

Markus Raudkivi
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PFAS regional monitoring in the Baltic Sea area

Interreg
Baltic Sea Region



Co-funded by
the European Union

SUSTAINABLE WATERS
EMPEREST



Methodological recommendations for monitoring and assessment of PFAS in the aquatic environment

Regionally
harmonised
approach for PFAS
monitoring and
assessment

- EMPEREST addresses the existing significant gaps in the monitoring and assessment of PFAS with **methodological recommendations** to provide **harmonised guidance** to the Baltic Sea region.
- These recommendations will include **detailed information** on what, when and where to measure and how to assess and use these results.
- The recommendations will be assembled **in cooperation with regional experts and authorities**, to assure their quality and applicability. Through the **science-policy dialogue**, these recommendations are expected to contribute to the development of potential target values and indicators for the regional assessment of the Baltic Sea aquatic environment.

The Baltic Sea



Unique but young and fragile ecosystem



Catchment area:
4x area of the sea



Population (catchment):
85 million



Busy waterway: on average ~1500 ships a day



Multitude of pressures
affecting the Baltic



About HELCOM



1974: The Helsinki Convention, signed by the then seven Contracting Parties



1980: Establishment of the HELCOM Secretariat



1992: Ten Contracting Parties
EE, EU, DK, DE, FI, LV, LT, PL, SE, RU



2024: 50 years of the Helsinki Convention



12000 t
in 1910

Phosphorus (P) input
to the Baltic Sea
(waterborne)

1972
UN Conference
on the Human
Environment

1974
Signing of
the Helsinki
Convention
(7 members)

1980
Establishment
of HELCOM
Secretariat

1992
Revision of
the Helsinki
Convention
(expanded to
10 members)

2000
Ratification
of the 1992
Helsinki
Convention

2007
Baltic Sea
Action Plan

2007
HOLAS I
Assessment of
the ecosystem
health of the
Baltic Sea

2021
Baltic Sea
Action Plan
update

22749 t
in 2020

71295 t
in 1981



▲ Signing of the Helsinki Convention in 1974

HELCOM tools: how we get things done



The Helsinki Convention

Instrument of int. law, containing objectives & obligations. Annexes: technical guidelines and regulations.



Recommendations

on measures to address areas of concern, implementable through national legislation. In total, about 260 recommendations have been adopted so far.



Action plans & projects

Contain actions and measures with such as [Baltic Sea Action Plan](#), Regional Action Plan on Marine Litter, and most HELCOM projects.



Monitoring & assessments

- Indicators (pressures on and state of the environment)
- Thematic assessments
- Holistic assessments



Ministerial Meetings

Set the major strategic directions and provide the necessary political commitment.



