat. The contamination of marine resources destined for human consumption may also have serious consequences to health. Other risks remain rather under-studied but tend to indicate humans could also be exposed to chemical risks at sea during other types of activities such as bathing and recreational sports.

For more than 20 years, Surfrider Foundation has been committed to improving water quality in Europe. As part of our Healthy Waters campaign to combat water pollution, Surfrider Foundation Europe has been looking into the impacts of chemical pollution on the Ocean and people. Despite overall efforts to address some sources of pollution at EU level, contamination remains a major challenge that is preventing the achievement of healthy waters in Europe's seas, rivers, and lakes. **We therefore call on decision-makers to guarantee excellent water quality for everyone and adopt an integrated approach that takes into account all the sources of pollution that have an impact on water and human health.**

THE OMNIPRESENCE OF THE CHEMICAL SECTOR IN OUR WORLD

Chemicals are constitutive of our surrounding environment and can be found everywhere in our daily lives. Be they naturally occurring or synthetic, we resort to thousands of chemicals on a regular basis through our clothes, our medicines, our household items, and our sources of energy among other uses. The chemical industry supplies all the economic sectors in various ways. Key trends and outlooks of the chemical industry show that society's reliance on chemical substances has increased substantially in the past decades and will continue to do so in the future.

Figures from US authorities indicate that the equivalent of one new substance has been added to the Chemical Abstract Service (CAS) Registry every two-and-a-half minutes for the past 50 years[1]. Global chemical production grew from 1.2 to 2.3 billion tonnes between the beginning of the 21st century and 2017. It is foreseen to triple by 2050[2]. Currently, the EU is the second largest producer in the world after China. In terms of total value, European chemical sales rose by 38% between 2000 and 2020, ultimately reaching €499 billion.

The production and consumption of chemicals have rapidly increased and are projected to continue, which would indicate a similar upward trend for the related chemical risks. At the same time, the risk of harm to the environment and human health from chemical pollution has also gained attention, as illustrated by a 2020 Eurobarometer poll according to which 90% of Europeans are concerned about the impact of chemicals on the environment[3]. In 2022, the Stockholm Resilience Center announced that the planetary boundary for 'novel entities' (encompassing synthetic chemicals) had been breached. Scientists warned that the stability of our planet's system was at heightened risk.

Many obstacles are faced by authorities when they seek to tackle this pollution. The sizable and ever-increasing volume of substances in use, along with their potential to cause adverse effects, make the effective management and control of chemicals very challenging[4]. The emission of chemical substances occurs at all stages of the global value chain, from the extraction of raw materials to manufacturing processes, uses, and finally disposal of consumer products[5]. Their chemical, physical, and toxicological properties are wide-ranging. The consumption of industrial chemicals in the EU was estimated at 304 million tonnes in 2017, of which 22% were considered hazardous to the environment and 71% hazardous to human health[6].

1 European Environment Agency, 2019a.
2 United Nations Environment Programme, 2019.
3 Eurobarometer, Attitudes of Europeans towards the Environment: https://europa.eu/eurobarometer/surveys/detail/2257.
4 European Environment Agency, 2019c.
5 United Nations Environment Programme, 2019.
6 European Environment Agency, 2019c.

Furthermore, this vast and steady production of chemicals means we are confronted with a wide-ranging mix of substances entering the environment simultaneously. The impacts of the combined effect of these contaminants have still not been thoroughly and comprehensively reviewed to fully grasp their underpinning risks[7].

In addition to these known challenges, the safe management of contaminants is further complicated by the fact that a majority of substances are poorly characterised, preventing any clear assessment of the hazardous properties they entail. Of the 100,000 synthetic chemicals estimated to be placed on the market in the EU, robust and extensive information is available for only 500. Around 10,000 of them are only fairly characterised, while 20,000 are covered to a limited extent and the remaining 70,000 or so chemicals are barely characterised[8]. Current data and initiatives cover and regulate known chemicals (and only part of them) but this represents only a fraction of the chemicals found in the environment and their related risks. These new or lesser-known substances are often referred to as 'contaminants of emerging concern', which can be understood as pollutants that are not commonly monitored in the environment nor covered by regulation. Some UV filters, flame retardants, pharmaceuticals, and personal care products are usually considered to fall into this category.

