

Cynulliad Cenedlaethol Cymru | National Assembly for Wales
Y Pwyllgor Newid Hinsawdd, Amgylchedd a Materion Gwledig | Climate
Change, Environment and Rural Affairs Committee
Ymchwiliad Microblastigau | Microplastic Inquiry
Ymateb gan : Eunomia
Evidence from : Eunomia

Eunomia Research & Consulting Ltd. (Eunomia) welcomes this inquiry, and the opportunity to submit evidence. In recent years Eunomia has undertaken several studies exploring the sources, pathways and impacts of microplastics, and developing evidence-based recommendations for policymakers as to how best to address this issue.^{1,2,3,4}

It's worth noting that knowledge of the impacts of microplastics (not only in the marine environment, but also in freshwater bodies, soil and air) is far from complete, as this is an emerging field of research. However, while we may not fully understand the impacts, it appears fair to say that the more we learn, the greater the apparent cause for concern. Accordingly, there is a strong argument that the precautionary principle should be applied, and we should do all that can reasonably be done within the bounds of acceptable cost to prevent the generation of microplastics at source.

Indeed, this principle is enshrined in EU Law. Article 191(2) of the Treaty on the Functioning of the European Union (TFEU) states that:⁵

¹ Eunomia Research & Consulting (2018) Investigating Options for Reducing Releases in the Aquatic Environment of Microplastics Emitted by Products, Report to DG Environment of the European Commission, February 2018, available at <http://www.eunomia.co.uk/reports-tools/investigating-options-for-reducing-releases-in-the-aquatic-environment-of-microplastics-emitted-by-products/>

² Eunomia Research & Consulting (2017) Options for Reducing Emissions of Pre-production Plastic Pellets, Powders and Flakes, Report to Fidra, available at <http://www.eunomia.co.uk/reports-tools/options-for-reducing-emissions-of-pre-production-plastic-pellets-powders-and-flakes/>

³ Eunomia Research & Consulting (2016) Study to Support the Development of Measures to Combat a Range of Marine Litter Sources, Report to DG Environment of the European Commission, available at <http://www.eunomia.co.uk/reports-tools/study-to-support-the-development-of-measures-to-combat-a-range-of-marine-litter-sources/>

⁴ Eunomia Research & Consulting (2016) Measures to Prevent Marine Plastic Pollution: The Trouble with Targets and the Merit of Measures, September 2016, available at <http://www.eunomia.co.uk/reports-tools/measures-to-prevent-marine-plastic-pollution/>

⁵ OJEU (2012) Consolidated Version of The Treaty on the Functioning of the European Union, Official Journal of the European Union, 26th October 2012, available at <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:12012E/TXT&from=EN>

Union policy on the environment shall aim at a high level of protection taking into account the diversity of situations in the various regions of the Union. It shall be based on the precautionary principle and on the principles that preventive action should be taken, that environmental damage should as a priority be rectified at source and that the polluter should pay.

We respond briefly below to the specific points as requested in the terms of reference. Significant further detail on measures to tackle specific sources of microplastics is available in our recent report for DG Environment of the European Commission, entitled “Investigating Options for Reducing Releases in the Aquatic Environment of Microplastics Emitted by Products”. This is available at <http://www.eunomia.co.uk/reports-tools/investigating-options-for-reducing-releases-in-the-aquatic-environment-of-microplastics-emitted-by-products/>

To what extent are microplastics, including synthetic microfibers, a problem within Wales’ aquatic environment? How does this impact on environmental and human health?

- 1) We do not have any evidence of our own specific to the Welsh aquatic environment, but note that there is a rapidly growing literature on the reported prevalence of microplastics in a range of different environmental compartments.
- 2) In terms of environmental and human health impacts, we do not yet have a full picture, especially in relation to human health. There are numerous negative impacts reported in the literature in respect of marine fauna, and we also know that humans consume microplastics (through eating shellfish, for example) and potentially breathing in airborne microplastic particles.⁶ However, in terms of the associated impacts on human health, many questions remain unanswered – predominantly because sufficient research has not yet been undertaken given the relatively short period to date in which this topic has been of interest to the research community.⁷

What are the main sources of microplastic pollution, including microfibres?

