



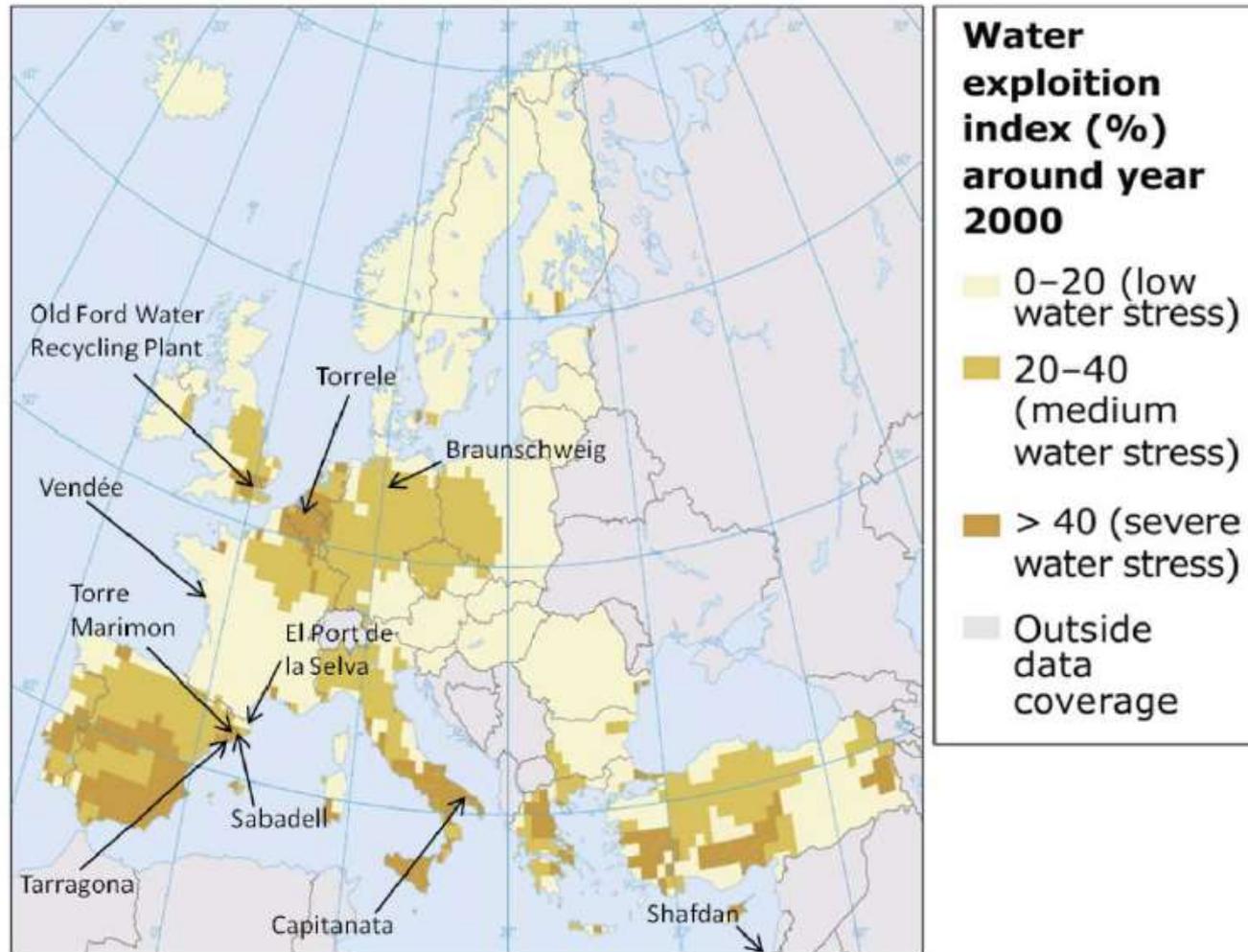
El Port de la Selva Indirect potable reuse at small scale using MAR

