Baltic Eye Policy Brief

April 2015

The cosmetics clean-up

- first step to reduce microplastic input into the Baltic Sea

More and more microplastics are littering the Baltic Sea. One significant source of emission is found in our bathroom cabinets where we keep our personal care products. While these products keep us clean, they end up polluting the sea.
Up to 40 tons of microplastics are released annually into the Baltic Sea catchment through the use of products like body wash, shower gels, and scrubs.
Some major companies have initiated phase-outs of their microplastic ingredients. But unless this is done in all countries, and to a greater extent, the overall emissions to the sea will continue to increase.

Microplastics accumulating in the oceans have drawn worldwide attention in recent years. A growing number of scientific studies show that microplastics can bring serious harm to the marine environment and its inhabitants.

This problem is far from new. Plastic started entering the environment more than 50 years ago and continues to do so in increasing quantities. Today, microplastics are omnipresent in all seas and oceans; in the water columns and sediments, at beaches and in organisms. They are even found in Arctic ice and in deep seas.

The accumulation of plastics is particularly severe for the Baltic Sea. Plastic degrades slowly in nature - and because the water exchange is extremely slow in the Baltic Sea, all plastics that enter the marine environment will stay there for the foreseeable future.

Photo: Baltic Eye/Henrik Hamrén

RECOMMENDATIONS

- Put the Helcom Regional Action Plan (RAP) on marine litter into immediate action as a concerted action of all Baltic Sea countries.
- Phase-out microplastics in personal care products in all Baltic Sea countries.
- Mandate detailed product labelling for all products containing microplastics.
- Establish an action-oriented dialogue between industry and politicians to speed up the phase-out process.

What are microplastics?

Microplastics are tiny synthetic polymer particles and fragments, less than 5 mm in diameter. They constitute the largest part of all plastic debris in the global marine environment and are generally divided into two sub-groups:

- Primary – industrially produced particles in micro-size.
- Secondary – textile microfibers, paint abrasives, and fragments resulting from the break down of larger plastic items.

Primary microplastics used in cosmetics and personal care products are small by design, normally from 1 mm in diameter down to nanometers (1 nanometer = one millionth of a millimetre). These particles are mainly used as abrasives in different body scrubs and shower gels, but are also found in products like toothpaste, make-up, and deodorant.

Magnets for bacteria and contaminants

When in water, micoplastics act as magnets, attracting and carrying bacteria and various contaminants that ”colonize” the particles. This becomes particularly evident in the sewage treatment plants where the particles are mixed with various chemical pollutants and microbes.

