



Finnish-Estonian Collaborative Research Project: Utilizing Passive Samplers in Pharmaceutical Research in the Gulf of Finland

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PHARMACEUTICALS AS HAZARDOUS SUBSTANCES

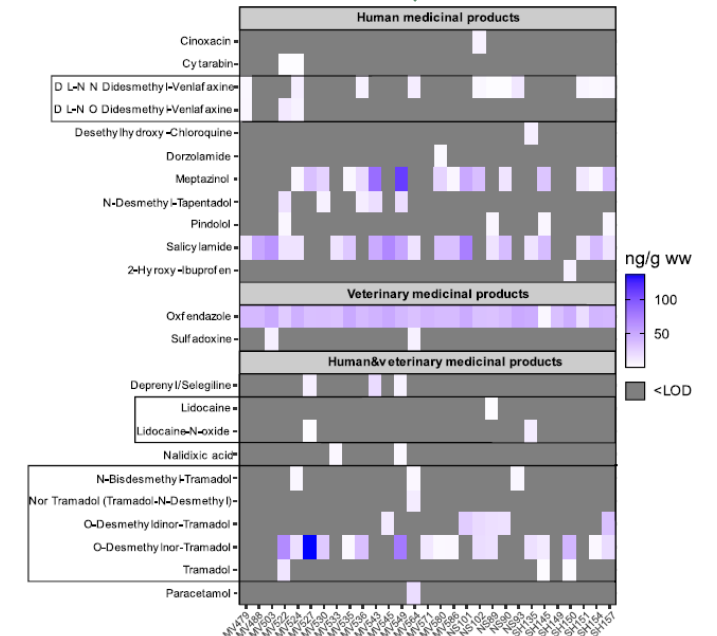
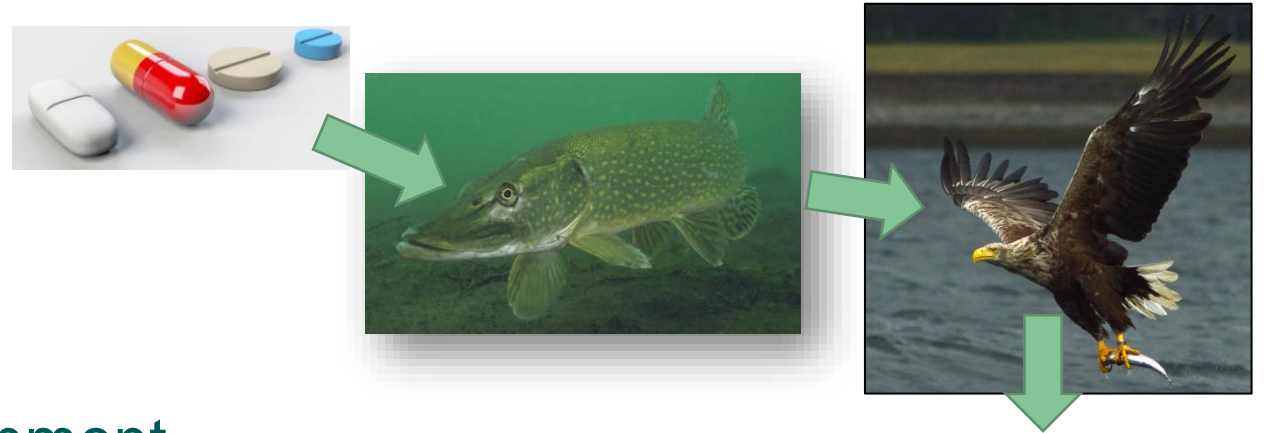
Planned to affect on organisms

(Nearly) constant flow to the environment

→ "pseudo POPs" (*Persistent Organic Pollutant*)