Knowledge of these chemicals and their properties is usually scarce, but they are thought to constitute potential threats to both the environment and mankind. As the production and consumption of chemicals continue to grow at such a rapid rate, these emerging risks are likely to continue to rise in tandem with potentially far-reaching negative impacts on ecosystems and human health.

The European Environment Agency's outlook to 2030 projects some very concerning trends regarding the state of chemical pollution in the EU. The risk of chemical pollution seems to be continuously growing. While the omnipresence of chemicals in our society will continue, it is very unlikely that human and environmental exposure to toxic chemicals will decrease in the future. Given the gravity of the situation, there is an urgent need to take action and strengthen our policy framework to reduce point-source and diffuse pollution and reduce their adverse effects.

A LOOMING THREAT ON THE OCEAN

The Ocean represents 65% of the surface of Europe, a proportion that is larger than in any other continent[9]. It is a vital resource valued by millions of individuals for their livelihood, economic growth but also leisure. It is also home to an exceptionally rich biodiversity. Yet the marine environment faces multiple pressures stemming from conflicting anthropogenic activities with far-reaching negative impacts that are substantially degrading the ecosystems and constantly stretching the limits of a safe and sustainable operating space for humanity[10]. Chemical pollution is a stark illustration of this issue. The marine environment is the receptacle for numerous chemical substances linked to human activities. Contamination is highly diverse, both in terms of its sources as well as the variety of chemical molecules released into the environment. It may affect the high seas as well as coastal areas, leading to a rising number of environmental, sanitary, and socio-economic issues.

As chemical pollutants are being discharged into the environment via diffuse or point sources, aquatic and marine ecosystems have become one of the main receptacles of this pollution. It is commonly agreed that 80% of ocean pollution originates from land via stormwater overflows, urban and agricultural run-offs, industrial discharges, atmospheric deposition, or transport, to name but a few. The remaining 20% stem from sea-based activities like shipping, aquaculture, accidental spills, and oil and gas exploration[11]. Some of the key chemicals encountered in the marine environment include persistent organic pollutants (POPS) like polychlorinated biphenyl (PCBs), polybrominated diphenyl ethers (PBDEs), certain per- and polyfluoroalkyl substances (PFASs); heavy metals like mercury, lead, and cadmium; pesticides; pharmaceuticals; hydrocarbons; radioactive waste[12] and so on. Their presence and concentration may vary from one geographic area to the other. Some contaminants, such as mercury, are already well known and have been subject to extensive regulation, while others are considered of emerging concern.

8 COM(2020)667 final.
9 COM(2020)256 final.
10 European Environment Agency, 2019d.
11 Tornero, V., Hanke, G., 2016.
12 Westerhof, P., et al., 2022.

Many reports highlight the issue of micropollutants as a major threat to the environment. Pollution as a whole is identified as one of the five main drivers of biodiversity loss today, affecting the survival of around 12.5% of plant and animal species on the planet[13]. In the marine environment, the presence of toxic chemicals can have serious consequences for ecosystems and disrupt the overall equilibrium of the marine environment. Some well-documented impacts on biodiversity include the disruption of reproductive functions and the immune system. They may cause neurological damage to some species or even increase mortality. Research indicates that the ecological status of half of the continent's water bodies may be affected by pollution, thus constituting a major threat to biodiversity[14].

Available data on the chemical status of European marine regions depict an alarming situation for our rivers, lakes, and seas. Recently, two Regional Seas Conventions (RSCs), OSPAR and HELCOM, published their updated report on the assessment of the North-East Atlantic and the Baltic Sea respectively. In both regions, results showed that the presence of hazardous substances overall remained at concerning levels, though some encouraging trends. This is mainly explained by the fact that bans or stricter regulations were implemented for some of these legacy chemicals like mercury or cadmium. However, because of their persistence, toxicity, or capacity to bioaccumulate in organisms, they still constitute a serious threat to the marine environment, years or decades after their prohibition. As a result, overall progress remains too slow and insufficient to ensure the rapid recovery of the environment[15].

Similar trends are reported at EU level, highlighting the fact that achieving a zero-pollution ambition in European seas will be very difficult and several hazardous substances including PCBs, heavy metals, hydrocarbons, and pesticides will remain a major threat to Ocean Health. Overall, 85% of marine areas in Europe are considered to be 'problematic' with regard to chemical pollution[16]. This means that in most areas of the EU's seas, the concentration of monitored contaminants breaches the levels at which the integrity of ecosystems would be maintained. While providing an initial overall assessment of European seas, it must be acknowledged that current data usually focus on a limited number of contaminants, and other hazardous substances may also be present in high concentrations in the marine environment but are currently not monitored as regularly and systematically[17].