Once released into the the sea, microplastics end up in the

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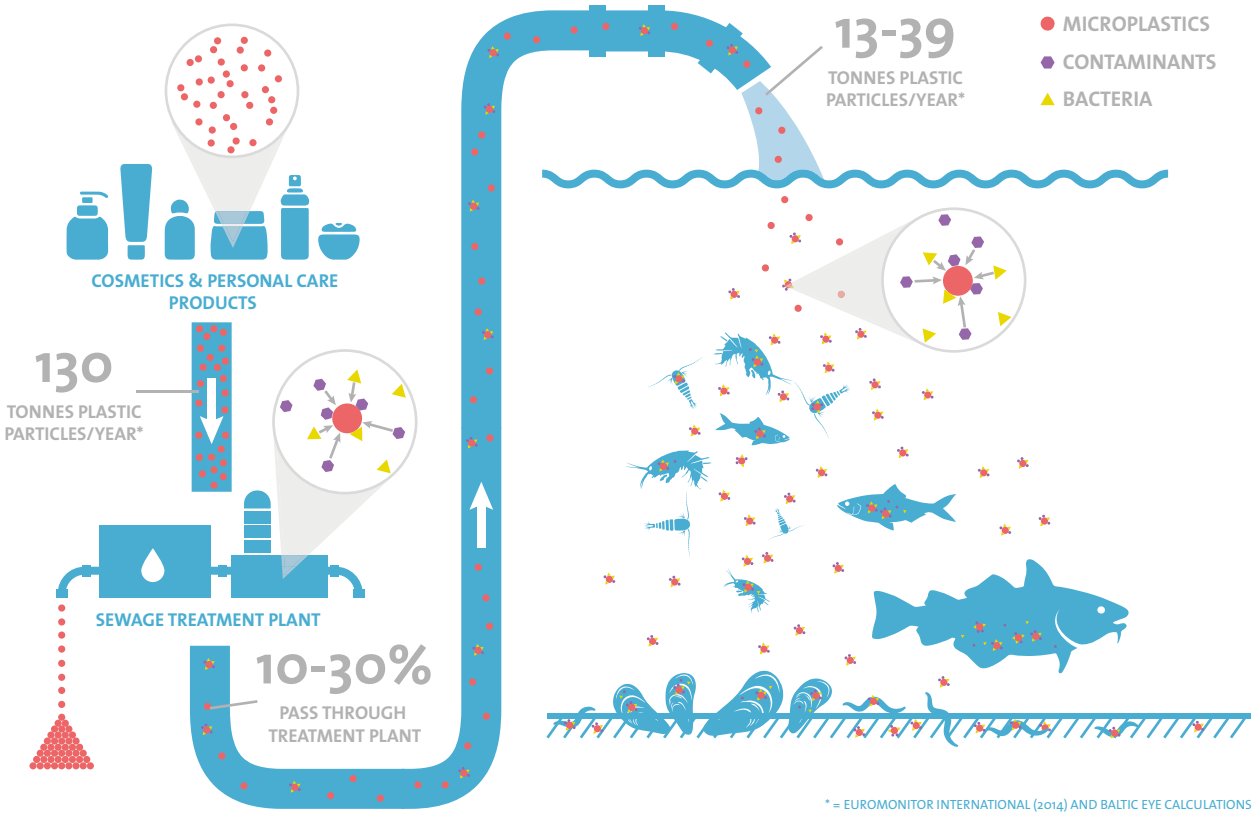


Most personal care products are designed to be flushed down the households drains after use. In the Baltic Sea catchment area around 130 tons of microplastic particles from these products annually enter the wastewater treatment systems. A significant part pass through the sewage treatment plants and enter the aquatic environment. Coated by chemical pollutants and microbes, the plastic particles can be taken up by key species like plankton, worms and fish, but also mammals. The smaller the particles, the larger is the risk that they penetrate into cells and tissues and potentially cause adverse effects on immune cells and organs.

sea surface layer, water columns and sediments, where they can be further coated by bacteria and various contaminants.

Transfer along the food chain

Virtually all marine animals can take up microplastics. For instance, zooplankton and sediment-feeding animals (e.g. worms and mussels) mistake the tiny plastic particles for food and eat them. Once ingested, the microplastics then can be transferred along the food chain to other marine animals.

Impact on animals

A growing number of scientific studies show that microplastics can seriously harm the marine environment and its habitants. The particles may reduce animals' abilities to feed. They can also damage internal organs, cause inflammation, and decrease energy storage and reproduction.

When key species of the marine food web consume microplastics they also consume any bacetria or toxins that are attached to the particles. This might lead to accumulation of various attached or leaching contaminants throughout the food web.

Into cells and tissues

The smaller the particles, the larger is the risk that they penetrate into cells and tissues of the animals. Exposure studies with polyethylene on blue mussels, which is an important species of the Baltic Sea food web, showed that small particles entered the mussels' tissues and blood cells, causing adverse effects on immune cells and organs.

Microplastic particles in the smaller fraction (0,02 mm in diameter) eaten by zooplankton.

Human exposure

Transfer of microplastics into tissues may lead to increased human exposure. Based on data from a study measuring microplastic uptake by mussels cultivated for human consumption, scientists estimate that the average European shellfish consumer will eat around 11,000 plastic particles per year.

How much is there?

Microplastic marine litter comes from a great variety of different sources, some of them still unknown and others very hard to quantify.

A source whose emissions actually can be quantified is the use of cosmetics and personal care products containing microplastics. Around 130 tons of polyethylene particles from personal care products are flushed down the household drains in the Baltic Sea catchment area each year, according to Baltic Eye estimates based on market data (Euromonitor 2015).

