

# MicroWasteBaltic



**How important are MP loads from MWWTPs?**

**What are the ecotox effects?**

**Is advanced treatment worth the costs?**

# MicroWasteBaltic: seed-project

- Impact of **micro**pollutants emitted from municipal **waste**water treatment plants on **Baltic** Sea ecosystems and assessment of costs-benefit of advanced treatment technologies in a regional perspective
- Sept 2017 – Aug 2018
- Lead: **Stockholm University**
- Partners:
  - **Finnish Environment Institute (SYKE)**
  - **Institute of Oceanology of the Polish Academy of Sciences (IOPAN)**
  - **Latvian Environment, Geology and Meteorology Centre (LEGMC)**
  - **State Agency for Agriculture, environment and Rural Areas of the German Federal State Schleswig-Holstein (LLUR)**



# Main purpose and overarching goals

## Seed-project:

### 1. Assess funding opportunities

### 2. State-of-play

1. review previous/ongoing projects
2. compilation of existing data (measured concentrations in WWTPs, surface water, ecotox data related to wastewater)
3. compilation published removal efficiencies advanced treatment in full scale implementation (or large scale pilot)

### 3. Work-plan

1. Ask stakeholders (e.g. here!) for input, e.g. what are their needs?
2. Additional partners – complementing competence
3. Develop work packages for main project

## Main project:

- 1) assess the **load and impact of emissions of MPs from MWWTPs** on the BS ecosystem (regional/local scale) and
- 2) evaluate the **potential benefit** of reducing loads of MPs using advanced wastewater technologies, considering costs and environmental impact for various implementation scenarios.

# Main WPs and targets

## 1. How important are MWWTP emissions as input routes?

**Compilation of available data on measured concentrations of MPs in effluents, surface waters and additional measurements to fill data gaps.**

1. Compilation of data. Data gaps?
2. Design sampling campaign – fill gaps (location, substances, non-target-analysis)
3. Up-scaling

## 2. Do MWWTP emissions of MPs cause negative effects in the Baltic Sea?

**Assessment of biological effects and ecological risk.**

1. Compilation of data.
2. Field measurements biomarkers (near outlets, river mouths, reference)
3. Ecotoxicological test batteries (biotests)
4. Correlations between effects and MP concentrations/non-target fingerprints.

# Main WPs and targets

3. How much can loads and effects be reduced by implementing advanced technologies, realistically?

## **Advanced wastewater treatment removal efficiencies.**

1. Compilation of published MP removal efficiencies
2. Additional measurements in influent and effluent from full scale advanced treatment (target + non-target)
3. and measurement of toxicity reduction (biotests)

4. Is it worth it?

## **Socio-economic analysis.**

1. Benefit in terms of a) reduced load all MPs, b) reduced load priority substances, c) reduced ecotoxicity of wastewater
2. Costs (published by others), scenarios (e.g. MWWTP size cutoff)
3. Environmental costs (e.g. CO<sub>2</sub> emissions)
4. Policy instruments to use?

# Stakeholders

**Politicians (local, national, EU parliament)**

**National authorities (responsible for hazardous substances in the environment)**

**Regional authorities (municipalities, county governments, water districts)**

**HELCOM (e.g. Pressure group, PLC-work)**

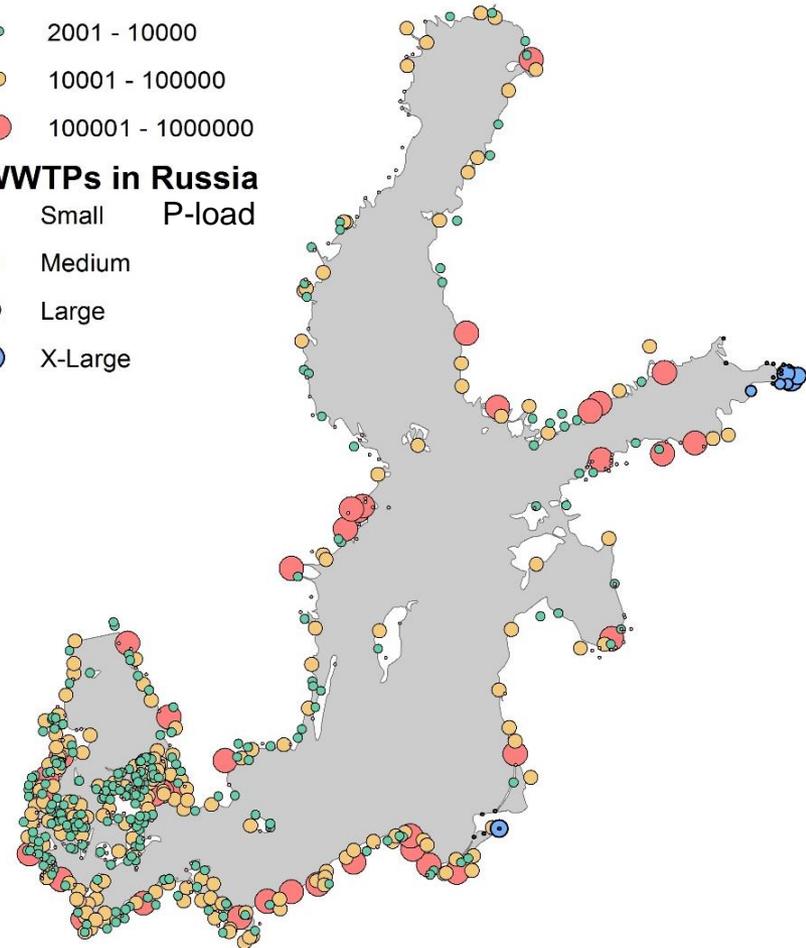
**EU: key officials at DG Env  
National water organizations (Eureau, Swedish, Finnish, Gdansk water associations, and more)**