13 COM(2021)400 final.
14 United Nations Environment Programme, 2019.
15 OSPAR, 2023, Hazardous Substances Thematic Assessment, Quality Status Report 2023: https://oap.ospar.org/en/ospar-assessments/quality-status-reports/qsr-2023/thematic-assessments/hazardous-substances/.
HELCOM, 2023.
16 European Environment Agency, 2019a.
17 COM(2020)256final.

Climate change may also be a worsening factor for these already worrisome trends. Complex interlinkages between these two crises place further stress on ecosystems. Some hazardous substances have been found to heighten the impacts induced by climate change. On the other hand, ocean acidification and changes in salinity may amplify the toxicity of chemicals while making species and habitats more vulnerable to their harmful effects. A rise in temperatures combined with declining flows in waterways may also increase the concentration of chemicals[18].

THE BURDEN OF DISEASE OF CHEMICALS

The safe management of chemical substances is a major concern for public health. It is widely acknowledged that pollution is a major threat to human wellbeing. A 2022 study published by the Lancet Commission on Pollution and Health stated that pollution was the cause of 9 million premature deaths in the world, a fifth of which could be attributed to chemicals. These concerning figures have not decreased since 2015[19].

Chemical pollution may have very severe long-term impacts on human health. Exposure routes are multiple and include inhalation, ingestion, and dermal contact. The health effects of chemical pollutants are multiple and varied. They depend on many factors, such as the specific properties of chemicals, their occurrence in the environment, their persistence, their potential to bioaccumulate, etc. Epidemiological and toxicological research showed that some of the known effects may include cardiovascular diseases, developmental defects, neurological troubles, and increased risk of diabetes or cancer[20]. These observations however neglect the impact of the "cocktail effect" triggered by the presence of multiple substances even at low concentrations. The true cost of chemical pollution on human health thus still runs the risk of being largely underestimated still[21].

The impact of toxins on health is a major burden for society. Indeed, the Global Burden of Disease (GBD) attributable to exposure to toxic chemicals was estimated by the World Health Organisation (WHO) at around 6%[22]. As a result, the issue has come under increased scrutiny in the last few decades, both in the scientific community and among decision-makers. While all global studies stress the fact that there are still some substantial knowledge gaps concerning chemical pollution, current figures focusing on a small set of well-studied pollutants already point to serious risks for society. Therefore, the '*currently known disease burden from chemicals is large,* [yet the] *unknown burden may be considerable*'[23].

In the realm of marine and coastal management, an emerging field of research is gaining growing attention and has been pinned under the umbrella term Ocean and Human Health (OHH)[24]. Echoing the One Health principle, this concept illustrates the fact that the health of the Ocean and the survival of mankind are intrinsically linked[25]. The marine environment provides a wide range of ecosystem services, both material (food, transport, livelihood disease treatment, etc.) and non-material (climate regulation, source of recreation and physical activity, cultural and spiritual services etc.), which are highly beneficial to society. Yet, these are being put at risk by the multiple pressures stemming from anthropogenic activities, and in turn, the worsening state of the Ocean can also impact public health[26]. A key health hazard related to ocean chemical pollution is through the consumption of contaminated fish and shellfish. Methylmercury for instance, a specific compound of mercury, may have toxic effects on the nervous system and even affect the cognitive development of children and foetuses[27].

While being the most well-known and researched risk for OHH, seafood consumption is not the only way human beings may be affected by marine chemical pollution. The impacts of other types of exposures are still, for the most part, unknown and thus underestimated[28]. Ultimately, citizens may be exposed to toxic chemicals beyond the sole consumption of seafood. As an example, the Netherlands, recently advised against children being exposed to sea foam following the detection of high concentrations of PFASs in the zone[29]. These substances, a group of around 4,700 man-made chemicals used in a wide range of industrial processes and consumer products, have been at the centre of discussions in recent years because of rising concerns regarding their adverse effects on human health and the environment due to their persistence, toxicity, and capacity to bioaccumulate[30]. Potential pathways for exposure to PFASs have been under scrutiny to establish and address the risks, while sites that have been contaminated by these 'forever chemicals' are being identified across Europe.

