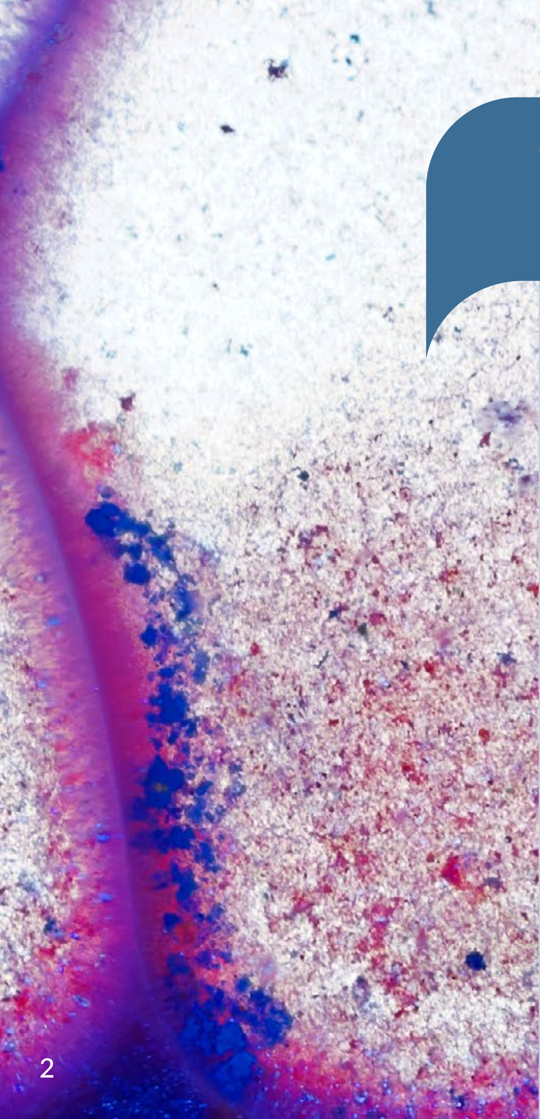
How can we reduce ‘forever chemicals’?

Key messages of the EMPEREST project

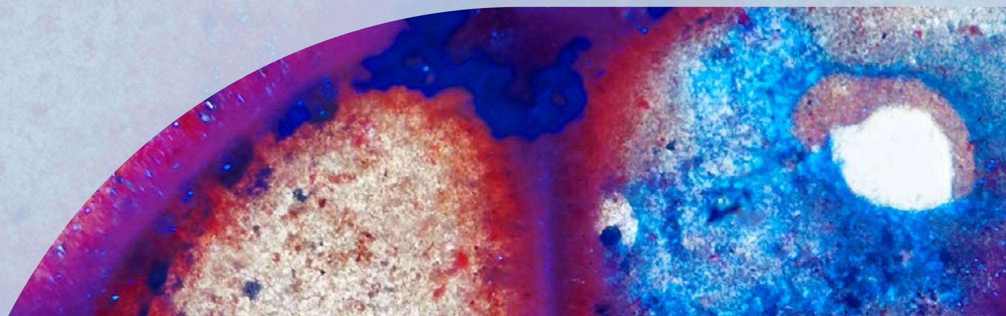
EMPEREST – Eliminating Micro-Pollutants from Effluents for Reuse Strategies

Interreg Baltic Sea Region
Co-funded by the European Union
SUSTAINABLE WATERS EMPEREST



1. PFAS are everywhere

Extensive research has established that PFAS pose significant risks to both **human health** and the **environment**. Moreover, their persistence makes remediation efforts both technically challenging and financially burdensome.

