

A proposal for

Combined non-target
screening and effect-based
monitoring within JDS4

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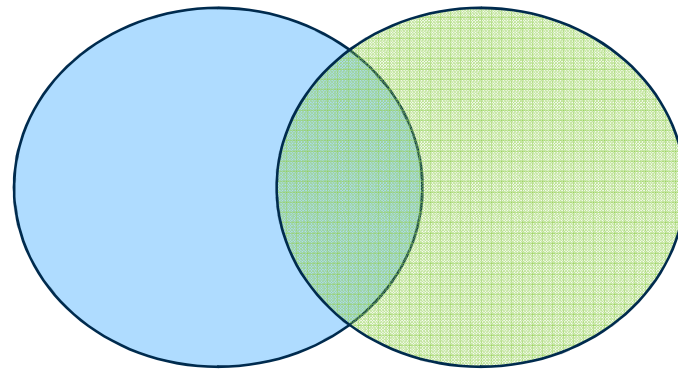


**HELMHOLTZ
CENTRE FOR
ENVIRONMENTAL
RESEARCH - UFZ**

One campaign – two approaches

“Watch the Danube”

“Demonstrating the benefits of combined NTS & EBM”



To be organised
by UFZ on behalf of
German Environment Agency



Objectives

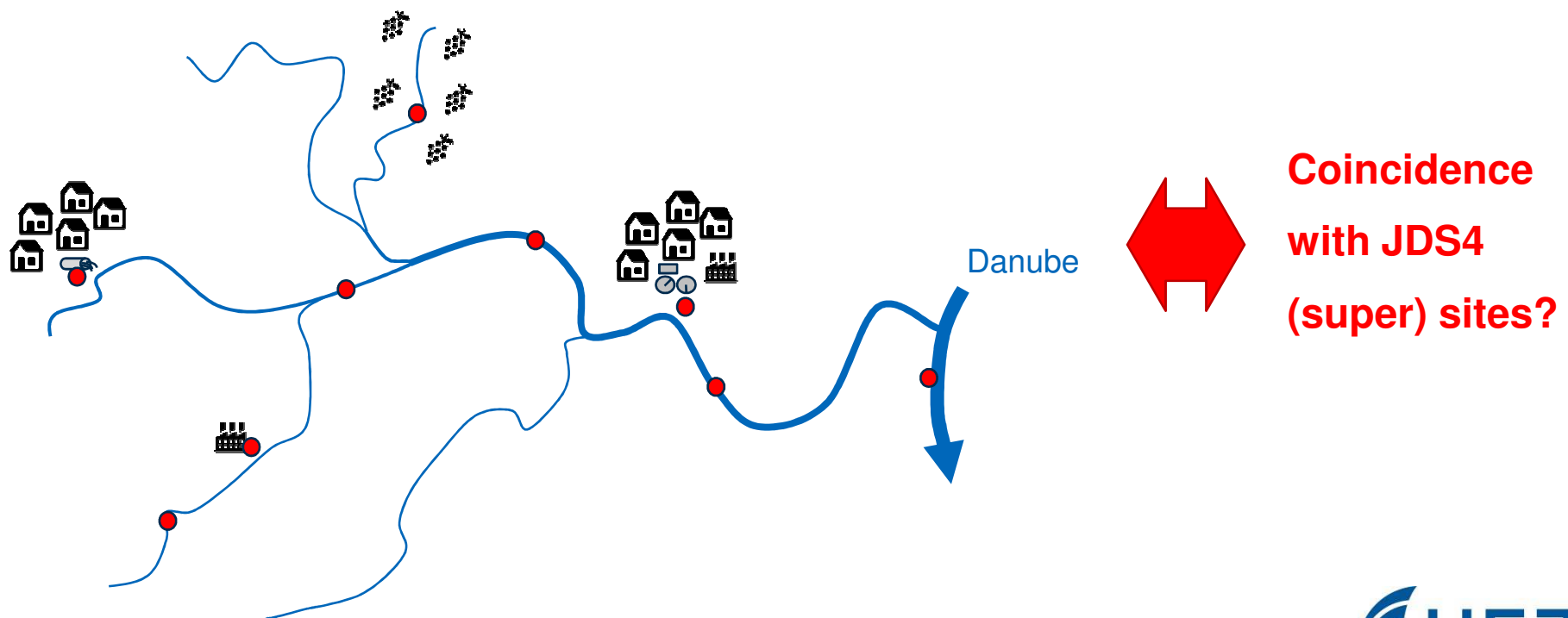
Demonstrating the feasibility of NTS & EBM in monitoring studies for

- detecting and prioritising toxic risks of chemical contamination to ecosystems
- identifying hot spots of contamination independent from known or priority substances
- providing a better link between chemical and ecological status

⇒ Site selection should cover a broad diversity of contamination scenarios and significant differences in a consistent dataset