18 Westerhof, P., et al., 2022.
19 Fuller, R., et al., 2022.
20 Landrigan, P., J., et al., 2020.
21 CHEM Trust, 2022, Chemical Cocktails – The neglected threat of toxic mixtures and how to fix it: https://chemtrust.org/chemicalcocktails/
22 Landrigan, P., J., et al., 2020.
23 Identification of marine chemical contaminants released from sea-based sources (pnnl.gov)
24 Review of the evidence for oceans and human health relationships in Europe: A systematic map
25 Fostering human health through ocean sustainability in the 21st century - Fleming - 2019 - People and Nature - Wiley Online Library
26 European Marine Board Policy_Needs
27 World Health Organisation, 2020, 10 chemicals of public health concern: https://www.who.int/news-room/photo-story/photo-story-detail/10-chemicals-of-public-health-concern.
28 United Nations Environment Programme, 2019.
29 Netherlands warns children not to swallow sea foam over PFAS concerns | PFAS | The Guardian
30 European Environment Agency, 2019b.

Implementing the precautionary approach is thus highly relevant in the face of emerging chemical risks such as this one. It is essential to pursue research efforts to get a clearer estimate of the Global Burden of Disease entailed by marine chemical exposure. Getting a better understanding of the exposure risks entailed by some of these substances while maintaining the precautionary principle at the core of policies to avoid any underestimated environmental and sanitary risk should be the way forward in policy-making.

THE EU'S ROADMAP TOWARDS A SUSTAINABLE FUTURE

Given the major risks posed by chemical pollution, an extensive body of legislation and commitments has progressively been developed at global and European level. On the international scene, in 2002 the World Summit on Sustainable Development (WSSD) defined an overarching goal for participating countries around the world '*to achieve, by 2020, that chemicals are used and produced in a way that leads to the minimization of significant adverse effects on human health and the environment*'[31]. This commitment aimed to give participants impetus and guide their legislation towards a safer and sounder management of chemical substances throughout the whole lifecycle for the next 20 years.

The UN 2030 Agenda for Sustainable Development, adopted in 2015, also defined 17 Sustainable Development Goals (SDGs), broken down into 169 targets to be achieved by 2030. Among them, several SDGs should contribute to improving water quality and protecting human health with regard to chemical pollution. SDG number 3 calls on parties to '*ensure healthy lives and promote wellbeing for all at all ages*'; SDG 6 to '*ensure availability and sustainable management of water and sanitation for all*'; and finally, SDG 14 encourages them to '*conserve and sustainably use the oceans, seas and marine resources for sustainable development*'[32].

At the regional level, the EU is often praised for having one of the most advanced policy frameworks for controlling chemicals and preventing water pollution[33]. Over the past decades, the Union has progressively developed a set of regulatory requirements to improve water quality and protect the state of our aquatic and marine ecosystems. Two key overarching texts lie at the core of this framework and are closely intertwined: the Marine Strategy Framework Directive (MSFD) and the Water Framework Directive (WFD). Both set clear objectives for the EU's legislative framework. They aim to achieve the 'good status' of marine and freshwaters and provide clear-cut deadlines (2020 for the MSFD and by 2027 at the latest for the WFD) for that purpose. The two Directives acknowledge the need to address the issue of water pollution. The sanitary dimension of the issue is, however, very limited and the notion of One Health is not explicitly mentioned.

On the other side of the policy landscape, the Regulation on Registration, Evaluation, Authorisation and Restriction of CHemicals (REACH) and the Classification, Labelling and Packing of hazardous substances (CLP) Regulation are the pillars of the legislation to manage chemical substances (comprising more than 40 policy instruments)[34]. It aims to protect human health and the environment from the risks that may be posed by chemicals by controlling the production, manufacturing, and uses of chemicals in the Union.

In 2019, the publication of the European Green Deal gave new impetus to the EU's framework for environmental protection. Among its key commitments for achieving an EU economy that is sustainable for the future, the European Commission announced its Zero Pollution ambition to guarantee a Healthy Planet for all by 2050 via the implementation of a roadmap and timeline to achieve a toxic-free environment and reduce air, water and soil pollution to levels that are not harmful to health and natural ecosystems[35].