## WWTPs in EU pe

- 0 - 2000
- 2001 - 10000
- 10001 - 100000
- 100001 - 1000000

## WWTPs in Russia

- Small P-load
- Medium
- Large
- X-Large



# Stage of pharmaceutical cycle

Mainly **Consumption/use**, but also useful for management in other stages

**Improved understanding of the risks from pharmaceuticals to the environment**

(Elaboration of HELCOM indicators on diclofenac and estrogen)

**Compilation of comprehensive data on pharmaceutical substances in the effluents of WWTP to evaluate input to the fresh water and marine environment**

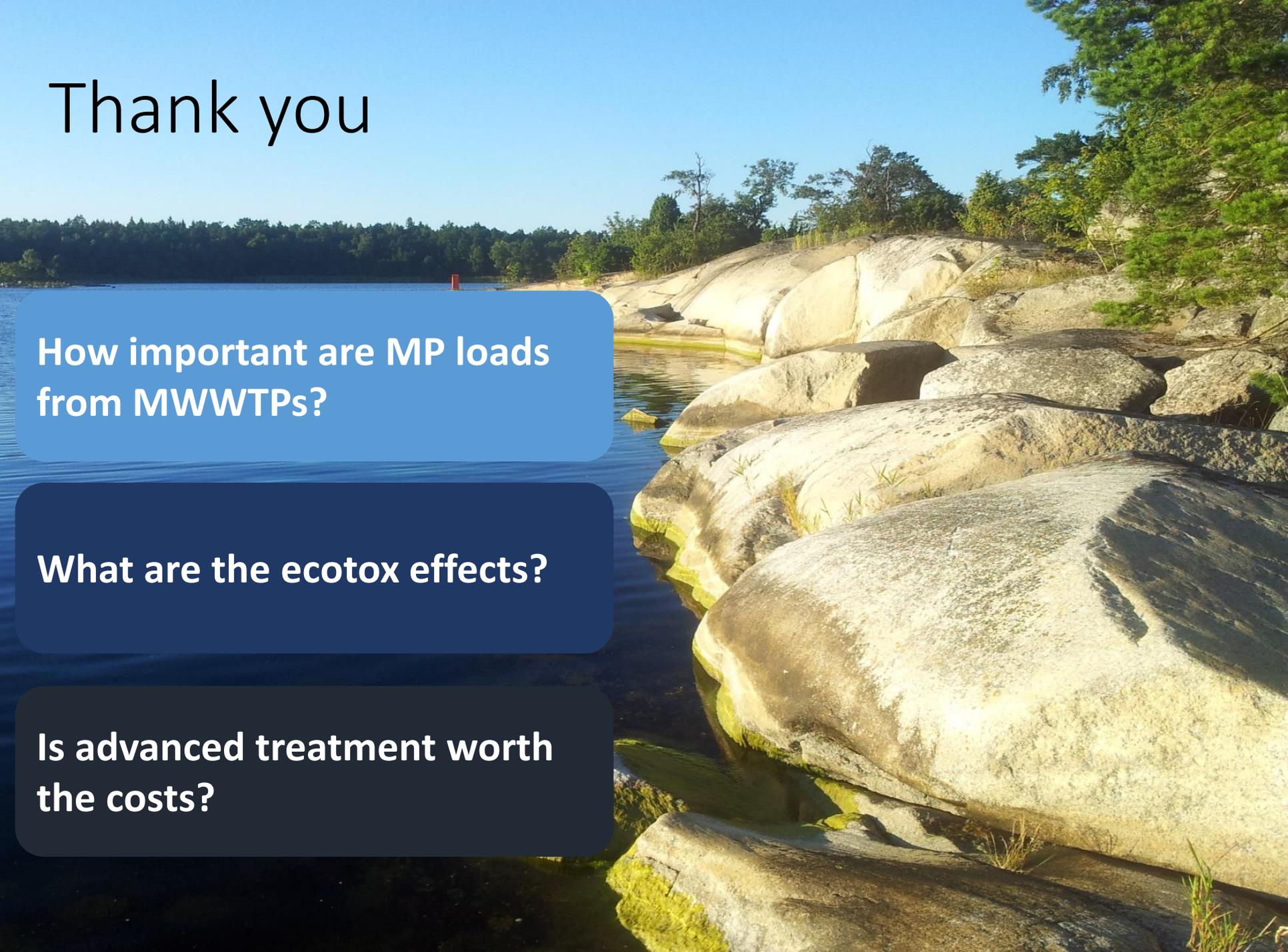
(Ensuring environmental risks and impacts observed post-marketing are identified and reported)

**Promoting more effective treatment of wastewater**

**Compilation of info on advanced end-of-pipe measures preventing releases of pharmaceuticals to the environment**

Better management of sludge, manure and **wastewater for reuse**

# Thank you



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# Many pathways to and from the sea