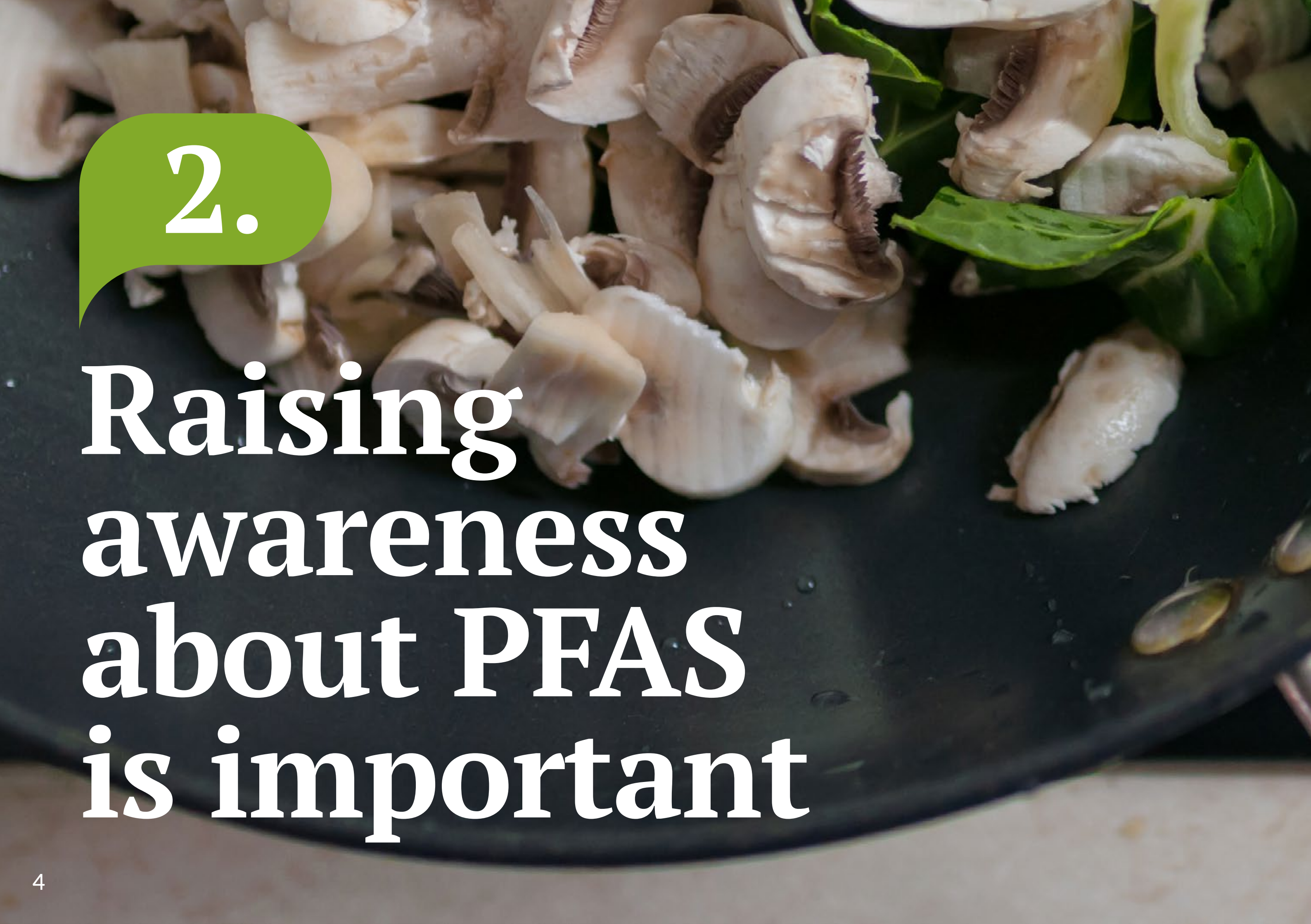


Our evidence shows that PFAS contamination is widespread in the Baltic Sea and its catchment area, with especially high levels found in biota. In water, concentrations of some already banned PFAS compounds are decreasing, suggesting that PFAS restrictions work for reducing pollution; however, most PFAS compounds are not restricted. **EMPEREST monitoring and assessment guidelines** should be considered when updating PFAS monitoring systems, for better and harmonised results in the region.

Special attention should be paid to ultrashort PFAS, such as TFA because of lack of data and possibly very high concentrations.

Legislative barriers need to be put in place early – before the long-term scientific data is available – as the pollution is already happening while monitoring lags behind.

It is important to reduce PFAS emissions and to identify local PFAS pollution hotspots to mitigate PFAS risks. **EMPEREST risk assessment tool** was developed to support this. Successful mitigation of the risks requires establishing dialogue between authorities, industries and water utilities.



2.

Raising awareness about PFAS is important

Awareness about PFAS varies across the Baltic Sea Region. Understanding the PFAS problem is challenging due to the large number of substances, how widespread and persistent they are, consequences on health being non-immediate, etc.

