

Shifting towards ecological transition in the Mediterranean



Initiatives for curbing plastic pollution within a circular economy approach in the Mediterranean Sea

The IUCN marine programme on plastics

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IUCN GMPP - TACKLING MARINE PLASTIC ISSUES www.marplasticcs.org



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Primary Microplastics in the Oceans a Global Evaluation of Sources

a global estimate and mapping of the sources and quantities of primary microplastics – plastics that enter the oceans in the form of small particles directly released from household and industrial products.

This report concluded that invisible particles washed off synthetic clothing and car tyres are the two main contributors of microplastics from primary sources into our oceans.



Primary Microplastics in the Oceans:

a Global Evaluation of Sources Authors: Julien Boucher. Damien Friot







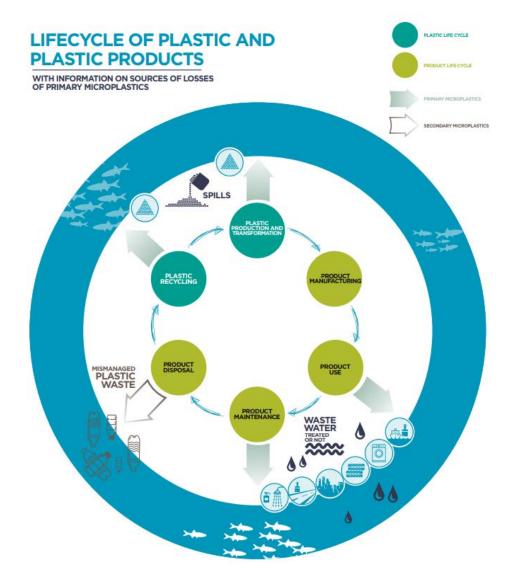






KNOWLEDGE

Building on the best available science, IUCN is developing various tools to better understand the state and impacts of plastic pollution and supporting governments and industries in their shift from a linear to a circular model for plastics











CAPACITY BUILDING

IUCN is bringing together local and regional stakeholders to encourage national action to address plastic pollution based on an integrated lifecycle approach







National marine plastic litter policies in EU Member States: an overview

November 2017





POLICY

IUCN is supporting national and regional policy frameworks and legislative reform processes, and facilitating the development of national programmes, including action plans and green economy roadmaps

IUCN initiated a desk analysis of gaps and opportunities in current policies and regulatory frameworks. Based on the results of this study, decision-makers will be provided with national reports which assess the impacts and effectiveness of legal instruments and tools available to address plastic pollution. The legal review and effectiveness assessment will in turn inform the development of national action plans and roadmaps.







BUSINESS

IUCN is engaging and mobilising business actors to tackle plastic pollution. IUCN is also supporting the development of national private sector platforms to identify replicable solutions and drive circular economy innovations.



PLASTIC FOOTPRINT: STATE OF THE ART AND WAYS **FORWARD**

Decision-makers need reliable data, metrics and tools to monitor progress.

Benchmark of existing footprint and life cycle impact assessment approaches for plastics.

These can be improved by:

- Gathering better country level data on plastic waste management;
- Designing better models to assess micro- and macro- plastic leakages;
- Developing a standard set of indicators which highlight costs of inaction and identify investment opportunities for a more circular economy.



Plastic footprint: state of the art and ways forward

Julien Boucher, Anna Kounina, Philippe Puydarrieux,









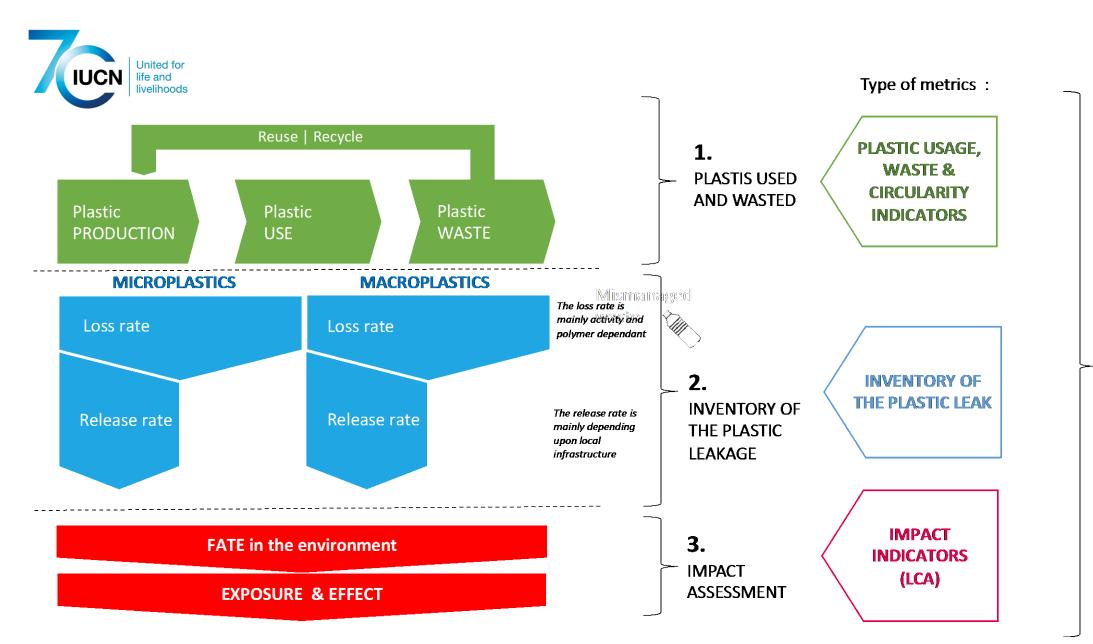


Figure 7. What is included in a plastic footprint





Releases from primary microplastics are equivalent or outweigh that of secondary microplastics from mismanaged waste for Europe

GLOBAL RELEASES TO THE WORLD OCEANS:

COMPARISON WITH PLASTICS ORIGINATING FROM MISMANAGED WASTES





PLASTIMED BEMED: CLOSING THE PLASTIC TAP 2019-2021







Implementing partners

Funding partners

Metrics to inventory **plastic flows** leaking into the environment: "How much plastic is leaking and from where?"