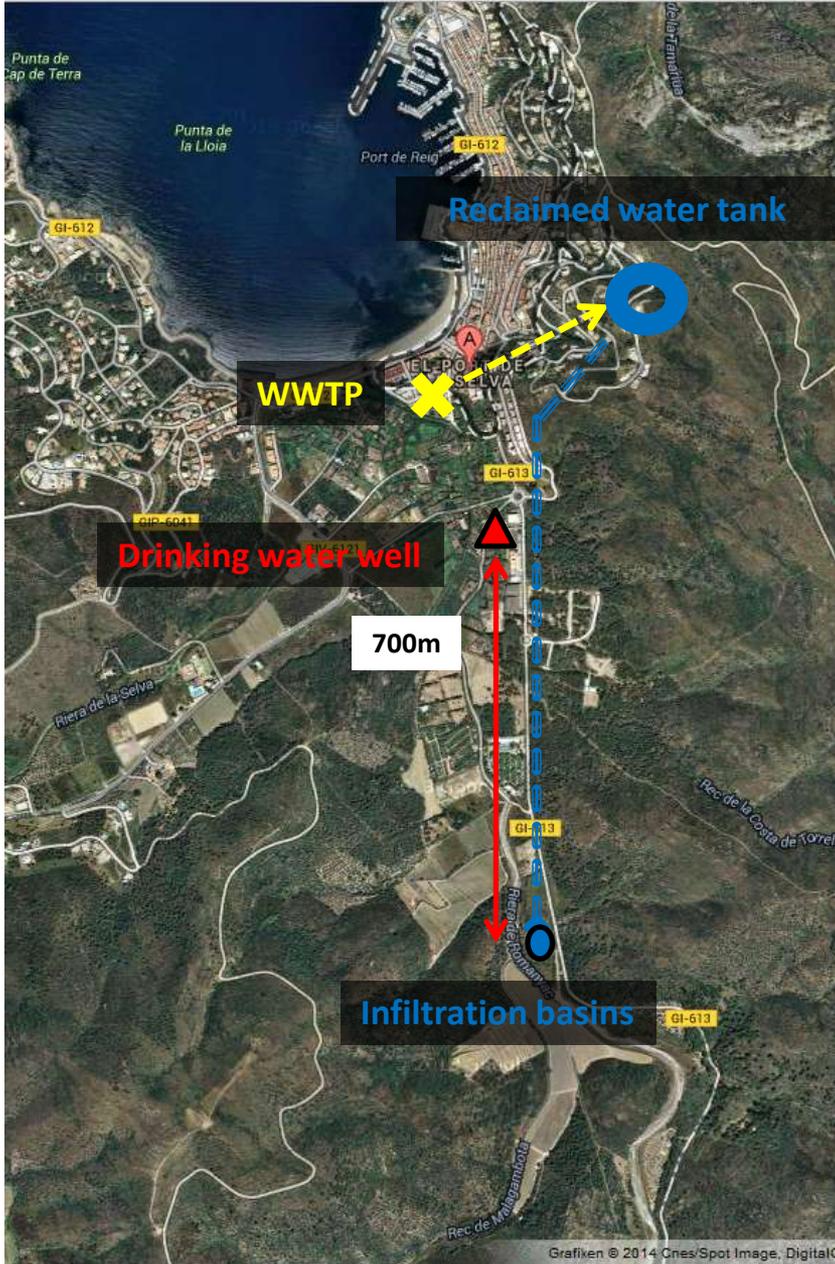
Ulf Miehe





Where is El Port de la Selva?





What is the idea?

- Infiltration of tertiary effluent of wastewater treatment plant
- Goals:
 - Augment water level in aquifer for drinking water production
 - Prevent seawater intrusion

Set-up:

- Tertiary effluent produced in WWTP and pumped the reclaimed water tank
- Water can flow from storage tank by gravity to the infiltration pond
- Infiltration basin upstream of well for drinking water production