- 3) In our recent study for the European Commission we calculated the extent of source generation of different types of microplastics in the EU, and their fate. This is shown in Figure 1 (using midpoints). The estimated ranges for

⁶ Prata, J., C. (2018) Airborne microplastics: Consequences to human health? Environmental Pollution, March 2018, Volume 234, pp115-126, available at

<https://www.sciencedirect.com/science/article/pii/S0269749117307686>

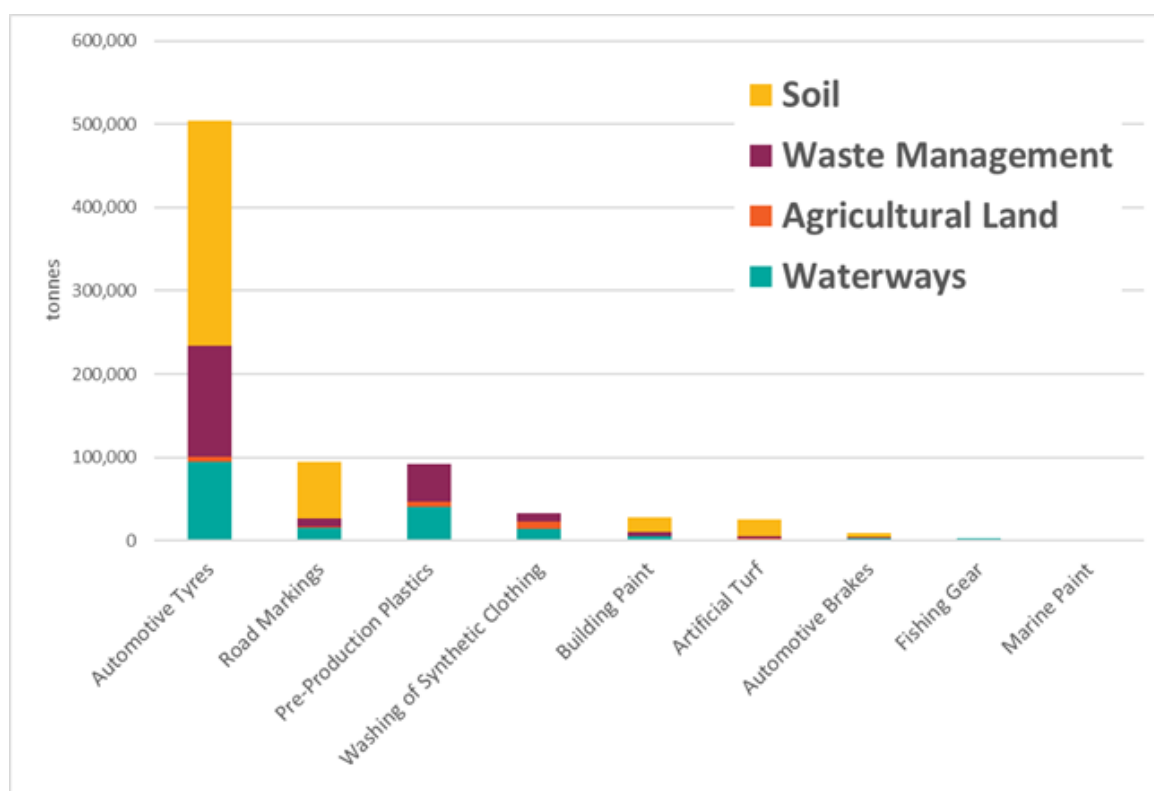
⁷ See Kontrick, A. (2018) Microplastics and Human health: Our Great Future to Think About Now, Journal of Medical Toxicology, June 2018, Volume 14, Issue 2, pp 117-119, available at

<https://link.springer.com/article/10.1007/s13181-018-0661-9>

microplastics being emitted to surface waters each year at the EU level are shown in Figure 2.

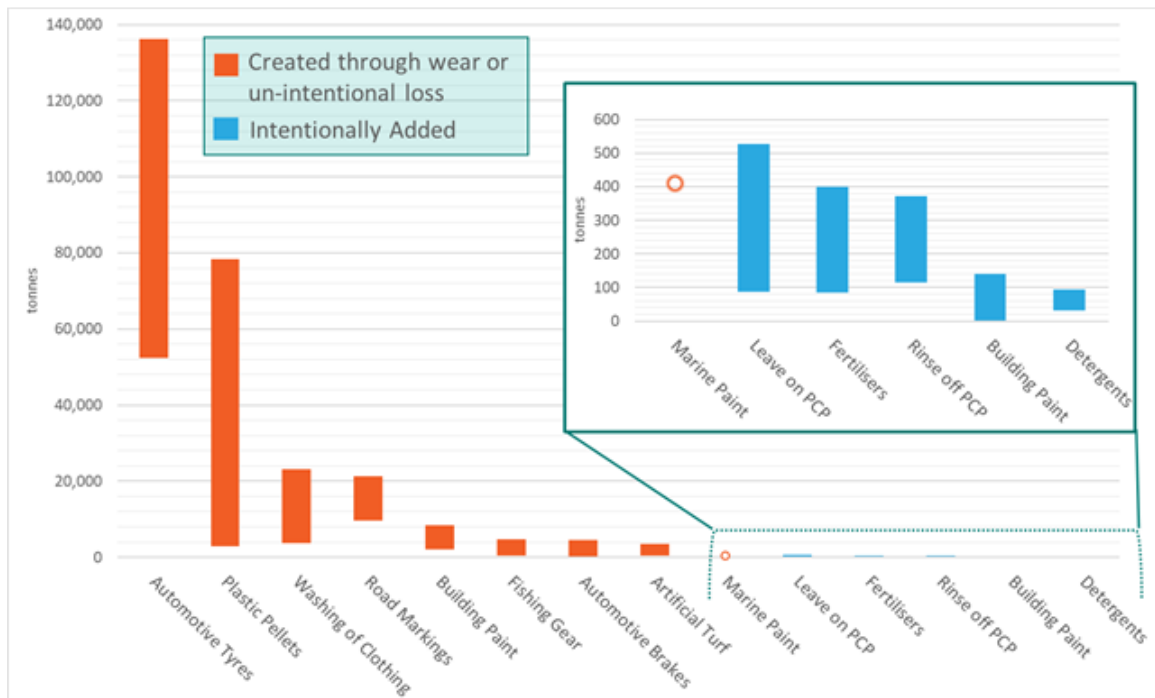
- 4) While one might attempt a 'rough estimate' by pro-rating such figures to Wales on the basis of relative population, we would caution that this would not be appropriate. Our preference would be to build up a Wales-specific estimate using our knowledge of the different components that affect releases and pathways.