Despite these far-reaching and long-term policy commitments established both at global and European level, it is regrettable to witness that the existing indicators show a failure to meet any of the targets defined. Similarly, the 'European environment — state and outlook 2020' report from the EEA concludes that the EU is overall not on track to meet the objectives and targets defined for chemical pollution, freshwater, and marine policies. Ongoing efforts remain insufficient, and we witness serious delays in the revision of several key commitments of the Green Deal like the revision of REACH, the Marine Strategy Framework Directive, or the Bathing Water Directive. Major challenges are still unaddressed and will continue to contribute to the mixed or deteriorating trends identified[36].

31 European Commission, 2013.
32 United Nations, Department of Economic and Social Affairs, The 17 Goals: https://sdgs.un.org/goals.
33 European Environment Agency, 2019a.
34 COM(2020)256 final.
35 COM(2021)400 final.
36 WISE Marine Information System For Europe, Good Environmental Status (GES) assessments of EU marine waters by integration level https://water.europa.eu/marine/data-maps-and-tools/msfd-reporting-information-products/ges-assessment-dashboards/general-dashboards.

Currently, most of the indicators established under key EU policies for the aquatic and marine environments have not been met. Under the MSFD, the concentration of contaminants fails to be at levels that do not give rise to pollution effects for most of its indicators. Likewise, regarding marine and freshwaters specifically, a majority of EU marine regions fail to achieve Good Environmental Status (GES) for contaminants, and the likelihood of achieving the WFD 2027 target seems remote. Findings from the WFD's second River Basin Management Plans (RBMPs) showed that only 38% of surface waters in Europe are classified as having a good chemical status. For the water bodies failing to achieve good chemical status, there was a 33% higher risk of not achieving good ecological status when good chemical status is not reached[37]. Key threats from chemical pollution remain partially or inadequately addressed by the existing legislation and existing implementation gaps undermine our chances to achieve a toxic-free environment that is safe for all.

SURFRIDER'S CALL TO ENSURE HEALTHY AND SAFE WATERS FOR ALL

Surfrider Foundation has been committed to improving water quality and ensuring Healthy Waters for all in Europe for more than 20 years. Unfortunately, this objective has still not been achieved. More efforts are now needed, not just to assess the quality of water, but to protect it by preventing the pollution that affects it. Protecting the Ocean is inseparable from the protection of our own well-being. Ocean and Human Health are deeply intertwined through a tangled net of strong connections and exchanges between mankind and the marine environment. The EU has been praised for its advanced legal framework and its leadership to drive change in environmental policy at the global level. Yet it is clear that chemical pollution remains insufficiently prevented and controlled despite the considerable risk it constitutes for human and marine life.

[37] European Environment Agency, 2018.

We therefore call on decision-makers to:

ENSHRINE THE CONCEPT OF OCEAN AND HUMAN HEALTH AT THE CORE OF THE EU POLICY FRAMEWORK

To ensure we build a legal framework that is future-proof and fit for purpose to address the wide-ranging risks of marine chemical pollution, we must cease to consider environmental and human health as distinct issues. A holistic approach to chemical exposure that enshrines the precautionary principle is needed to guide the policy-making process. EU marine and chemical policies should align with the key elements of the Ocean and Human Health concept, to ensure a comprehensive coverage of the types of exposure to hazardous substances and all their related impacts on the environment and human beings. This involves for instance broadening the scope of the MSFD beyond seafood exposure, both in setting overarching objectives and in defining indicators and monitoring parameters.

PREVENT CHEMICAL POLLUTION AT SOURCE AND GUARANTEE A SAFE AND SUSTAINABLE FUTURE FOR ALL

Given the levels of production and use of chemicals in our society, addressing their related pollution risks will not be achievable without a proactive approach to reducing the emission of hazardous substances, primarily at source. Following its zero-pollution hierarchy[38], the EU should always prioritise preventive actions, in line with the precautionary action. Consistent measures and strict controls should thus be effectively put in place to limit pollution risks throughout all the phases of the chemical lifecycle. We call on decision-makers to facilitate and accelerate the transition to more sustainable, non-toxic production and consumption modes to reduce our exposure to hazardous substances. A critical instrument for preventing pollution at source will also be the widespread and strict implementation of the Polluter Pays Principle to provide incentives to businesses to step away from the use of hazardous substances.