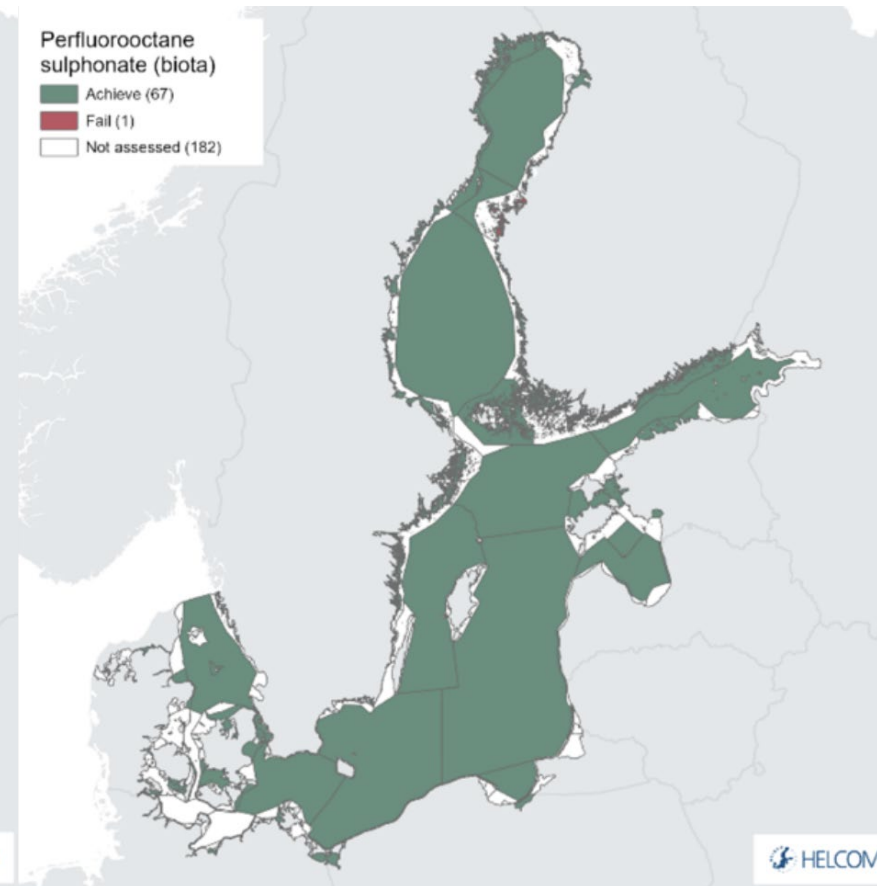
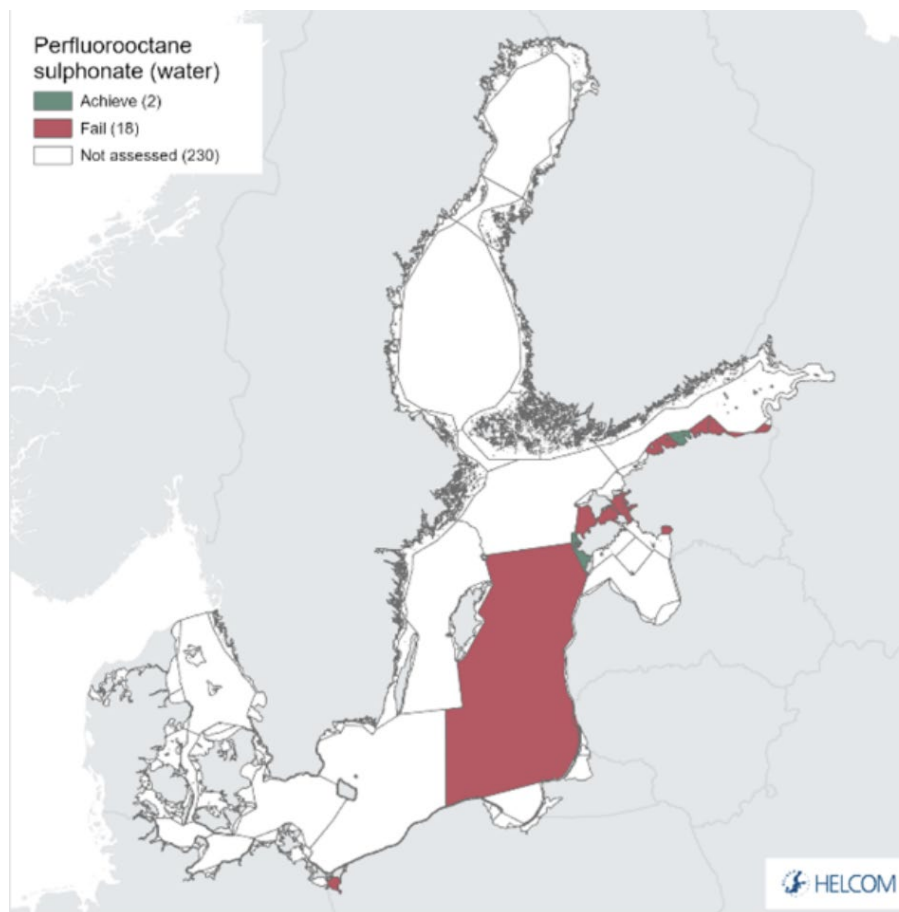
THIRD HELCOM
HOLISTIC ASSESSMENT
OF THE BALTIC SEA
2016-2021

HOLAS 3

HOLAS 3 results were published from April to October 2023

As an indicator, to evaluate the state of the Baltic Sea, HOLAS 3 included PFOS concentrations in both water and biota

- Assessment showed that although some water results for PFOS are showing bad environmental status, this effect is not seen in biota



Meanwhile in EU...