Site selection

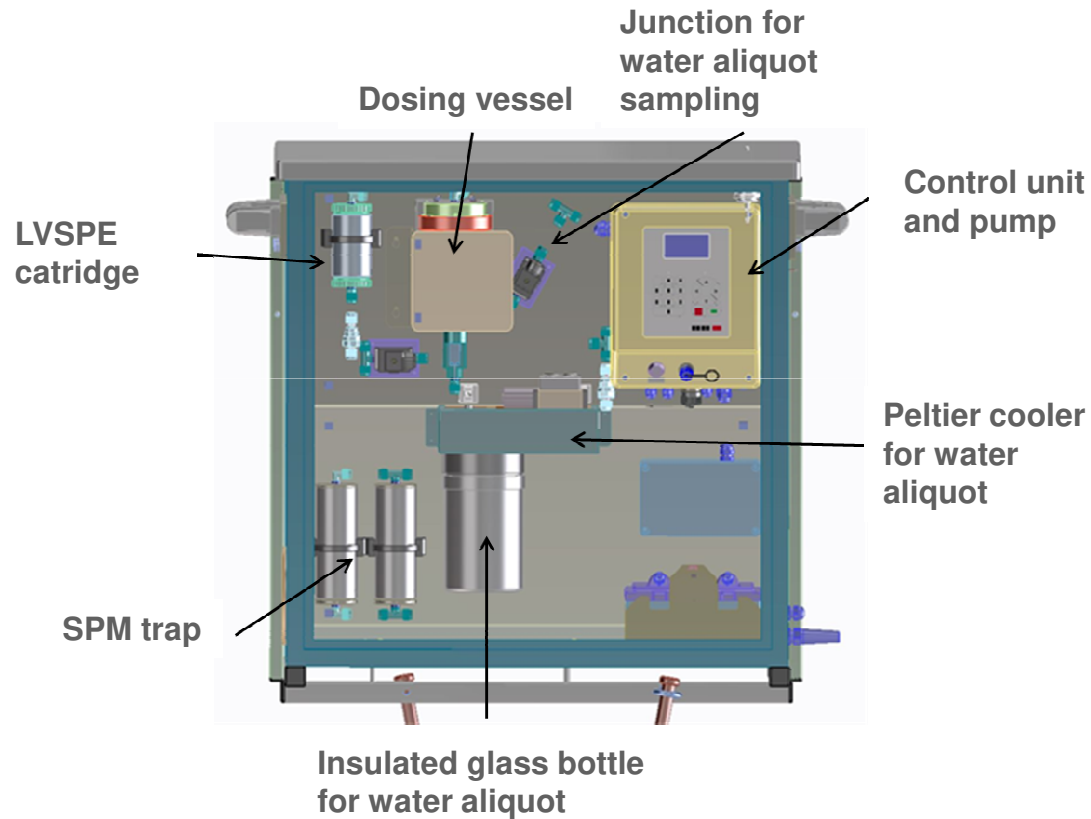
- 2-3 Catchments (20-25 sites) with different exposure scenarios
- Point and diffuse sources likely having different chemical and effect patterns
- Sample sources and (diluted) mixtures further downstream



Icons from: <https://icons8.com>

Sampling

Re-developed LVSPe device:



Three samples in one

- SPE cartridge
- Water aliquot
- SPM

Sampling

- 20-50 L of water on LVSPE
- Water aliquot (200 mL)
- SPM from 20-50 L of water

} Done by UFZ with LVSPE device
Volume limits the # of analyses!

Optional / to be decided

- Passive samplers for hydrophobic compounds
- Bottom sediment
- Fish
- Gammarids

Depending on:

- sites selected,
- finances,
- commitment of partners & local support
- synergies within JDS4 & other projects.

Chemical analysis

Commitment of UFZ

- Target / Suspect / Non-target screening of water samples, LVSPE extracts & SPM by LC-HRMS
- Target / Non-target screening of SPM and LVSPE extracts by GC-EI-HRMS
- Target analysis for endocrine disruptors (steroids, phenols)