More efforts must also be made to identify and assess all chemical risks and integrate them more consistently into the relevant legislation. We strongly encourage the development of an operational Union-wide, cross-sectoral early warning system for chemicals as foreseen in the Zero Pollution Action Plan. Such a mechanism would greatly contribute to the rapid identification of risks and ensure that corrective actions are initiated as soon as possible.

ACCELERATE REGULATORY ACTION TO TACKLE CHEMICAL POLLUTION AND MAKE OUR LEGAL FRAMEWORK FIT FOR THE FUTURE

To ensure a resilient and forward-looking approach, it is essential for the EU to bolster and refine the ambitions of its European Green Deal. Faced with the serious consequences of chemical pollution on the environment and health, we cannot afford any further delay in achieving a healthy planet for all by 2050. While progress has been made to tackle the issue, additional measures need to be implemented swiftly to ensure the safer management of toxic chemicals and address existing policy gaps. Some key challenges such as monitoring and regulating substances as groups in order to control their hazardous nature more easily or accounting for the risks of chemical mixtures must be urgently integrated into the different policies concerned with this pollution. Authorities must also continue to continue to work towards the phasing out the most harmful substances, especially those presenting persistent, toxic and bioaccumulative properties, and make the precautionary principle prevail.

In parallel, it is crucial to improve compliance with the EU environmental acquis. Current indicators all show that the marine and aquatic environment are in a poor chemical state. We urge EU decision-makers to step up their enforcement action, it is also important to secure the place of the civil society to fulfil its role as a watchdog to enhance public scrutiny over the policy-making process. We also call on EU institutions to ramp up their efforts to pursue the roadmap set out in their Zero-Pollution Action Plan and Chemical Strategy for Sustainability, especially regarding the revision of some key initiatives (the MSFD, REACH, the Cosmetic Regulation and the Bathing Water Directive...) to align legal requirements with contemporary needs and challenges. It is paramount to ensure that legal requirements remain comprehensive and fit for purpose to address the challenges posed by hazardous substances (legacy and emerging contaminants).

38 COM(2021)400 final.

REINFORCE THE SCIENCE-POLICY INTERFACE AND GUARANTEE STAKEHOLDER ENGAGEMENT

Achieving a toxic-free environment will require substantial effort and resources. To support the implementation of key initiatives, it is important to enhance the science/policymaking interface and make sure that exchanges with the scientific community are facilitated and policy developments reflect the most up-to-date knowledge on chemical risks. Streamlining monitoring practices and facilitating access to data should be further promoted.

Moreover, to sustain its stance as a frontrunner in the implementation of the 2030 Agenda for Sustainable Development, the EU should further support research efforts to push the Ocean and Human Health agenda. Deeper insights into exposure risks for both the environment and human health and their interrelationships are very much needed to help guide policymaking. Additional efforts should be invested to identify and work towards the reduction of blind spots and knowledge gaps. We especially encourage the development of research consortium involving citizens via participatory science projects to collect robust, wide-ranging data and build more inclusive policies.

Finally, it is important to ensure that the policy-making process is inclusive and involves a diverse array of stakeholders, including concerned citizens whenever possible. As chemical pollution is an ever-increasing source of growing public concern, it is essential to work on raising awareness of known risks and amplify our collective understanding and responses to marine chemical challenges.

CONCLUSION

In 1962, American biologist Rachel Carson famously raised the alarm on the risk we were running of achieving a '*Silent Spring*' due to the extinction of biodiversity stemming from our massive use of pesticides in agriculture. Today, marine ecosystems are facing the same risk of being silenced too if no action is taken to tackle the looming global chemical crisis. Society is at a turning point. Marine chemical pollution is a complex issue with far-reaching implications that need close collaboration on the part of governments, industries, the scientific community, and civil society.

We must seize the moment to act and put in place the necessary conditions to ensure a paradigm shift in the way we consider the chemicals' lifecycle and their impacts. The development of the chemical sector must not come at the detriment of the planetary boundaries. We must actively promote change and advocate for regulatory measures that can guarantee a healthy and sustainable Ocean for both current and future generations.

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SURFRIDER FOUNDATION

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SURFRIDER FOUNDATION EUROPE is a non-profit whose purpose is to protect and showcase the importance of lakes, rivers, the ocean, waves, and coastlines. It currently has over 18,000 members and is active across 11 European countries through its volunteer-run branches. For 30 years Surfrider Foundation Europe has been taking action in three areas of expertise: marine litter, water quality and public health, coastal management and climate change.