A recent Swedish study showed that 10-30% of the microplastic particles in household sewage water pass through sewage treatment plants and are released into the sea. Thus, up to around 40 tons of microplastic particles from personal care products enter the Baltic Sea - each year.

What can we do?

Two key measures for tackling the challenge of microplastics are sustainable product design and prevention at the source. Unfortunately, many of the known sources are very hard to stop. However, the use of microplastics in personal care products is a significant source of emission that actually can be eliminated.

Several multinational companies have already initiated phase-outs of microplastics from their personal care products, replacing the plastics with alternatives like silica. In some countries around the Baltic, these initiatives have led to a decreased use of microplastics in personal care products.

The decrease is unfortunately more than counterbalanced by an increased use in other countries where phase-outs have not started. According to the Euromonitor forecast for 2014 to 2018, the net amounts of microplastic emissions from personal care products to the Baltic Sea are likely to increase in the coming years.

To significantly reduce these emissions, phase-outs must be implemented further, more rapidly and to the same extent in all Baltic Sea countries.

Stronger legislation or industry taking responsibility?

Putting an end to microplastic emissions from personal care products is not a question of either legislative measures or trade and industry initiatives. It is a question of bringing legislative measures and industry measures together to speed up the process.

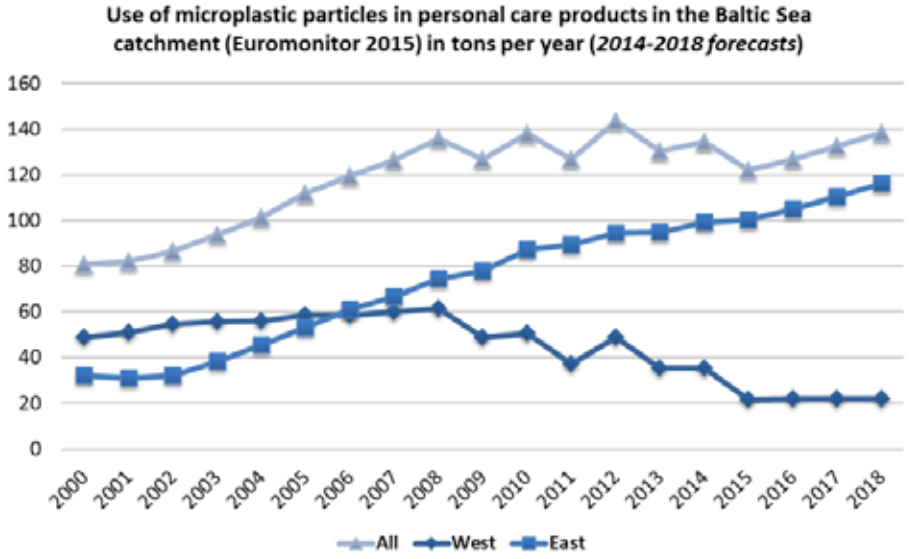
Because legislative measures could take years to implement, Baltic Eye suggests an immediate dialogue between politicians and industry to end microplastic emissions from all personal care products.

Voluntary initiatives have already demonstrated that it is perfectly do-able to replace plastic particles in personal care products with environmentally friendly alternatives. Such initiatives should, therefore, be endorsed on both national and EU levels and implemented in all member states.

EU-wide ban

The Helcom Regional Action Plan (RAP) on marine litter identifies microplastics as one of the top priorities. It stresses the importance of establishing an overview of the different sources of microplastics and engage with manufacturers and retailers. For microplastics in personal care products Helcom suggests that ”the impact on the marine environment should be reduced by applying substitutes.”

In several US states, the use of microplastics in personal care products has already been banned. In December 2014 the Netherlands, Austria, Belgium, Luxemburg and Sweden issued a joint call for a similar EU-wide ban. This proposal should be seriously considered and supported by all EU countries, to demonstrate the political will to act according to the EU precautionary principle and to reach the targets expressed in the EU Marine Strategy Framework Directive (MSFD) through Descriptor 10 dealing with marine litter.



