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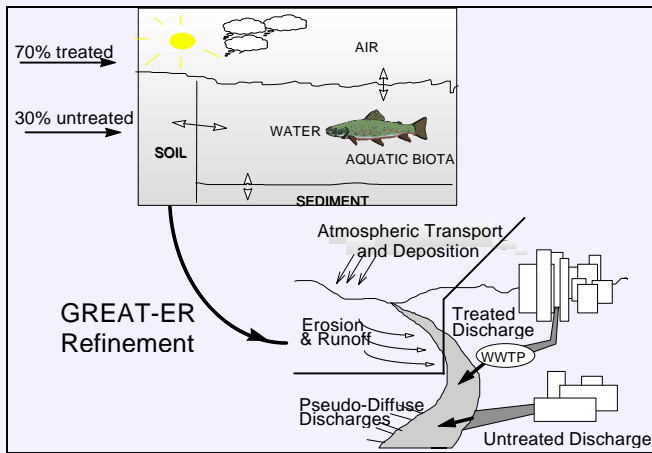
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What is GREAT-ER?

The objectives of the **GREAT-ER** project were:

- to develop and validate a more accurate **aquatic chemical exposure prediction tool** for use within the EU environmental risk assessment schemes.
- to develop a new database, model and software system
 - to calculate the **distribution of predicted environmental concentrations (PEC)** (both in space and time) of 'down-the-drain' chemicals in European surface waters on a river and catchment area level
 - using a **Geographical Information System (GIS)** for data storage and visualisation, combined with simple mathematical models for prediction of chemical fate.



Refinement of generic regional exposure models by taking actual discharge pathway, treatment and river flow data into account

GREAT-ER Output

- a colour-coded GIS-map
- a profile of a chemical's concentration versus the river distance of a river branch
- aggregated PEC's to integrate the results for an entire catchment

Approach

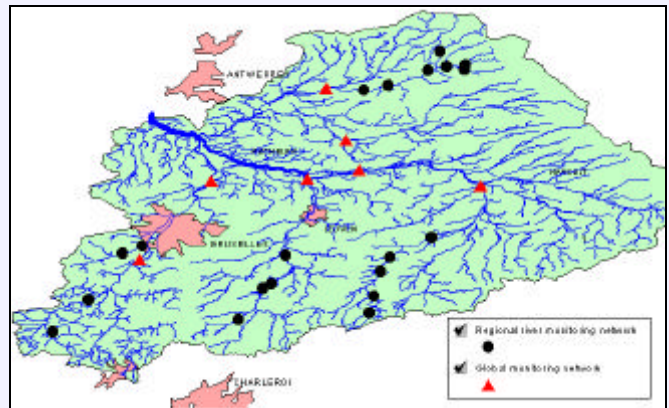
A case study has been worked out for the **Rupel basin** in Belgium: The catchment has a **variety of landuse** industrial, urban and agricultural zones.

- Goals:
- **Feasibility study** to apply GREAT-ER on a large (coarse) scale
 - **Exposure assessment** of LAS (Linear Alkylbenzene Sulphonate, a surfactant used in household detergents) for the Rupel basin

Monitoring and Validation strategy

The Rupel monitoring network, **based on expert judgement** consists of 27 stations of which:

- 7** stations are scattered out over the entire Rupel basin (**global monitoring network**)
- 20** stations are more concentrated on specific subbasins, namely the "Kleine Nete", "Grote Gete", upstream parts of the "Dyle" and "Senne" (**regional river monitoring network**)



Boron measurements will be made to validate

- the hydrological model (empirical relationship between the river flow and the sum of all upstream river lengths)
- the data conversions which had to be made during the implementation of the Rupel basin in GREAT-ER (e.g. aggregation of discharge points, connection of discharge point to the river, diffuse discharges were considered as point discharges,...).

LAS measurements will be made to validate

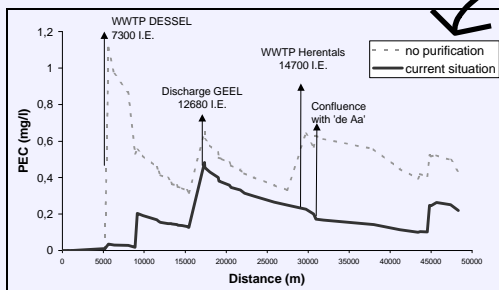
- the simplification of the network (i.e. existing rivers who weren't modelled)
- all parameters concerning the biodegradability of LAS (e.g. in-sewer-removal).

Simulation results of LAS

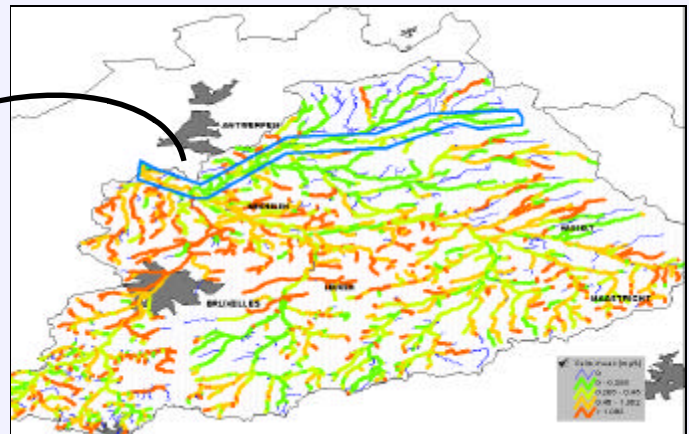
Different 'what-if'-scenarios were simulated:

- What if all discharges are treated and what if none are?
- What if a trickling filter is replaced by an activated sludge system?
- How does building a new WWTP at a specific location affect PEC in the rivers?
- How do in-stream-removal and in-sewer-removal affect the PEC in the rivers?

Results show that **WWTP's have a significant, though local, improvement** on LAS-concentrations in the rivers.



Example: Concentration profile of LAS in the 'Kleine Nete - Nete - Rupel'



Example simulation LAS [mg/l] for the Rupel basin: current situation

Geography-referenced Regional
Exposure Assessment Tool
for European Rivers

Take-home message

- GREAT-ER: new chemical exposure assessment tool**
- Planning of a monitoring campaign for validation**
- Good simulations of LAS in the Rupel basin**

Acknowledgement

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