Usually (bio)degradable, but some are more persistent

→ bioaccumulation potential



Badry et al. 2022

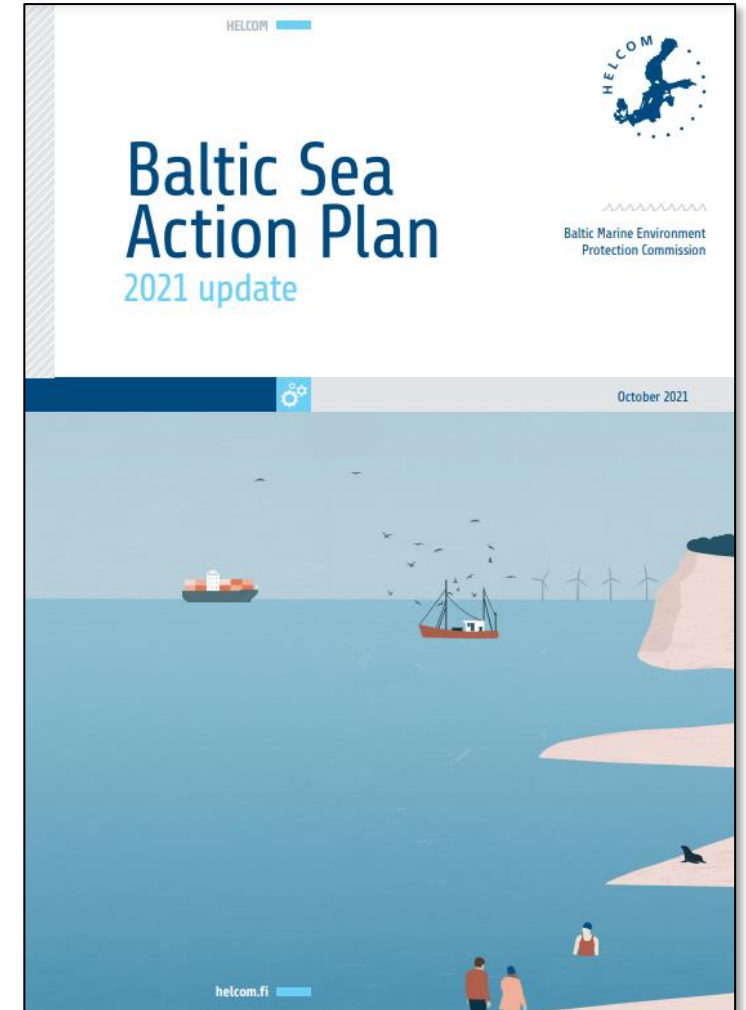
PHARMACEUTICALS IN THE HELCOM BALTIC SEA ACTION PLAN

IMPROVE THE KNOWLEDGE BASE ON:

occurrence of pharmaceutical substances in the environment

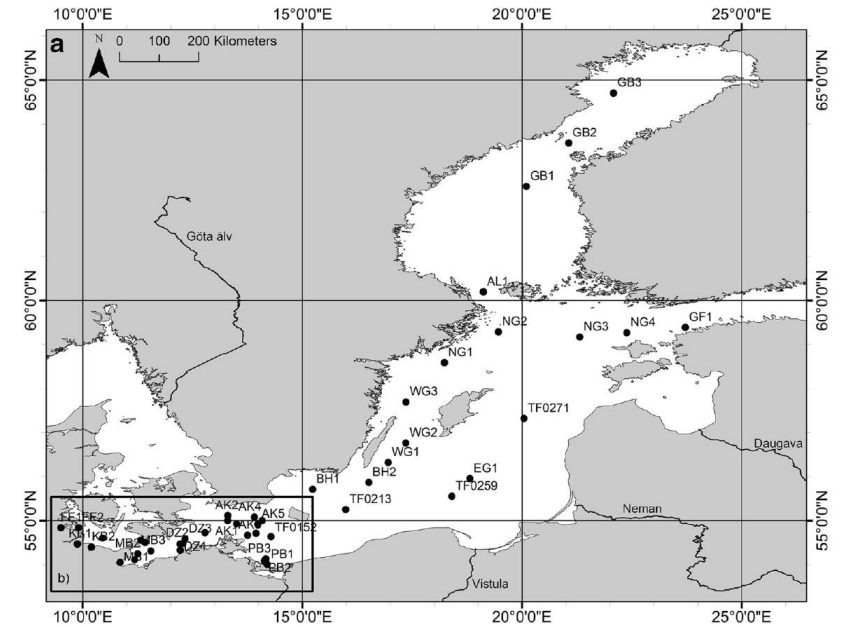
their persistence and harmful effects

Ensure availability of this information for a broad expert community by 2025

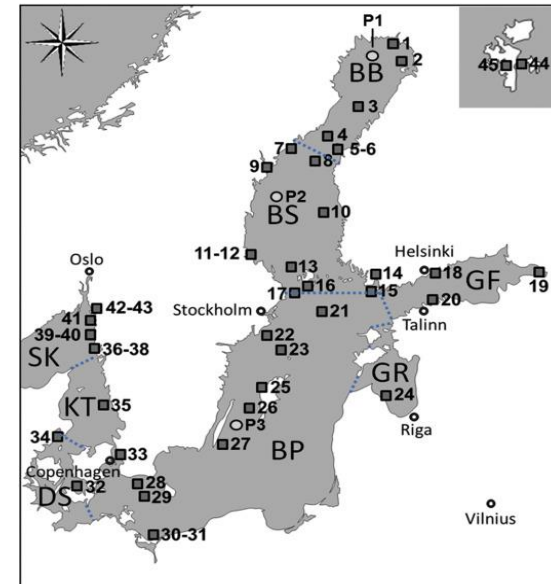


HOW MUCH DO WE KNOW?

Pharmaceutical surveys in the Baltic Sea Area



Fisch et al. 2021



Björlenius et al. 2018

WEAKNESSES OF GRAB SAMPLES

Information only on momentary concentrations.

Temporal coverage requires numerous samples and sampling trips.

Many samples = high analytical costs.

Concentrations may be too small to detect.



STRENGTHS OF PASSIVE SAMPLERS

Instrument containing a collecting medium.
Medium binds substances of interest from the surrounding water.

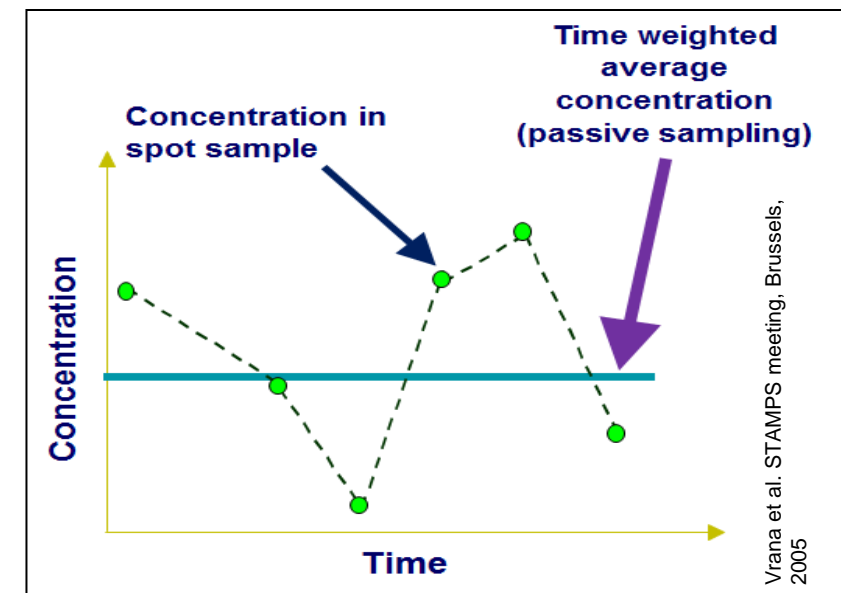
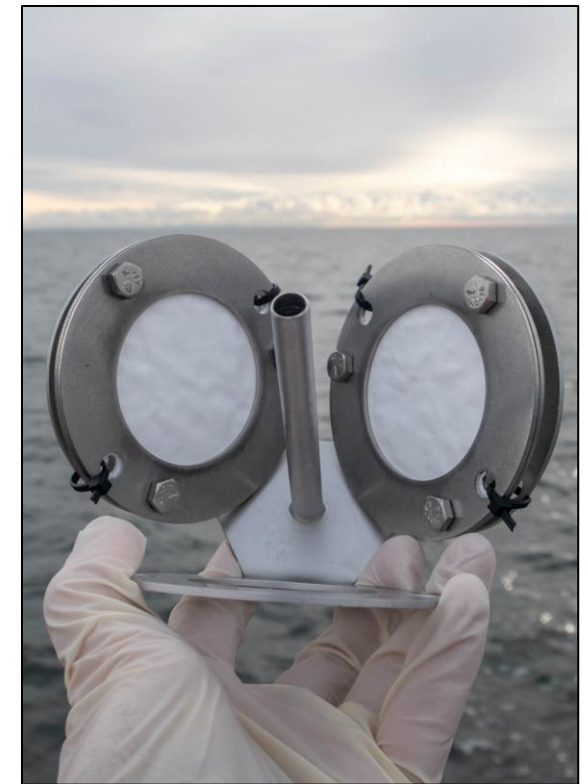
Substances are extracted and analysed.