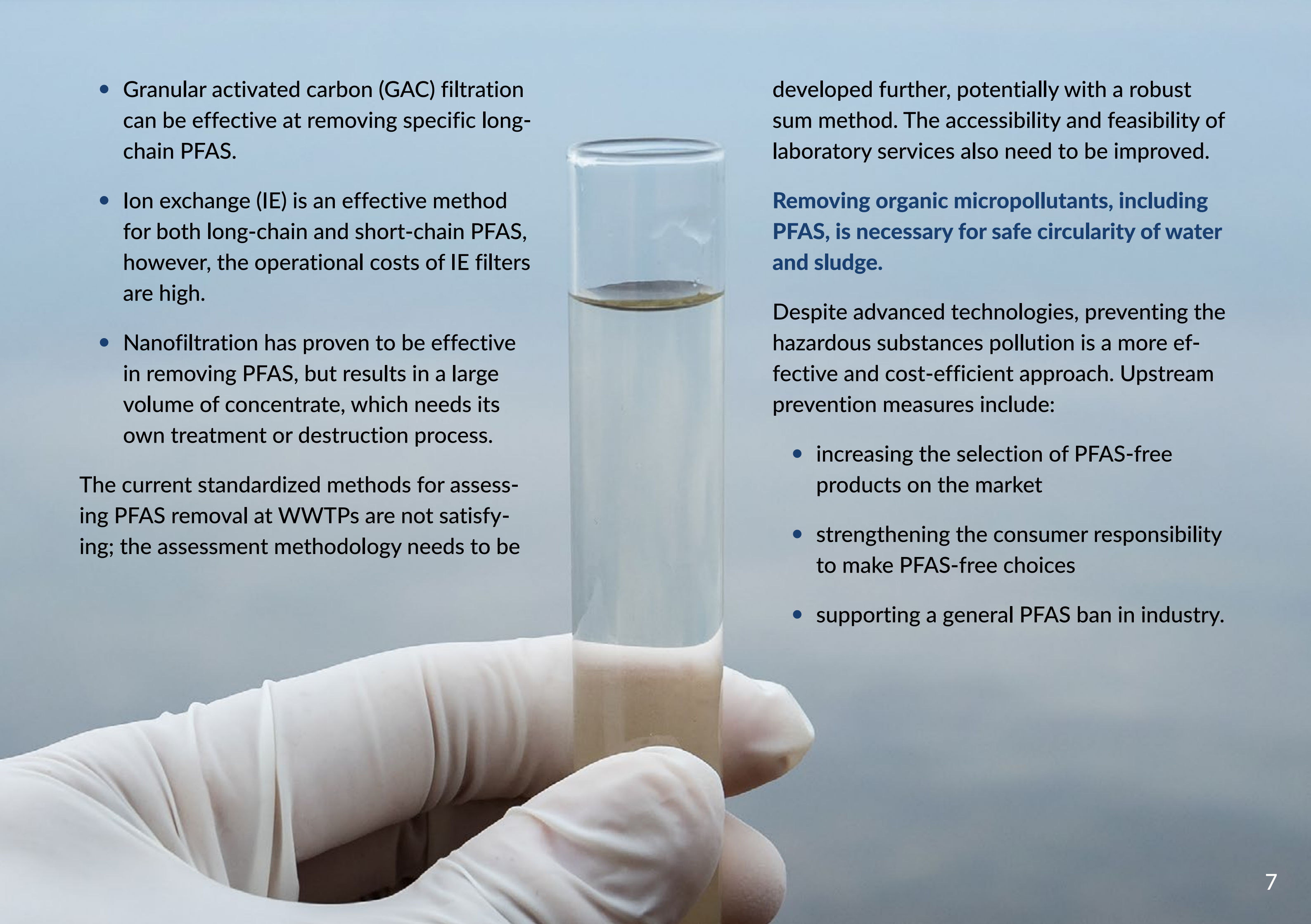
To fill in knowledge gaps regarding PFAS, **EMPEREST open access training package** provides material about properties, occurrence, health issues, monitoring, risk assessment and technologies for their elimination from wastewater; national water associations and other organisations will use the materials in their trainings.

3.

Wastewater treatment plants can remove organic micropollutants from the water cycle

EMPEREST offers operators and authorities information concerning the use, costs and efficiency of removal technologies needed in the **implementation of the revised Urban Wastewater Treatment Directive (UWWTD).**

- Factors that affect the choice of micropollutant removal technology vary between different plants. A mobile pilot plant concept can help gather treatment-plant specific information for the investment decision.
- Activated carbon adsorption and ozonation are feasible techniques for removing the micropollutants currently listed in the revised UWWTD.
- Conventional use of ozone alone is not efficient in PFAS removal. Ozone can reduce the length of the PFAS chain, while the resulting shorter-chain PFAS or other intermediates are persistent and potentially harmful as well.



- Granular activated carbon (GAC) filtration can be effective at removing specific long-chain PFAS.

- Ion exchange (IE) is an effective method for both long-chain and short-chain PFAS, however, the operational costs of IE filters are high.

- Nanofiltration has proven to be effective in removing PFAS, but results in a large volume of concentrate, which needs its own treatment or destruction process.

The current standardized methods for assessing PFAS removal at WWTPs are not satisfying; the assessment methodology needs to be developed further, potentially with a robust sum method. The accessibility and feasibility of laboratory services also need to be improved.

Removing organic micropollutants, including PFAS, is necessary for safe circularity of water and sludge.

Despite advanced technologies, preventing the hazardous substances pollution is a more effective and cost-efficient approach. Upstream prevention measures include:

- increasing the selection of PFAS-free products on the market

- strengthening the consumer responsibility to make PFAS-free choices

- supporting a general PFAS ban in industry.

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The EMPEREST project, co-financed by Interreg BSR Programme,
works towards protecting and restoring the clean Baltic Sea.