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**Federal Office for the Environment FOEN**

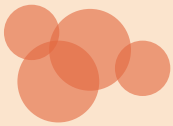
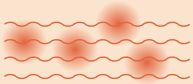


# Humans and animals

- *Plastics are found everywhere in the environment and can be absorbed by humans and animals, particularly in the form of microplastics.*
- *There are no current indications that aquatic organisms are under threat from the concentrations of microplastics measured to date in Swiss waters. However, the level of microplastic pollution is underestimated, since analysis techniques to date could not detect smaller particles. Further research is therefore required.*
- *Plastics hardly decompose in the environment. It can therefore be assumed that levels will rise over time.*
- *To prevent future risks to humans and animals, the input of plastics into the environment must be reduced as far as possible.*

## Plastics enter the environment and remain there

Plastics are used all over the world in all shapes and sizes and may enter the environment, where they decompose only very slowly. They degrade into smaller and smaller fragments and accumulate in soil and the sediments of waterbodies. Microplastics are mostly absorbed by humans and animals with their food. In Switzerland small quantities of microplastics have also been found in the digestive systems of birds and fish. Wild animals can even ingest fairly large plastic items. Since the concentrations in the environment will increase in the long term, future negative impacts cannot be ruled out. Essentially,

| Large plastic items | Microplastics | Chemical components of plastics | Environmental pollutants |
|---|---|---|---|
|  |  |  |  |
| Plastic items on the ground or floating may injure animals, e.g. if they become entangled in lost fishing gear, or if they swallow them and cause intestinal damage. If an animal swallows too much plastic, this also makes it feel satiated and it may starve. | Microplastics are absorbed into the organism via food or breathing and are probably in a large part excreted again. Inflammatory reactions have been observed in earthworms. Harmful effects on other animals cannot be ruled out. | Chemical components of plastics (including additives) are present in all plastic products and can be absorbed by humans and animals. Some of these substances are toxic or have other negative effects. | Substances harmful to the environment and health may have a strong tendency to adhere to plastic fragments in the environment because of surface effects and may contaminate them. |
| No animals which have starved due to large plastic items or been strangled by nets have been found in Switzerland to date. Likewise, humans are currently not at risk. | There are no current indications that aquatic organisms are under threat from the concentrations of microplastics measured to date in Swiss waters. However, the level of microplastic pollution is underestimated, since analysis techniques to date could not detect smaller particles. Little data is available for soil. Further research is therefore required in order to estimate the risk to humans and animals more accurately. | The expectation based on initial estimates for additives is that the absorption of microplastic-bound components is negligible compared to those absorbed by the usual pathways. However, further research is needed. This estimate only applies to those components which can actually be absorbed by other pathways. | Nevertheless, negative effects of the absorption of microplastics affected by environmental pollutants are negligible compared to those of pollutants absorbed through food or directly (e.g. by inhalation). |

the potential effects on humans and animals that can occur are listed in the table.

## Switzerland in an international comparison

In Switzerland, relatively little plastic waste ends up in the environment. This is due to the country's well-functioning, environmentally compatible waste disposal system. According to present knowledge, however, a threat to animals from microplastics in Swiss waters and soil cannot be entirely ruled out. In world regions without a functioning waste disposal system, isolated zones, e.g. waters, already exist which are so heavily polluted that they present a risk to wildlife.

## Humans can also absorb microplastics

Microplastics can be found in a number of foods, e.g. seafood, fish, sugar and honey. The ways in which microplastics get into our food are complex, since they may arrive onto our plates or into our glasses from the air, but may also enter the food chain from the environment. Researchers have thus now also found microplastics in human faeces. No evidence of microplastics has been found so far in Swiss drinking water.

A small proportion of airborne microplastics is particulate matter which is small enough to be inhaled. The share of microplastics in respirable particulate matter is in the low single digit range. Humans and animals are protected from harmful effects by compliance with the immission limits in the Swiss Federal Ordinance on Air Pollution Control *(see "Air" factsheet).*

It is not yet clear whether very small plastic particles – "nanoplastics" – can enter the body through the wall of the intestines or lung lining. If so, this could trigger e.g. inflammation or release components of the plastics which are harmful to health. Further research is needed into whether these possible risks are relevant to health.

## Possible measures

- **Apply the precautionary principle:** the input of plastics into the environment must be reduced as far as possible.
- **Dispose of plastic waste properly:** recycle it in an environmentally friendly manner or incinerate it.
- **Reduce consumption of plastic by means of restrictions and prohibitions,** e.g. microplastics in cosmetics or single-use plastic bags.
- **Minimise tyre abrasion:** lightweight cars, correct tyre pressure, narrow tyres, regenerative braking, driving smoothly and at lower speeds, street cleaning including waste water treatment, treatment of contaminated road runoff.

## Further information

- FOEN information for specialists on fine particles
- Study of microplastics in Swiss waters (press release in German, French and Italian)
- Study of microplastics in global waters (press release)

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**Link to PDF file:**
www.bafu.admin.ch/plastics