Figure 1: Source Generation and Fate of Microplastics from Wear and Tear in the EU (midpoint)



Source: Eunomia Research & Consulting (2018)

Figure 2: Annual Emissions of Microplastics to EU Surface Waters (Upper and Lower Ranges)



Source: Eunomia Research & Consulting (2018)

How comprehensive is our knowledge about the scale of microplastic pollution and its effects? What should the research priorities be?

- 5) In general terms, a reasonable amount is known about the overall scale of microplastic generation, although there are numerous associated uncertainties – especially when trying to establish the fate of the microplastics subsequent to their initial release.
- 6) By contrast, our understanding of impacts is far from complete, which is not surprising, given that research interest in microplastics is itself relatively recent.
- 7) While further research to improve knowledge of the impacts will be helpful, our current lack of knowledge on the full range of impacts should not be seen as a reason to forestall preventative action to reduce losses in the first place.

What is currently being done to minimise the release of microplastics into the environment? What more can be done, and by whom, to address this issue within Wales?

- 8) In our most recent study for DG Environment we outlined the priority measures that should be taken forwards to reduce the loss of microplastics from key sources including:⁸
 - a. Vehicle tyre wear;
 - b. Plastic pellets/powders and flakes;
 - c. Synthetic clothing; and
 - d. Artificial turf infill.
- 9) For **vehicle tyre wear**, the solution proposed at the EU-level was for
 - a. the development of a standard measure of tyre tread abrasion rate;
 - b. the subsequent inclusion of tyre tread abrasion rates on the EU Tyre Label; and
 - c. using the Type Approval Regulation to restrict the worst performing tyres (in respect of tyre tread abrasion) from the market.
- 10) It was also noted that exploring the potential of techniques to capture tyre particles adjacent to roads – through existing approaches such as gully pot emptying, or through wider roll-out of sustainable drainage techniques – would have merit, albeit they would not prevent the generation of such microplastics at source. Improved roadside capture would, however, also be effective in capturing microplastics from other sources such as road markings, paint, and brake wear.
- 11) Welsh Government may have limited ability to influence the development of a standardised measure of tyre tread abrasion rate (which is anticipated to deliver wider benefits in terms of safety and GHG emissions) beyond providing political support from Wales for such an approach.
- 12) However, action could be taken in Wales on research into appropriate techniques for the capture of tyre particles at the roadside, and how this might be configured to deliver the widest possible range of co-benefits (i.e. trapping other pollutants in road run-off), capturing air-borne pollutants through green infrastructure etc.
- 13) More directly, there is considerable potential in Wales to bring about modal shift away from private motor vehicles, and especially towards methods of active travel such as walking and cycling. Indeed a recent academic paper looking at travel behaviour in Cardiff states that ‘taking into account individual travel patterns and constraints, walking or cycling could realistically substitute for 41% of short car trips’.⁹ Alongside delivering wider health benefits from increased

⁸ Eunomia Research & Consulting (2018) Investigating Options for Reducing Releases in the Aquatic Environment of Microplastics Emitted by Products, Report to DG Environment of the European Commission, February 2018, available at <http://www.eunomia.co.uk/reports-tools/investigating-options-for-reducing-releases-in-the-aquatic-environment-of-microplastics-emitted-by-products/>

⁹ Neves, A., Brand, C. (2018) Assessing the potential for carbon emissions savings from replacing short car trips with walking and cycling using a mixed GPS-travel diary approach, Transportation Research Part A

physical activity, improved air quality and reduced noise, such a shift, replicated across other areas where short car trips can be displaced, would serve directly to significantly reduce the emissions of tyre wear microplastics at source.