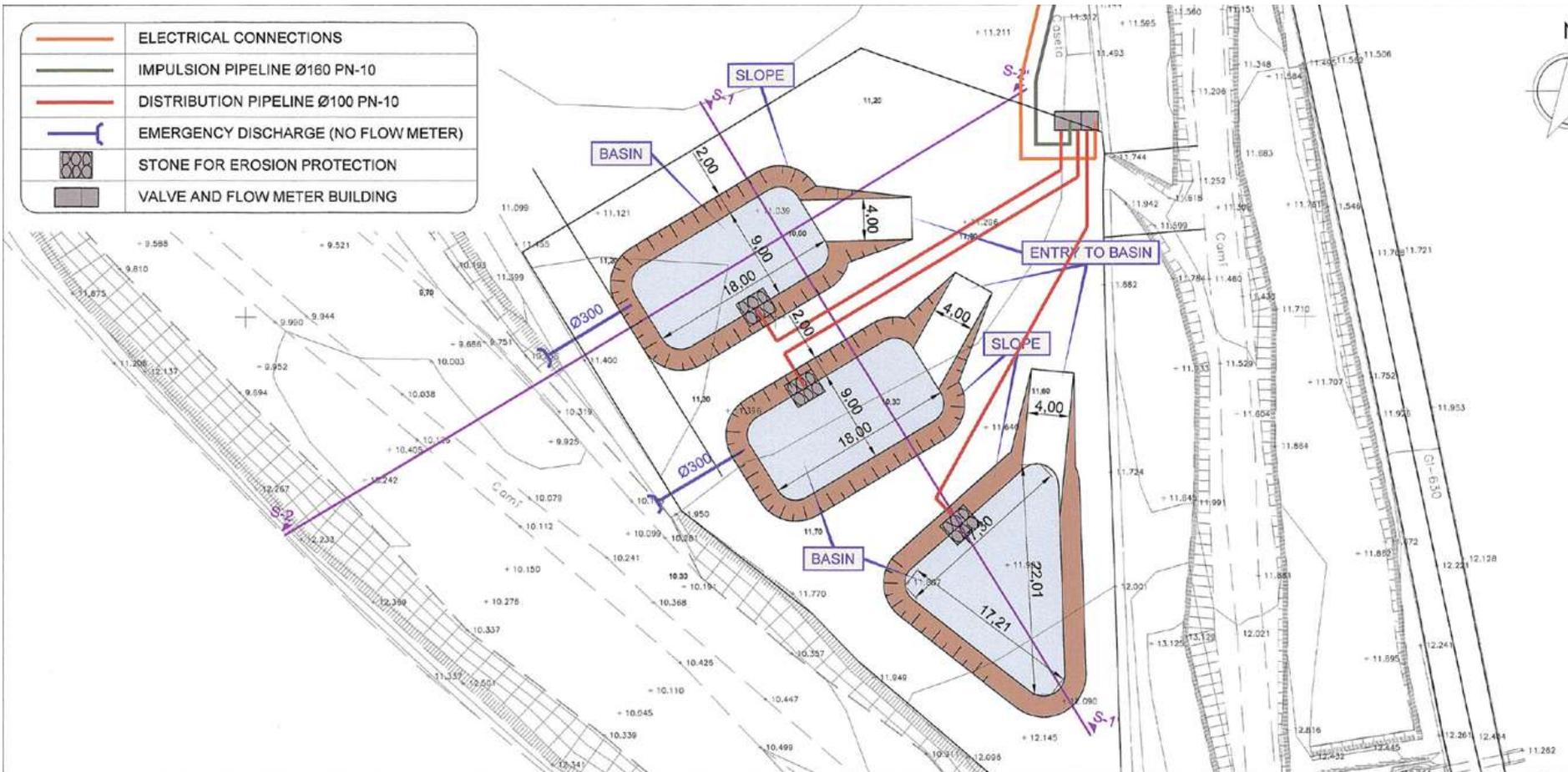
Activities in 2014/2015

- Monitoring of groundwater quality + tertiary effluent
- Installation of additional piezometer
- First risk assessment (microbial + chemical)
- Modelling
 - Impact of rain on aquifer level
 - Travel time from pond to drinking water well (>600 d)
- Upgrade/improvement of WWTP performance
 - P removal
 - N removal
 - Validation of UV performance
- Construction of pipeline and ponds
- Start of infiltration November 2015



Planning for infiltration ponds

Planning data: average flow 200 m³/d → 3*150-180 m² ponds for intermitted operation





Ponds (October 2015)