Phase-out initiatives by some multinational producers, e.g. by replacing microplastics with silica, have resulted in a decreased consumption in some countries around the Baltic Sea. But the total use of microplastics in personal care products is likely to increase if the phase-out measures are not extended and implemented in all countries.
Source: Euromonitor International (2015).

West: Germany, Sweden, Norway, Denmark, Finland.
East: Poland, Ukraine, Russia, Czech Republic, Slovakia, Belarus, Lithuania, Latvia, Estonia.

Background Information

Table: Volumes of consumption (t) of polyethylene particles (PE) in personal care products [1] from 2000 to 2018 (2014-2018 forecast) in countries of the Baltic Sea catchment area[2]. Consumption per capita (g), and the total release of polyethylene microplastic particles by the use of personal care products (t).

		2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	all years
Germany	per capita (g)	3,14	3,15	3,15	3,17	3,17	3,31	3,41	3,56	3,89	3,17	3,39	2,57	3,68	2,81	2,81	1,93	1,95	1,96	1,98	
	catchment (t)	12,14	12,20	12,21	12,26	12,28	12,80	13,20	13,78	15,06	12,27	13,12	9,96	14,23	10,87	10,88	7,48	7,55	7,60	7,65	**217,52**
Poland	per capita (g)	0,65	0,60	0,60	0,74	0,90	1,07	1,22	1,33	1,50	1,65	1,86	1,92	2,05	2,07	2,16	2,20	2,32	2,45	2,59	
	catchment (t)	24,63	22,84	23,05	28,23	34,30	40,75	46,70	50,77	57,40	62,77	70,98	73,28	78,21	78,82	82,60	84,00	88,69	93,59	98,99	**1140,59**
Ukraine	per capita (g)	0,14	0,20	0,25	0,35	0,49	0,61	0,76	0,86	1,05	0,59	0,62	0,62	0,64	0,63	0,64	0,64	0,65	0,67	0,69	
	catchment (t)	0,25	0,35	0,46	0,63	0,89	1,09	1,37	1,54	1,90	1,07	1,11	1,11	1,15	1,14	1,16	1,15	1,18	1,21	1,25	**20,00**
Russia	per capita (g)	0,16	0,19	0,22	0,24	0,29	0,34	0,40	0,45	0,51	0,49	0,55	0,52	0,54	0,53	0,53	0,52	0,53	0,55	0,56	
	catchment (t)	1,53	1,77	2,03	2,29	2,73	3,18	3,74	4,24	4,82	4,62	5,21	4,94	5,08	4,98	5,03	4,94	5,03	5,14	5,27	**76,57**
Sweden	per capita (g)	2,07	2,16	2,38	2,42	2,34	2,42	2,33	2,37	2,34	1,81	1,82	1,33	1,73	1,22	1,22	0,72	0,71	0,72	0,71	
	catchment (t)	18,59	19,46	21,43	21,75	21,07	21,78	21,00	21,34	21,08	16,34	16,39	11,95	15,57	11,02	11,02	6,48	6,42	6,46	6,40	**295,56**
Czech Republic	per capita (g)	0,97	1,01	1,06	1,13	1,22	1,27	1,31	1,41	1,50	1,45	1,50	1,48	1,50	1,46	1,47	1,45	1,48	1,53	1,57	
	catchment (t)	1,68	1,75	1,83	1,95	2,11	2,21	2,27	2,45	2,60	2,51	2,60	2,56	2,61	2,54	2,55	2,51	2,57	2,66	2,72	**44,66**
Norway	per capita (g)	2,14	2,24	2,32	2,39	2,51	2,56	2,65	2,71	2,81	2,27	2,28	1,52	2,07	1,48	1,51	0,91	0,92	0,95	0,95	
	catchment (t)	0,19	0,19	0,20	0,21	0,22	0,22	0,23	0,23	0,24	0,20	0,20	0,13	0,18	0,13	0,13	0,08	0,08	0,08	0,08	**3,22**