Deployment time: days to weeks.

→ Trace concentrations are concentrated to measurable level

Substances that are not consistently present in the water can also be detected.

Designed for different groups of substances, e.g. pharmaceuticals, PFAS, pesticides.



OUR PASSIVE SAMPLING STRATEGY

Samplers (type POCIS) are deployed at:
the coastal regions of Helsinki and Tallinn.
open sea of the Gulf of Finland

Non-polluted, diffusely polluted and point-polluted sampling sites

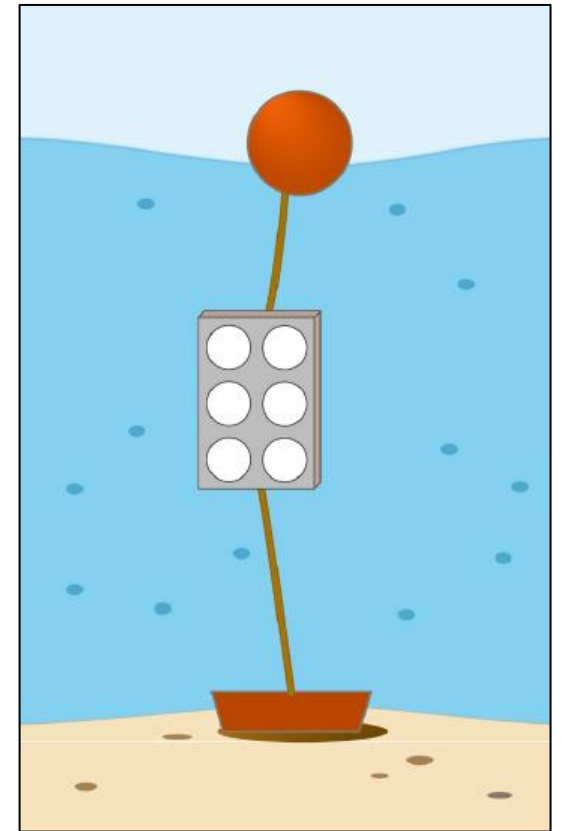
Deployment time: 3 - 4 weeks.

Sampling is done in 3 times:

autumn 2023

spring and summer 2024.

A total of 9-12 weeks of deployment.