As part of the European Green Deal, a Zero pollution action plan was adopted by the European Commission on the 12th of May 2021

As one of the activities, a large update on air, surface and groundwater pollutants, and treating urban wastewater was proposed on the 26th of October 2022, including

- A revision of Urban Wastewater Treatment Directive
- A revision of the Water Framework Directive priority substances list, including a **revision on the Environmental Quality Standards (EQS)** regulation

The EQS revision also included updates on the PFAS limit values in the environment

- Proposal to include 24 different PFAS in the limit value, using a relative potency factor (RPF) system
 - Comparatively, the PFOS marine water threshold value would be alleviated, **from 0.13 to 2.2 ng/L**
 - At the same time, PFOS biota threshold value would be strengthened, **from 9.1 to 0.039 µg/kg ww**

Reported data – Matrices: Water; Biota – Thresholds

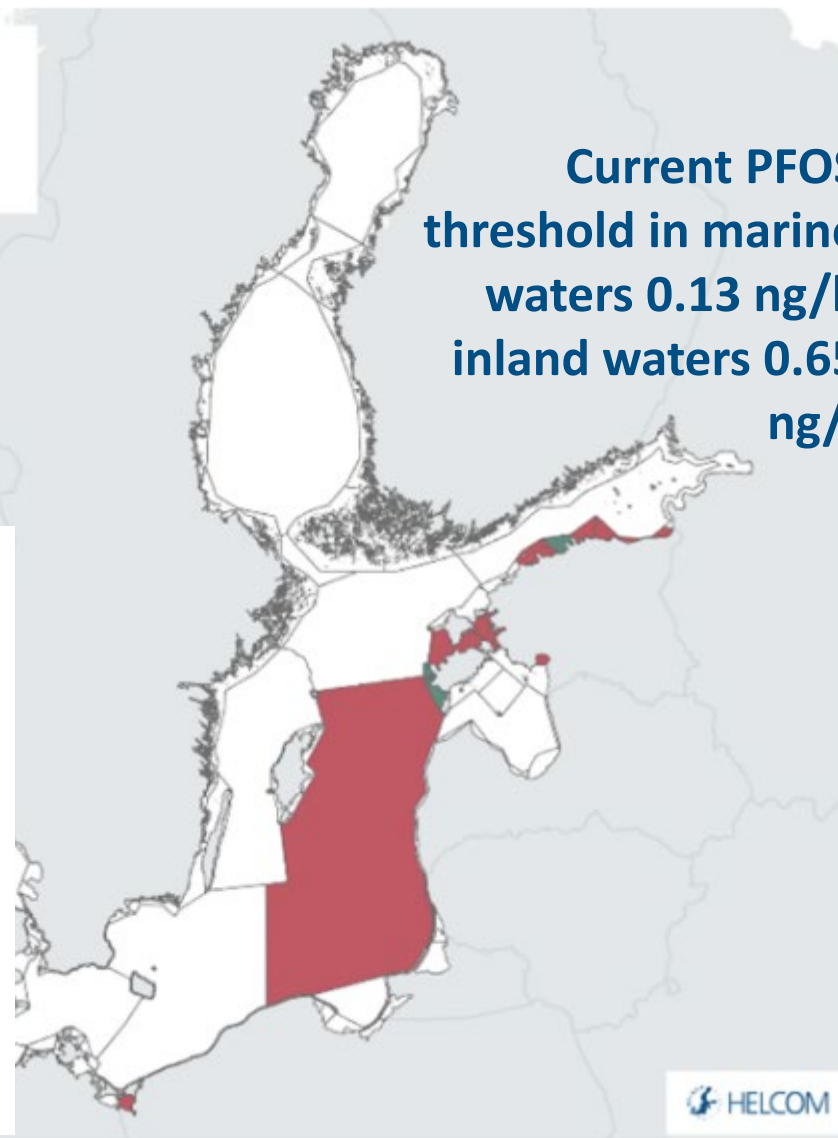
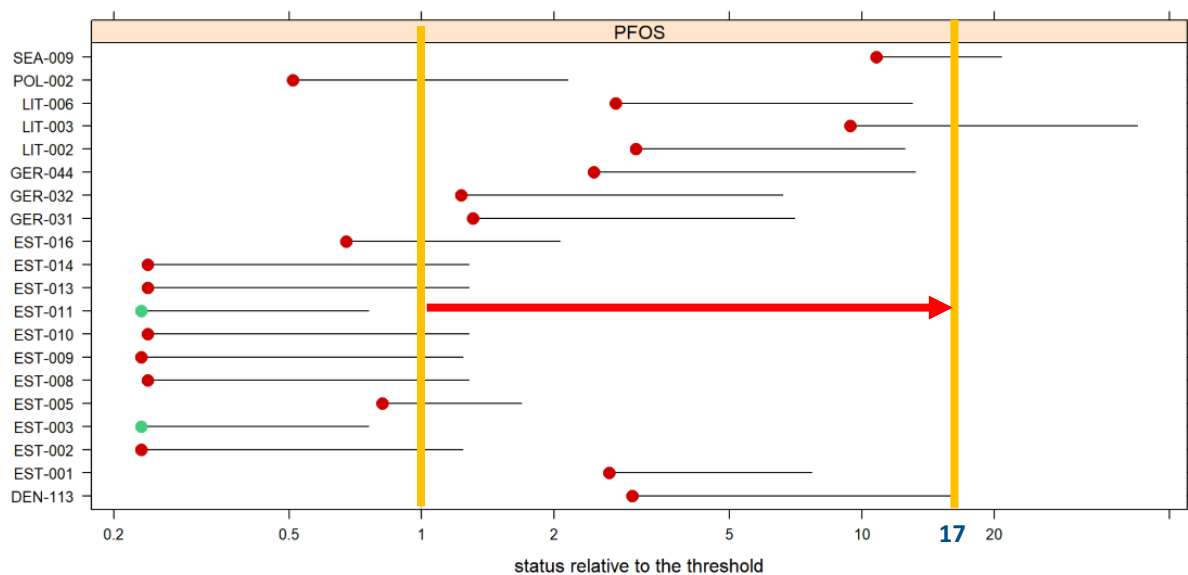
Substance	RPF	EU water "threshold" (ng/l PFOA eq)	EU biota "threshold" (µg/kg ww PFOA eq)	Substance	RPF	EU water "threshold" (ng/l PFOA eq)	EU biota "threshold" (µg/kg ww PFOA eq)
PFOA	1	4.4	0.077	PFHpA	0.505		
PFOS	2			PFTTrDA	1.65		
PFHxS	0.6			PFHpS	1.3		
PFNA	10			PFDS	2		
PFBS	0.001			PFTeDA	0.3		
PFHxA	0.01			PFHxDA	0.02		
PFBA	0.05			PFODA	0.02		
PFPeA	0.03			HFPO-DA (Gen X)	0.06		
PFPeS	0.3005			ADONA	0.03		
PFDA	7			6:2 FTOH	0.02		
PFDoDA	3			8:2 FTOH	0.04		
PFUnDA	4			C6O4	0.06		

Substance	RPF	EU water "threshold" (ng/l PFOA eq)
PFOA	1	4.4
PFOS	2	2.2
PFHxS	0.6	7.33

Perfluorooctane sulphonate (water)

■ Achieve (2)
■ Fail (18)
■ Not assessed (230)