Denmark	per capita (g)	1,50	1,57	1,70	1,76	1,91	1,92	1,93	1,91	1,94	1,51	1,68	1,22	1,45	1,02	1,05	0,59	0,60	0,62	0,63	
	catchment (t)	7,23	7,57	8,17	8,50	9,19	9,26	9,32	9,20	9,33	7,26	8,10	5,89	6,99	4,90	5,06	2,82	2,90	2,97	3,05	**127,70**
Finland	per capita (g)	2,03	2,22	2,43	2,48	2,55	2,75	2,85	2,94	3,04	2,46	2,49	1,80	2,30	1,62	1,61	0,93	0,93	0,92	0,92	
	catchment (t)	10,61	11,60	12,67	12,95	13,31	14,37	14,91	15,35	15,87	12,85	12,99	9,43	12,00	8,47	8,44	4,87	4,85	4,83	4,81	**205,16**
Slovakia	per capita (g)	1,60	1,64	1,67	1,71	1,75	1,81	1,86	2,01	2,20	2,16	2,19	2,21	2,28	2,27	2,29	2,27	2,30	2,35	2,41	
	catchment (t)	0,53	0,54	0,55	0,57	0,58	0,60	0,62	0,66	0,73	0,71	0,72	0,73	0,75	0,75	0,76	0,75	0,76	0,78	0,79	**12,87**
Belarus	per capita (g)	0,10	0,11	0,12	0,14	0,19	0,23	0,30	0,35	0,39	0,39	0,52	0,62	0,55	0,54	0,55	0,54	0,56	0,57	0,58	
	catchment (t)	0,37	0,41	0,45	0,53	0,73	0,85	1,13	1,33	1,45	1,46	1,93	2,33	2,06	2,02	2,07	2,03	2,08	2,13	2,17	**27,54**
Lithuania	per capita (g)	0,31	0,32	0,35	0,38	0,44	0,48	0,58	0,65	0,68	0,60	0,57	0,59	0,60	0,61	0,61	0,62	0,62	0,66	0,67	
	catchment (t)	1,08	1,09	1,20	1,30	1,52	1,64	1,99	2,22	2,36	2,05	1,97	2,03	2,06	2,08	2,10	2,12	2,14	2,27	2,29	**35,51**
Latvia	per capita (g)	0,59	0,64	0,69	0,74	0,66	0,71	0,67	0,68	0,64	0,51	0,57	0,58	0,59	0,59	0,60	0,60	0,61	0,61	0,62	
	catchment (t)	1,34	1,46	1,58	1,69	1,51	1,63	1,54	1,55	1,46	1,16	1,29	1,32	1,34	1,36	1,37	1,38	1,39	1,40	1,42	**27,18**
Estonia	per capita (g)	0,51	0,59	0,59	0,74	0,82	0,98	1,21	1,30	1,22	1,07	1,07	0,92	1,00	0,93	1,02	0,94	0,95	0,95	1,03	
	catchment (t)	0,71	0,82	0,82	1,03	1,14	1,36	1,69	1,80	1,70	1,49	1,49	1,29	1,40	1,30	1,41	1,31	1,32	1,32	1,44	**24,84**
all countries	catchment (t)	**80,87**	**82,041**	**86,639**	**93,896**	**101,57**	**111,73**	**119,7**	**126,48**	**135,99**	**126,76**	**138,1**	**126,95**	**143,63**	**130,38**	**134,56**	**121,91**	**126,95**	**132,43**	**138,35**	**2258,95**

[1] Euromonitor International (2015) Ingredients: Euromonitor International from trade interviews and industry sources. Database.
[2] "Reduction of Baltic Sea Nutrient Inputs and Cost Allocation within the Baltic Sea Catchment" (RECOCA), Baltic Nest Institute, Stockholm University Baltic Sea Centre.

FURTHER READING

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ABOUT BALTIC EYE

Baltic Eye is a part of Stockholm University Baltic Sea Centre and focuses on scientific communication.

Through Baltic Eye, researchers and communicators collaborate to develop and disseminate knowledge that contributes to a healthier Baltic Sea.

Baltic Eye seeks to promote scientifically based decisions aimed at improving the Baltic Sea environment.