# **MICROPLASTICS IN THE ENVIRONMENT: PATHWAYS AND DISTRIBUTION**



## **DISTRIBUTION OF MICROPLASTICS IN OUR ENVIRONMENT**



#### THE PATH OF THE PLASTIC BOTTLE INTO FOOD





#### WHAT EFFECTS DO MICROPLASTICS HAVE ON WILDLIFE?





### **MICROPLASTIC DISTRIBUTION THROUGH TIRE AND ROAD ABRASION**



#### **MICROPLASTICS AND LAUNDRY WASHING**

Direct levers to reduce microfiber release





# **MICROPLASTICS FROM TEXTILES**





# MICROPLASTIC RELEASE FROM TEXTILES

# Pro-contra analysis of current prevention tactics

WASHING MACHINE FILTER	<ul> <li>Can be retrofitted to any household washing machine (external)</li> <li>Efficiency depends on mesh size</li> <li>Filter has to be recycled and replaced regularly (material, effort, and costs)</li> </ul>	
WASHING BAGS	<ul> <li>Easy to use and reusable</li> <li>Protects textiles from mechanical stress (clothes last longer)</li> <li>Efficiency depends on mesh size, cleaning, and bag material may release microplastic fibres itself</li> </ul>	
CORA BALL	<ul> <li>Likely only captures larger fibres and particles (efficiency approx. 30 %)</li> <li>Could damage textiles and release more microplastics through abrasion</li> </ul>	
SPECIAL DETERGENT	<ul> <li>No information on the exact mode of action (chemical/mechanical)</li> <li>Reduction presumably only at low washing temperatures (20°C)</li> <li>Disproportionately high price</li> </ul>	



## MICROPLASTICS IN THE WATER CYCLE STATUS QUO



MICROPLASTICS IN THE WATER CYCLE INCLUDING WASSER 3.0 detect | remove | reuse



## **MICROPLASTICS IN OUR ENVIRONMENT: UNITED IN WATER**



#### WHAT EFFECTS DO MICROPLASTICS HAVE ON OUR HEALTH?





#### WHAT IS THE SIZE DEFINITION OF MICROPLASTICS?



#### THE TOP 10 TYPES OF PLASTIC WASTE IN INLAND WATERS

Shares of macroplastic deposits in European rivers and lakes\*



\*The values are based on 5 British studies, three country-specific studies (France, Switzerland, Poland) and one Europe-wide study. Source: Earth Watch Institute





#### **BEHAVIOUR OF PLASTICS IN WATER**

(depending on the density)

FLOAT	<b>Types of Plastics</b> Foams Natural rubber (NR) Polyethylene (PE) Polypropylene (PP)	<b>Density [g/cm<sup>3</sup>]</b> > 0.005 0.92 - 1.0 0.92-0.96 0.9 - 1.0
SUSPENDED	<b>Types of Plastics</b> Polystyrene (PS) Polycarbonate (PC) Polyamide (PA) Polymethylmethacrylate (PMMA)	<b>Density [g/cm³]</b> 1,05 1,0 - 1,2 1,0 - 1,2 1,16 - 1,2
SINK	<b>Types of Plastics</b> Polyvinyl chloride (PVC) Polybutylene terephthalate (PBT) Polyoxymethylene (POM) Polytetrafluoroethylene (PTFE)	<b>Density [g/cm³]</b> 1.2 - 1.4 1.3 - 1.32 1.34 - 1.43 > 1,8

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#### **MICROPLASTICS AND COSMETICS**

#### (Values for Germany)



Source: Fraunhofer Institut für Umwelt-, Sicherheits- und Energietechnik UMSICHT und NABU (Naturschutzbund Deutschland) e.V. (2018) Mikroplastik und synthetische Polymere in Kosmetikprodukten sowie Wasch-, Putz- und Reinigungsmitteln, Endbericht, DOI 10.24406/UMSICHT-N-494063.

WASSER

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#### **MICROPLASTICS AND DISSOLVED POLYMERS**



Source:: Fraunhofer Institut für Umwelt-, Sicherheits- und Energietechnik UMSICHT und NABU (Naturschutzbund Deutschland) e.V. (2018) Mikroplastik und synthetische Polymere in Kosmetikprodukten sowie Wasch-, Putz- und Reinigungsmitteln, Endbericht, DOI 10.24406/UMSICHT-N-494063.

## HOW DOES THE PLASTIC GET TO THE SEA?



Source: https://www.tauchen.de/umweltschutz/plastik-mit-giftbeilage-wie-der-stoff-unsere-meere-verschmutzt

## THE DISTRIBUTION OF PLASTIC GARBAGE IN OUR SEAS





Source: https://www.tauchen.de/umweltschutz/plastik-mit-giftbeilage-wie-der-stoff-unsere-meere-verschmutztwick-wie-der-stoff-unsere-meere-verschwutztwick-wie-der-stoff-unsere-meere-verschwutztwick-wie-der-stoff-unsere-meere-verschwutztwick-wie-der-stoff-unsere-meere-verschwutztwick-wie-der-stoff-unsere-meere-verschwutztwick-wie-der-stoff-unsere-meere-verschwutztwick-wie-der-stoff-unsere-wie-der-stoff-unser-stoff-unsere-wie-der-stoff-unsere-

#### **DISPOSABLE PLASTIC PRODUCTS IN OUR SEAS**



Quelle: EU-Kommission 2017



#### **POLYMERS, PLASTICS & MICROPLASTICS**

#### Where does the regulation start?



### **RETHINKING ECONOMY**





## **MICROPLASTICS IN SOILS**



## **MICROPLASTICS IN WASTEWATER TREATMENT PLANTS**







#### **POLYMERS IN OUR ENVIRONMENT**











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#### **ENTRY PATH OF MICROPLASTICS IN THE ENVIRONMENT**