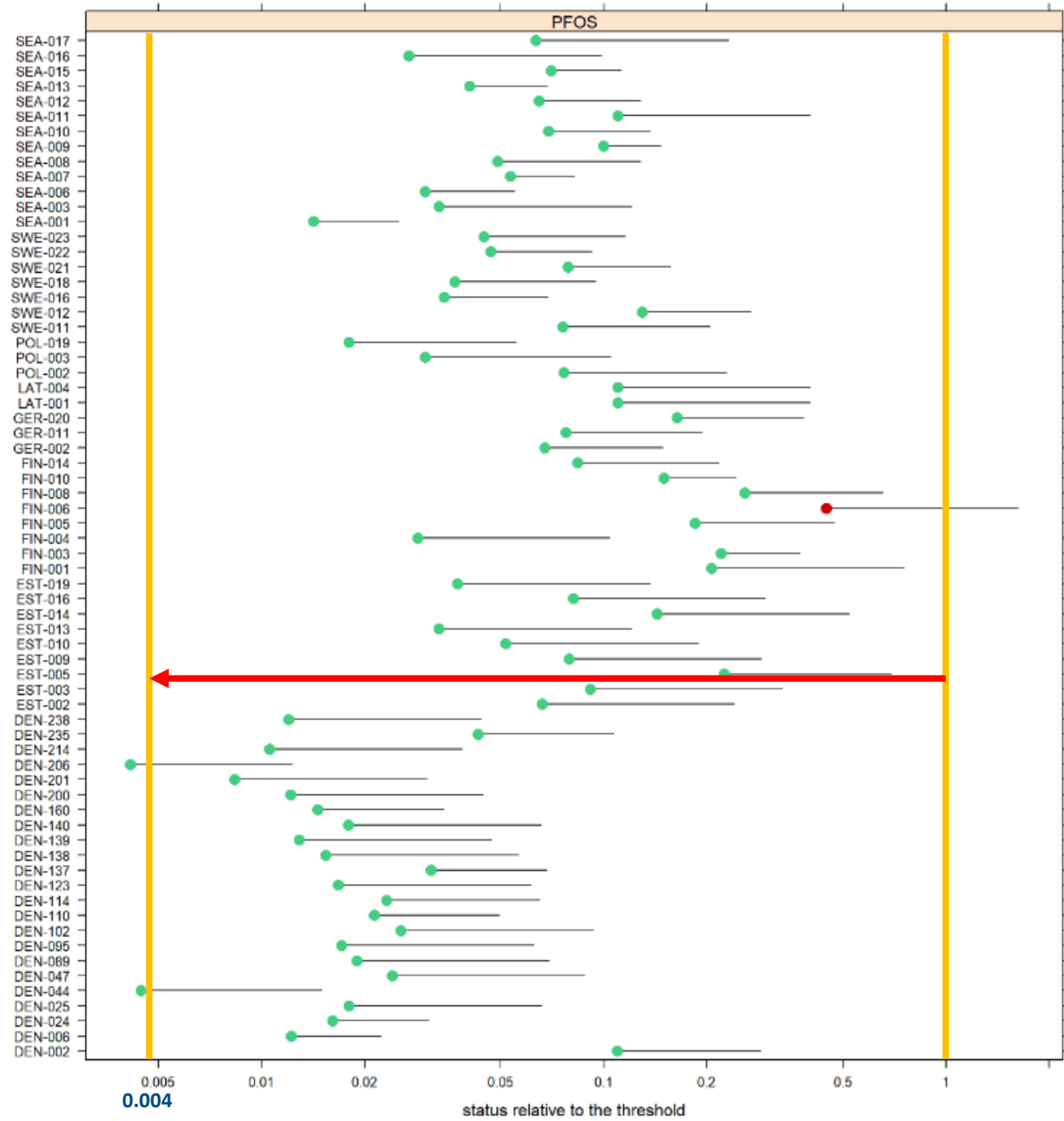
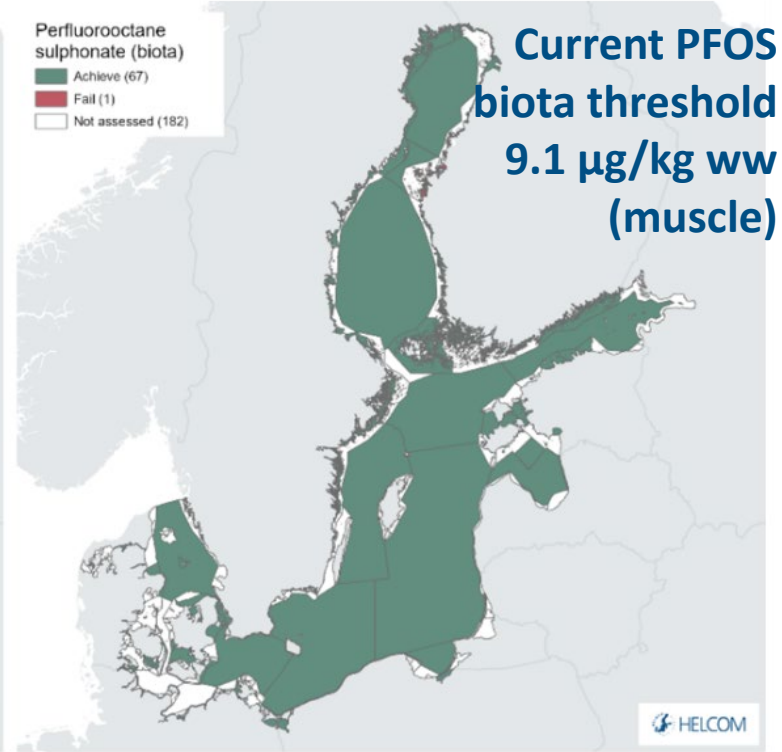
Current PFOS
 threshold in marine
 waters 0.13 ng/l,
 inland waters 0.65
 ng/l





