

## Europe Production, Transport & Recycling Activity

Activity	Observations
Plastic Production	<ul style="list-style-type: none"> <li>• Europe has the largest share of the global plastics industry based on combined imports and exports of plastics in primary forms at 148 billion USD according to 2021 trade value.</li> <li>• Accounted for 40% of world trade imports of plastics in primary forms in 2021</li> <li>• Accounted for 35% of world trade exports of plastics in primary forms in 2021</li> <li>• 15% of world plastic production in 2021</li> <li>• 4 of world's top 10 exporters of plastics in primary forms</li> </ul>
Plastic Manufacturing	<ul style="list-style-type: none"> <li>• 5 of world's top 10 importers of plastics in primary forms</li> <li>• More than 1.5 million people employed in plastics industry in European Union across 52,000 companies</li> <li>• Germany is the world's second largest importer and fourth largest exporter of plastics in primary forms in 2021 by trade value</li> </ul>
Maritime Freight Transport	<ul style="list-style-type: none"> <li>• 7 of world's top 50 ship container ports by cargo volume</li> <li>• 55 large ports as defined by World Ports Index</li> <li>• 67.9 % of freight movement was maritime across EU in 2021</li> </ul>
Rail Freight Transport	<ul style="list-style-type: none"> <li>• Rail accounted for only 5.4% of freight transport in 2021 across the EU.</li> <li>• Plastics accounted for less than 7.6 % of goods transported by rail across the EU in 2021</li> <li>• Germany is by far the largest contributor to rail freight transport in the EU, with 123 billion tonne-km in 2021, representing around 31 % of the total across the EU</li> </ul>
Road Freight Transport	<ul style="list-style-type: none"> <li>• 24.6 % of freight movement was by road across EU in 2021</li> <li>• In 2021, Germany accounted for 23.8 % of tonnage of goods transported by road in the EU</li> </ul>
Plastic Recycling	<ul style="list-style-type: none"> <li>• Over 1,400 plastics recycling plants (54% of global share based on industry database)</li> </ul>

## Environmental Incidents

It is estimated 145,150 tonnes of pellets are lost annually to the environment within Europe alone. There is a strong correlation between locations of pellets and concentration of plastic industry within Europe. With increased regulation and transparency of all the sectors within the plastic industry across Europe, there would be an increase in the amount of reported chronic and acute spills within many more countries within the region to highlight the true extent of the issue.

A total of 26 recorded chronic pellet loss sites have been identified across Europe, predominately from France, UK and Nordic regions. Using recorded pellet presence data from Fidra's Great Nurdle Hunt, there is a strong correlation between locations of pellets identified and the concentration of plastic industry within Europe. Extreme examples of these include Chessel Bay in Southampton where ongoing pellet loss has been identified since 2011, as well as Antwerp and Feluy in Belgium which has reported constant, high volumes of pellet loss into the Scheldt River and nearby watercourses respectively.

A total of 24 recorded acute pellet loss sites have been identified across Europe totalling an estimated 10,255.5 tonnes of pellets having been released into the environment since 1995. Of these, 19 have been reported in France. This is likely due to regulations that have been introduced to make it compulsory to report any acute spill of plastic pellets in France along the supply chain.

Nurdles have been identified throughout many of the marine and terrestrial protected areas across Europe particularly in the UK, Belgium and Netherlands where there is a high concentration of plastics industry activity.

## Environmental Sensitivity

The European Union's biodiversity information system for Europe confirms that as of 2020 protected areas currently cover 23% of the European (38 EEA countries) terrestrial landscape and around 8% of the marine environment<sup>1</sup>. Europe has over 130,000 protected areas which is more than any other continent in the world.

This review has identified that Europe has the largest share of the global plastics industry based on combined imports and exports of plastics in primary forms and has 54% of the global recycling industry. The examples of acute and chronic plastic pellet pollution identified in this study have highlighted the impact that the plastics industry is having on environmentally protected areas in the region with extensive pellet contamination having been identified in SSSIs, SACs and RAMSAR sites across the region.

## Socio-Economic Sensitivity

Four of the world's most popular tourist destinations are in Europe including France (largest number of arrivals worldwide – 90.9 million), Spain (83.5 million – 2nd most popular worldwide), Italy (64.5 million – 6th most popular worldwide) and UK (39.4 million – 10th most popular worldwide). While national economies may not be significantly affected by a large pellet incident in the long term (as most of their GDP is not derived from tourism) pellet incidents could have large scale impacts on local tourism within European countries for example high numbers of pellets have been reported in Cornwall, UK which borders the major US – Europe trade route and may be at risk of future acute spills. It was not possible to determine the impacts of pellet pollution on fishing industry in the region due to lack of data and research on this topic but as demonstrated in the Acute Spill Case Study these incidents have been known to impact fisheries with as yet unknown and unquantified health impacts. Similarly, accumulations of pellets can limit a community's access and enjoyment of the environment which may impact wellbeing, local traditions and access to coastal space used for local industry.

There is a risk associated with the microplastics to human health. Across Europe intentionally added microplastics are in the process of being banned from products because of this recognised risk to both human health and the environment<sup>2</sup>. More data is needed to understand the health impact of ingesting microplastics including pellets. However, microplastics are present in human food, microplastics have been found to contain ~4% of additives and they can adsorb contaminants<sup>3</sup>. A study on the risk associated with wild fish ingestion exposure to human health in this region found that wild fish consumption by adults could lead to 842 microplastic items being consumed annually. In addition to this, there was evidence of neurotoxicity and oxidative damage in fish, although this was yet to be detected in humans<sup>4</sup>. Whilst the risks associated with plastic pellet pollution on human health are likely to be low in comparison to the impact on wildlife there is a lack of evidence to know the true extent pellet pollution will have on human health in this region.

<sup>1</sup> Europa. (2020). Europe's Biodiversity – Protected Areas. Available at: <https://biodiversity.europa.eu/europes-biodiversity> [Accessed on 28/07/23].

<sup>2</sup> European Commission (2023) COMMISSION REGULATION (EU) .../... of XXX amending Annex XVII to Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) as regards synthetic polymer microparticles C34200: Committee established under the Regulation concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) (Joint responsibility with DG ENV).

<sup>3</sup> EFSA CONTAM Panel (EFSA Panel on Contaminants in the Food Chain). (2016). Presence of microplastics and nanoplastics in food, with particular focus on seafood. *EFSA Journal*, 14(6). <https://doi.org/10.2903/j.efsa.2016.4501>

<sup>4</sup> Barboza, L. G. A., Lopes, C., Oliveira, P., Bessa, F., Otero, V., Henriques, B., Raimundo, J., Caetano, M., Vale, C., & Guilhermino, L. (2020). Microplastics in wild fish from North East Atlantic Ocean and its potential for causing neurotoxic effects, lipid oxidative damage, and human health risks associated with ingestion exposure. *Science of The Total Environment*, 717, 134625. <https://doi.org/10.1016/j.scitotenv.2019.134625>