Complementary analyses

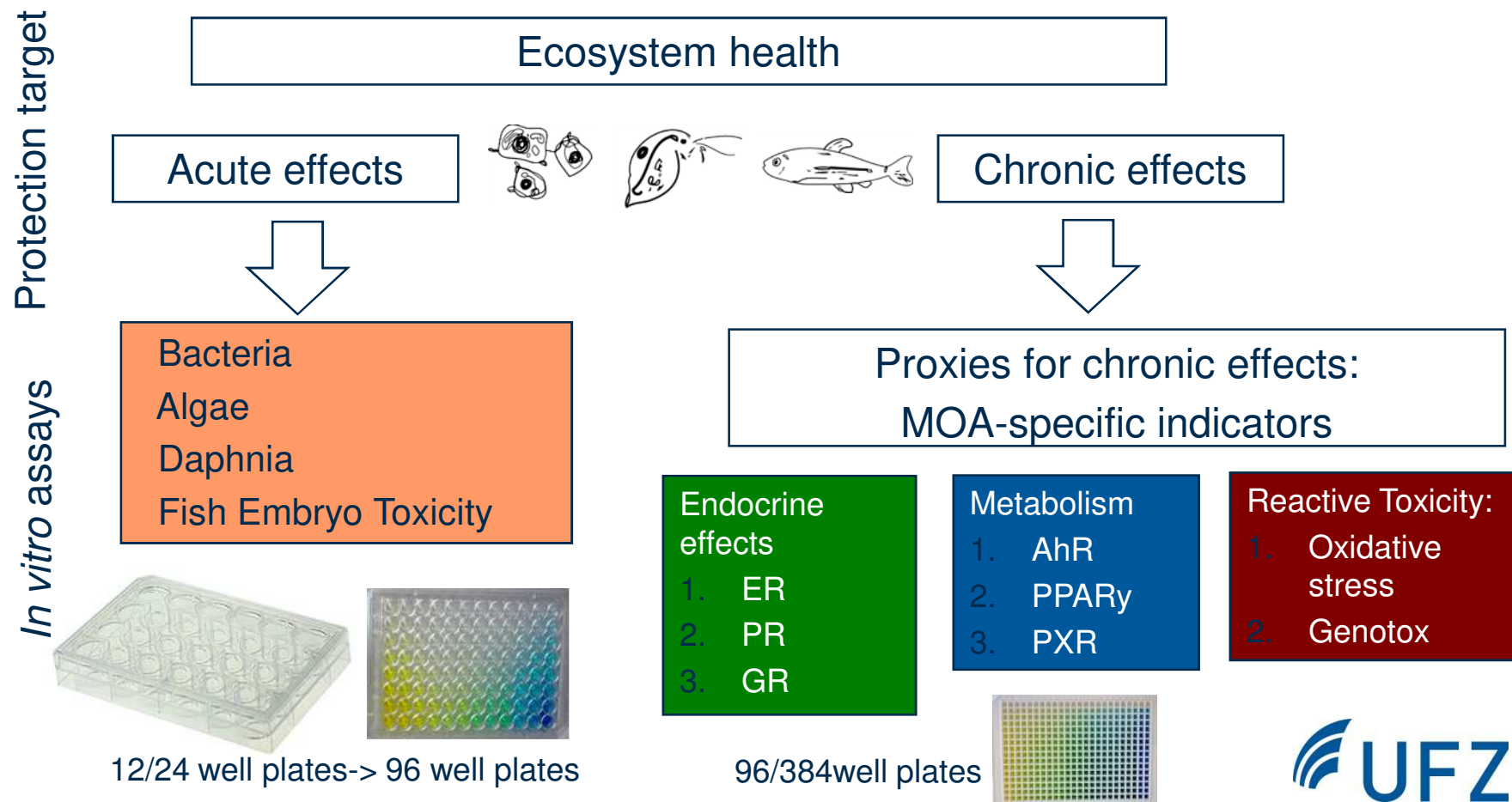
- Specific target methods
- Specific screening methods (GC-APCI?)

Possibility for lab intercomparison on NTS for a set of samples

Effect-based methods

In-vitro and small-scale *in-vivo* bioassays

(animal protection, low sample volume, low cost, large sample numbers)



Effect-based methods

Commitment of UFZ

- *In-vitro* high-throughput test battery on different endpoints (ER, AR, PR, GR?, AhR, PPAR γ (activation of metabolism), oxidative stress)
- *Daphnia magna* assay (immobilisation)
- Pelagic algae assay (PS II inhibition, growth)
- Zebrafish embryo assay (LC_x, other endpoints to be decided)

Complementary analyses

- Genotoxicity?
- Further complementary endpoints in small-scale assays

Link to ecology, eDNA, general water chemistry, metals?

Commitment of UFZ for whole JDS4

- Target / Suspect / Non-target screening of all water samples (direct injection) by LC-HRMS
- Target / Suspect / Non-target screening of sediment / biota samples by LC-HRMS
- Capacity building / interlaboratory comparison on non-target screening

Summary

- We are seeking for 2-3 case studies for the demonstration of combined NTS & EBM within JDS4
- We are striving for a close interlinking with the other activities in JDS4
- We would need logistical support in terms of accessibility and sampling
- We are happy to include complementary methods and endpoints, but want to avoid redundancy

We can offer our capabilities in NTS

- for analysing the whole set of JDS4 samples
- For capacity building / interlaboratory comparison on NTS

Effect-based methods for monitoring

Adverse effects as a cascade of events along Adverse Outcome Pathways