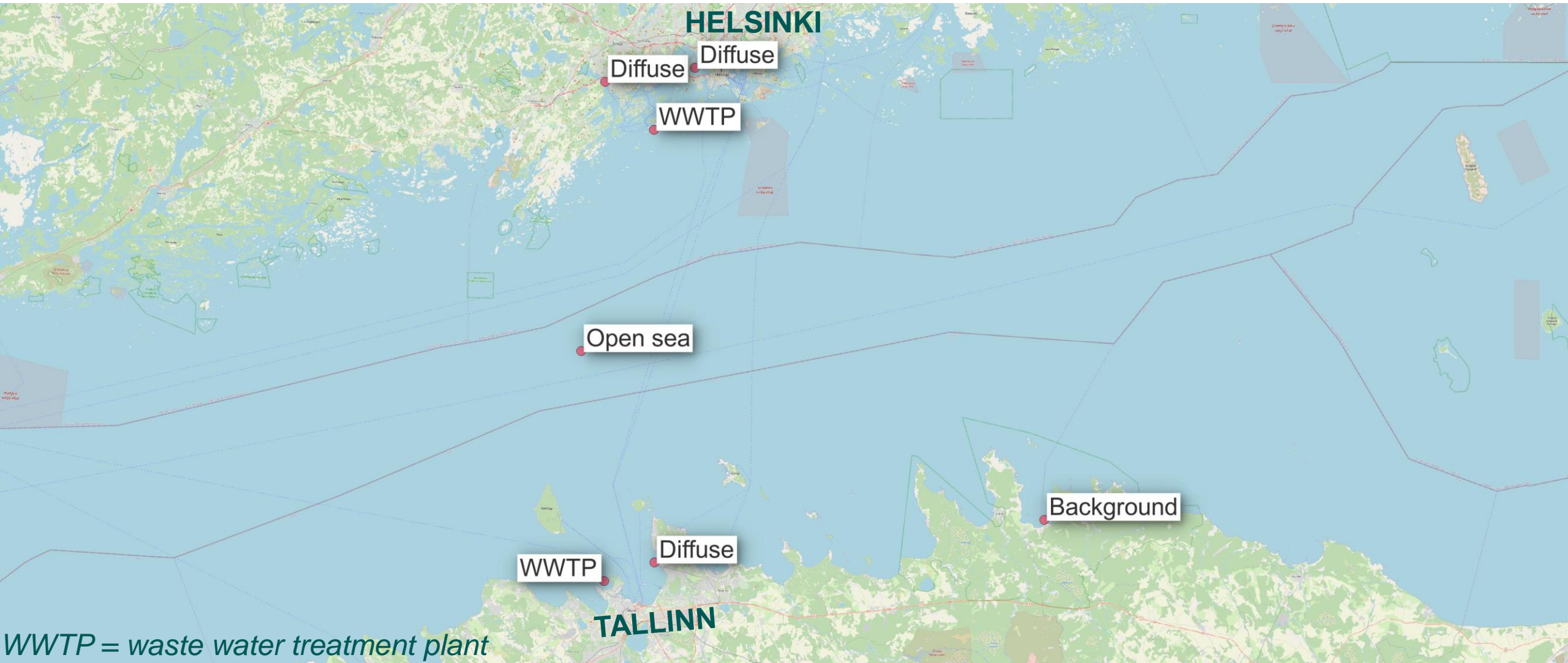


Ahkola & Stimes, 2022



OUR PASSIVE SAMPLING STRATEGY

SAMPLING SITES



WWTP = waste water treatment plant

PROJECT DELIVERABLES

Information on the occurrence of pharmaceuticals to support the state assessments of the Gulf of Finland and the Baltic Sea.

Experience and best practices in the use of passive samplers for the environmental monitoring of pharmaceuticals.

Collaboration between Estonian and Finnish researchers.

Project duration: 9/2023 – 12/2024



TO BE CONTINUED NEXT YEAR

THANK YOU!



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