Substance	RPF	EU water "threshold" (ng/l PFOA eq)	EU biota "threshold" (µg/kg ww PFOA eq)
PFOA	1	4.4	0.077
PFOS	2	2.2	0.039

- PFHxS
- PFNA
- PFBS
- PFHxA
- PFBA
- PFPeA
- PFPeS
- PFDA
- PFDoDA
- PFUnDA



EMPEREST Monitoring Data Collection

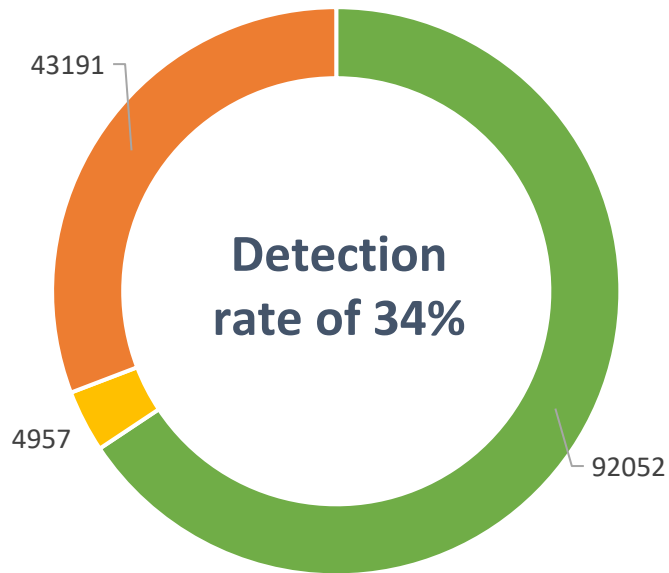
As a part of the EMPEREST project activities, a data call was issued to the Baltic Sea countries to collect PFAS environmental monitoring data

As a result, a database of around 186 000 PFAS measurements points were collected and analysed

- 3 main matrixes of water, biota and sediment
 - A number of different sub-matrices, including the type of sampling environment, species and analysed tissue (biota)
- 55 individual PFAS are included in the database (27 with isomeric data)
 - About 16 different sum parameters
 - About 19 substances after TOP-assay