Metrics to assess **environmental impacts** resulting from this leakage: "What are the environmental impacts resulting from plastic pollution?"

Metrics to monetize the consequences of the leakage and impacts/ measure the action: "How do the environmental impacts of plastic rank with regard to other environmental issues?"



Figure 11. Potential framework developed by Quantis to assess the impacts of plastics on marine ecosystems

Micro/ nano plastics loss rate 30 05 T of o 0 ssification INVENTORY 1 CO $\overline{\mathbf{O}}$ රු ntification 111 Release + others rate Qua Mis managed¹ waste loss rate

IMPACTS parameters for ecosystems

Fate

Exposure \rightarrow



Influenced by size and shape

Influenced by plastic type, release region



Transport and accumulation patterns of plastic debris between

the ocean surface, the water column, the seafloor, the shoreline and in biota (influenced by many factors including winds, buoyancy (plastics properties), biofouling, polymer type, size and shape, local and large-scale currents and wave action)



Degradation time (ultra-violet and heat degradation from the sun, hydraulic degradation

from the oceans currents, waves and tides as well as humidity, hydrolysis, microbial and funghal activity cause plastics to become instable and fall apart)



Fragmentation. & abrasion (exposure to UV radiation)



Plastic sinks



- Ingestion by large animals (limited food intake, damage of the digestive tract, reduced organism fitness by limited food consumption (e.g., obstructing the gut, false sense of satiation)
- Entanglement / through gills (injury and general debilitation, suffocation, decreased food consumption, reduced ability to avoid predators)

Microplastics

- Ingestion (altered feeding, increased metabolic demand, reallocation of energy reserves)
- Vector of chemical (e.g. POPs, PBTs, metals) and pathogen / parasite transport into marine organisms



Nanoplastics

Effect on ecosystems

Influenced by surface area, reactivity, intrinsic toxicity of the polymer and absorbed contaminants



Physical effects (leading to declined food consumption, blockage

of the intestinal tract, reduced feeding stimuli, inhibition of the gastric enzyme secretion, decreased steroid hormone ovulation delays, failure to reproduce, impaired energy metabolism management and an overall reduced fitness risk of accumulation through trophic chain)



Chemical effects from 1. release from plastics themselves (polymeric

materials, chemical additives, residual monomer, and chemicals causing toxicity, endocrine disruptions, etc.) and 2. substances that attach plastics (hydrophobic compounds and from surrounding metals sorbed seawater, e.g., POPs and PBTs)



Pathogen and parasite vector effect (invasive species, pathogens)





THE APPLICATION OF LIFE CYCLE ASSESSMENT IN CIRCULAR ECONOMY



Figure 19. LCA and circularity may lead to different actions (Aoustin et al., 2015)

Circular economy offers an alternative by reducing raw material input and waste to a minimum through designing products for circularity – reuse, repurpose, recycle.

Only a cross-sectoral systemic approach can drive significant and lasting change

>> reduce the negative environmental and social impacts of products



A clearer picture of plastics

Humans have created about 8.3 billion metric tons of plastics to date, outgrowing all man-made materials other than steel and cement.

How heavy is 8.3 billion metric tons?



25,000 X EMPIRE STATE BUILDING (331,000 metric tons)



80 MILLION X BLUE WHALE (104.5 metric tons)

1 BILLION X ELEPHANTS (7.5 metric tons)

The rapid rise of plastics

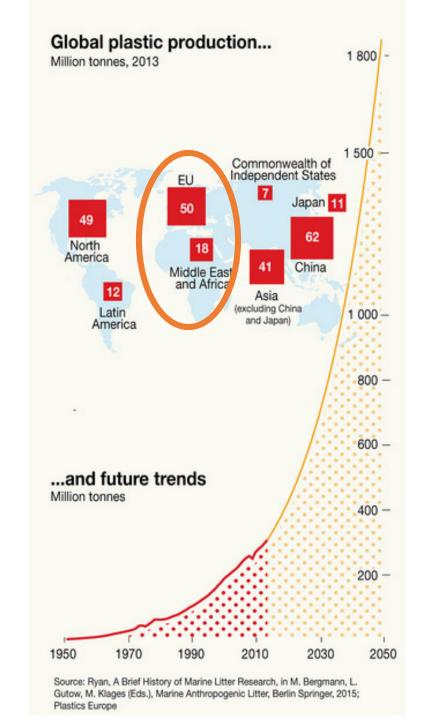
A world without plastics seems unimaginable today, yet their large-scale production and use only dates back to around 1950.





WHAT'S NEXT?

- Focus on reducing the total consumption of plastic, not just recycling plastics and their role within a circular economy
- >> As it's require energy, water
- Plastics are a global problem, they
 demand regional and local solutions that
 are tailored to the different sources and
 pathways of plastic to the ocean.
- Circular economy: pay attention to social criterias







THANK YOU!