- 14) It's worth also noting that tyre wear microplastics contribute to airborne particulate pollution. With the anticipated increase in uptake of electric vehicles, and associated decline in the use of diesel and petrol vehicles, tailpipe emissions of particulate matter will decline, meaning that those from tyre wear (and brake wear) will constitute a greater relative proportion of airborne particulate emissions. Given that electric vehicles (to date at least) tend to be heavier than diesel or petrol equivalents, they will tend to generate tyre wear microplastics at a higher rate, meaning that *absolute* emissions from tyre wear could be expected to increase over time as the shift to electric vehicles continues.
- 15) For **plastic pellets, powders and flakes**, the recommended approach in our study for the European Commission was for a European Regulation requiring supply chain accreditation. This would require those placing a certain amount of plastics on the market (starting with those placing the greatest amount on the market, then tightening the requirement over time to cover those placing smaller amounts on the market) to demonstrate that their entire supply chain adheres to best practice in terms of preventing and containing spills.
- 16) The European Commission, in Annex I to the Plastics Strategy, published in January of this year, presents a list of future EU measures to implement the Strategy.¹⁰ Under 'actions to curb microplastics pollution', one of the noted actions is 'development of measures to reduce plastic pellet spillage (e.g. certification scheme along the plastic supply chain and/or Best Available Techniques reference document under the Industrial Emissions Directive).
- 17) In our study, we strongly recommended that a supply chain approach would be preferable, as this would have a much greater impact (given that supply chains extend outside the EU) and would mean that producers in the EU would not be placed at a disadvantage relative to those outside the EU.
- 18) Wales could, of course, seek to be a pioneer in establishing the supply chain approach, through working with leading firms to establish that best practice is indeed being implemented through their own supply chains. This could also be undertaken through engagement directly with plastics converters in Wales (those who take the pellets and turn them into products or packaging), potentially as

¹⁰ See https://eur-lex.europa.eu/resource.html?uri=cellar:2df5d1d2-fac7-11e7-b8f5-01aa75ed71a1.0001.02/DOC_2&format=PDF

part of (or an additional aspect to) the work being taken forward by WRAP Cymru in relation to a route map for plastic recycling in Wales.¹¹

- 19) For **synthetic clothing**, the key challenge is in determining a standard measurement method that will identify the extent to which different factors (such as the nature of the material, the construction method, and the washing technique) affect the release of different types of fibres.
- 20) The development of such a standard is a pre-requisite to the introduction of effective measures which might include setting a maximum threshold for fibre release, and the development of product labelling.
- 21) Such a test is also required to assist in considerations of how the size of financial contributions from synthetic clothing producers to the cost of capture of microfibres (either in washing machines or in wastewater treatment works) might be calculated under a possible extended producer responsibility (EPR) approach.
- 22) Welsh research institutions could help to expand understanding in this area, and contribute to the discussion about how a standard test should be designed. Research could also usefully be undertaken to determine possible technological solutions to capturing microplastics released during washing, and also in separating out microplastics from waste water. At present, capture of microplastics from waste water comprises of capture within sewage sludge. It would be preferable to capture microplastics separately from the sewage sludge, as the latter is typically spread to agricultural land.
- 23) For **artificial turf infill**, which is typically derived from rubber crumb from used vehicle tyres, there are a number of best practice activities that can be implemented in order to minimise the loss (which is estimated at between 1 and 5 tonnes per pitch per year). In our report to the European Commission we recommended:
 - a. Best practice guidance on the prevention of infill loss, and the potential for use of natural infill materials, to be developed by FIFA and World Rugby;
 - b. Best practice guidance to be incorporated by FIFA and World Rugby as part of their accreditation scheme for pitches and thus a requirement for those who wish to be (or remain) accredited;
 - c. Subsequent broadening of the requirement such that any public body that owns or manages an artificial sports pitch has to adhere to the best practice guidance on preventing infill loss; and
 - d. In due course, through regulation, for any organisation that owns or manages an artificial sports pitch to be required to adhere to the best practice guidance on preventing infill loss.

¹¹ See WRAP Cymru (2018) Towards a Route Map for Plastic Recycling: Creating Circularity for Plastics in Wales, available at

<http://www.wrapcymru.org.uk/sites/files/wrap/Wales%20Plastics%20Route%20Map%20Final%20v5.pdf>

24) To date, this has not been taken forward by the European Commission, FIFA or World Rugby. There is clear potential here for Wales to take a strong leadership role in this area and establish a world-leading approach to best practice management of artificial turf infill.

If you have any questions on our evidence, please do not hesitate to get in touch.

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