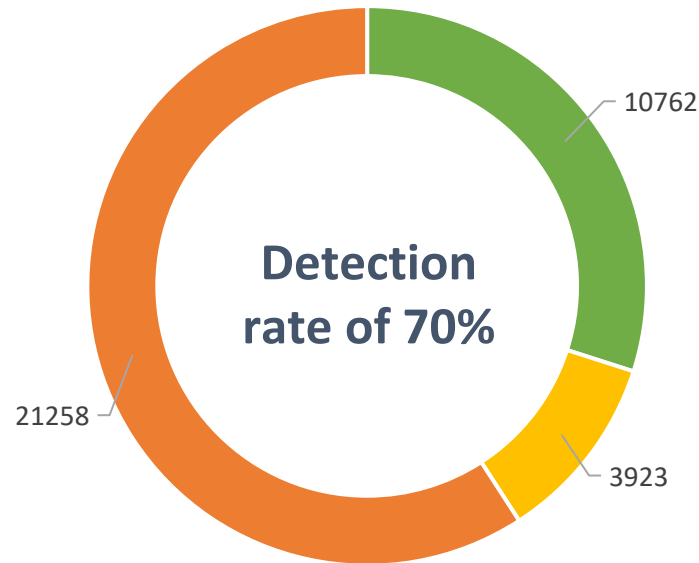
Reported data – All Matrices – All PFAS

Water
(n = 140 200)



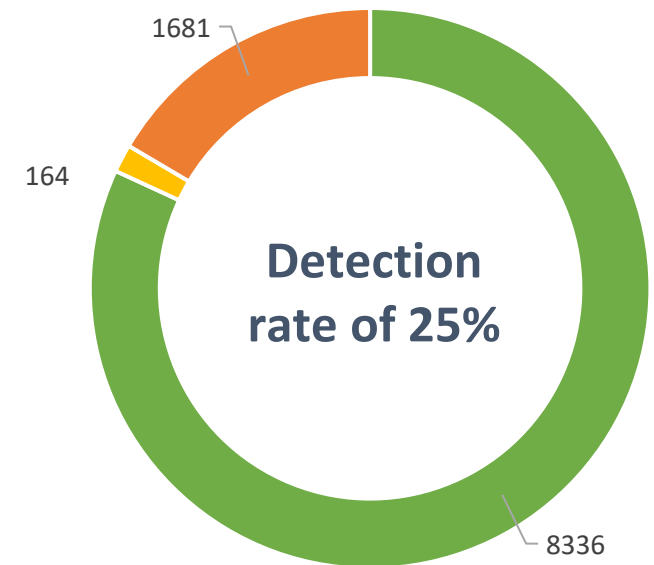
■ Under LOD ■ Between LOD and LOQ ■ Over LOQ

Biota
(n = 35 950)



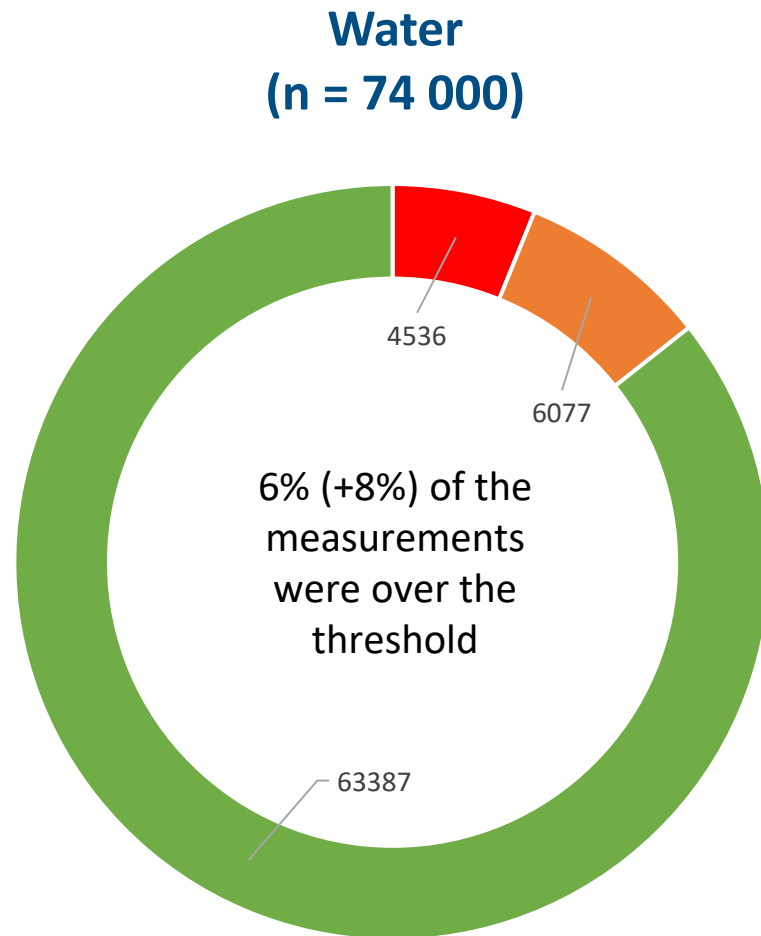
■ Under LOD ■ Between LOD and LOQ ■ Over LOQ

Sediment
(n = 10 181)

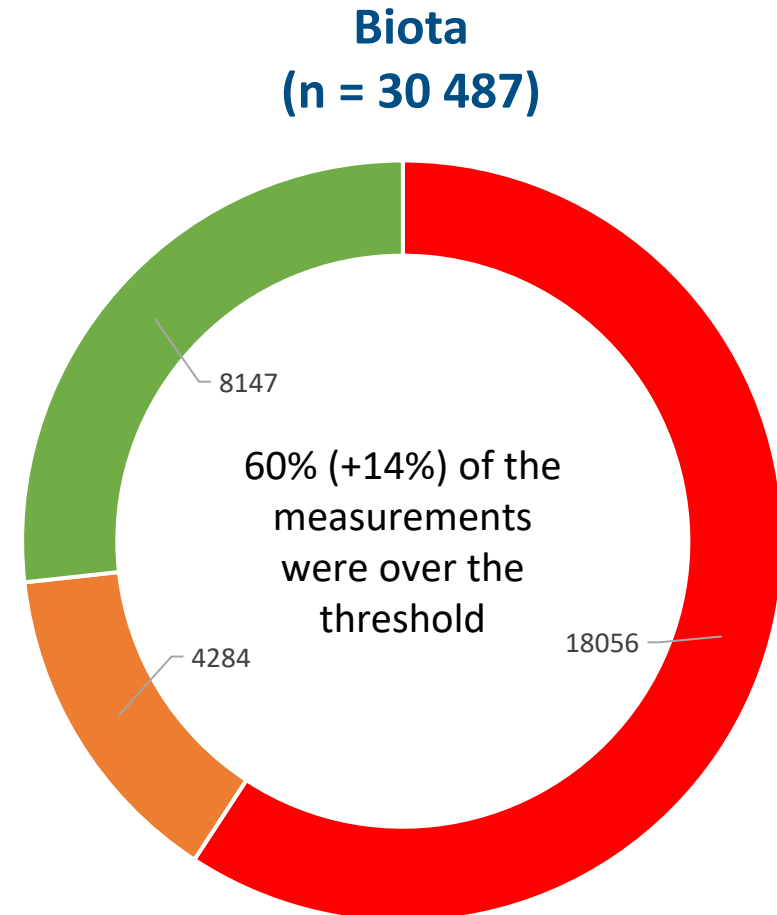


■ Under LOD ■ Between LOD and LOQ ■ Over LOQ

Reported data – Matrices: Water, Biota – PFAS 24



- Over "threshold"
- LOD over "threshold"
- Under "threshold"



Summary

The way PFAS are assessed in the environment is under change

- Changes driven by the new EQS proposal, but it's not finalised yet

For biota samples, the new EU threshold would mean a big change

- **PFOS** alone was **over the threshold in 96.8% of the biota samples**
- 5 more of the PFAS 24 (PFNA, PFDA, PFUnDA, PFDoDA, PFTrDA) are over the threshold in more than 80% of the biota samples

Thankfully, long-time trends showing decreasing concentrations of PFOS

- **Newer water samples show much lower general content of PFAS**
- Still, the PFAS industry uses are changed so often, we can't catch up



Thank you for your attention!

Markus Raudkivi

Project Coordinator

HELCOM Secretariat

markus.raudkivi@helcom.fi

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