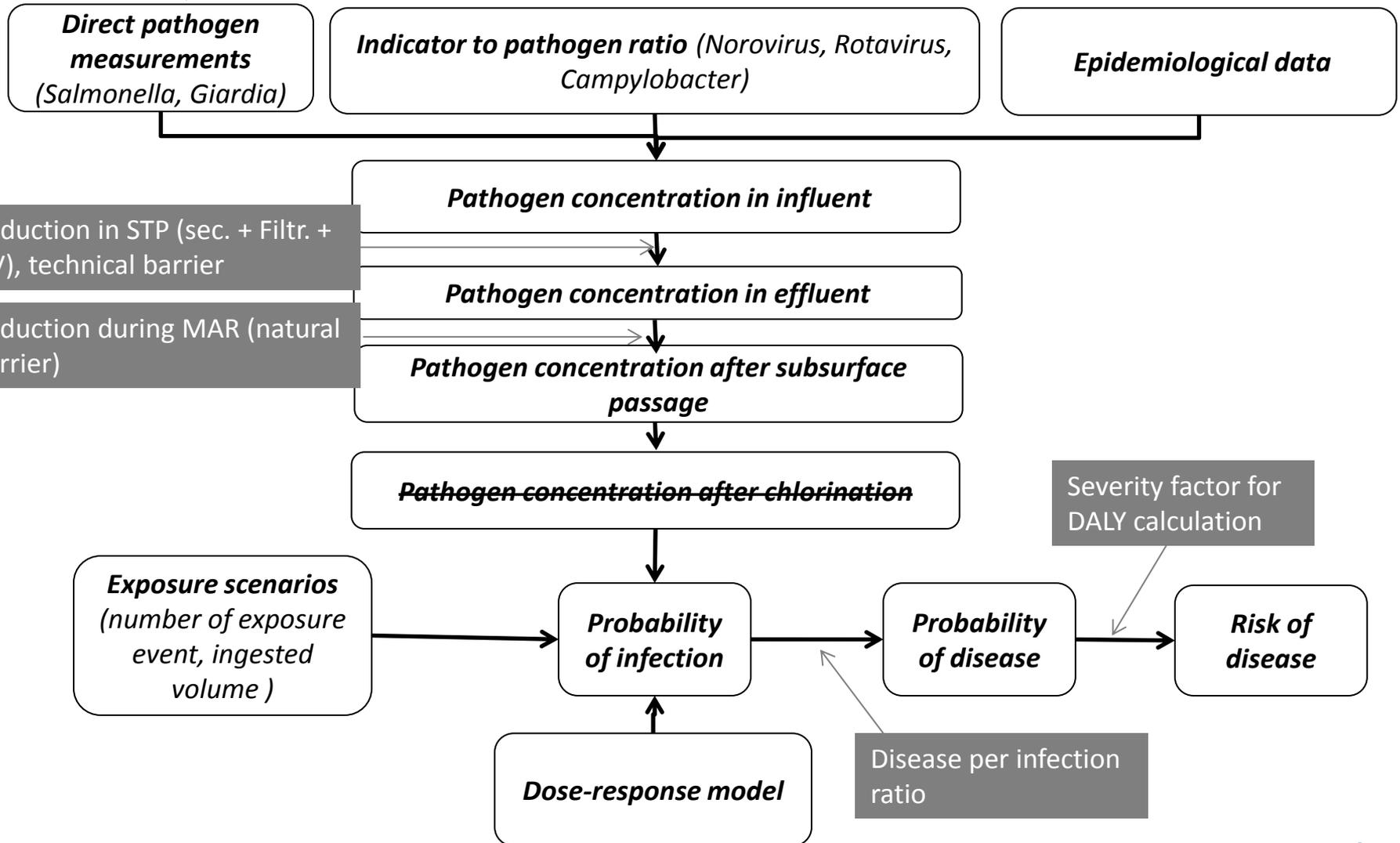
Parameters of concern and countermeasures to be implemented

Parameter	PoC		Countermeasure
Total phosphorus	TE	Limit < 2 mg/L	Install Fe-Dosing
Ammonia	SE	Goal: < 2 mg/L	Increase aeration in WWTP
Total Nitrogen	TE	Limit < 10 mg/L	Improved control (+ increased retention time in WWTP)
E.Coli	TE	Limit for E.Coli < 1000 MPN/100 mL	Filtration + UV
Salinity	SE	Goal: < 1500 μ S/cm	EC online probe for shut down system in case of high EC
Turbidity	TE	As low as possible to avoid clogging of ponds	Install frequency converters to improve operation of filtration (pending)
AOX	TE	Formation of chlorinated disinfection by products	Chlorination to be switched off

PoC: Point of compliance SE: Secondary effluent TE: Tertiary effluent



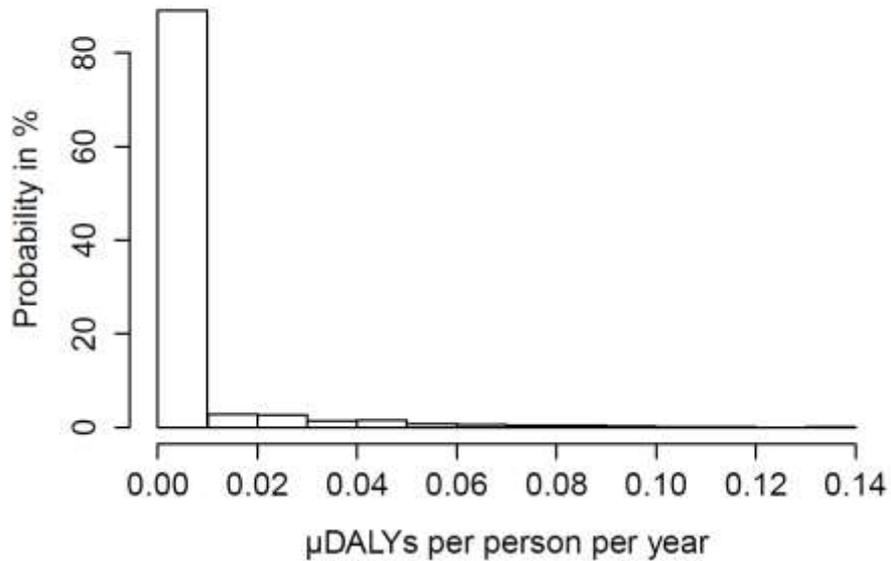
Risk assessment: pathogens (WHO approach)





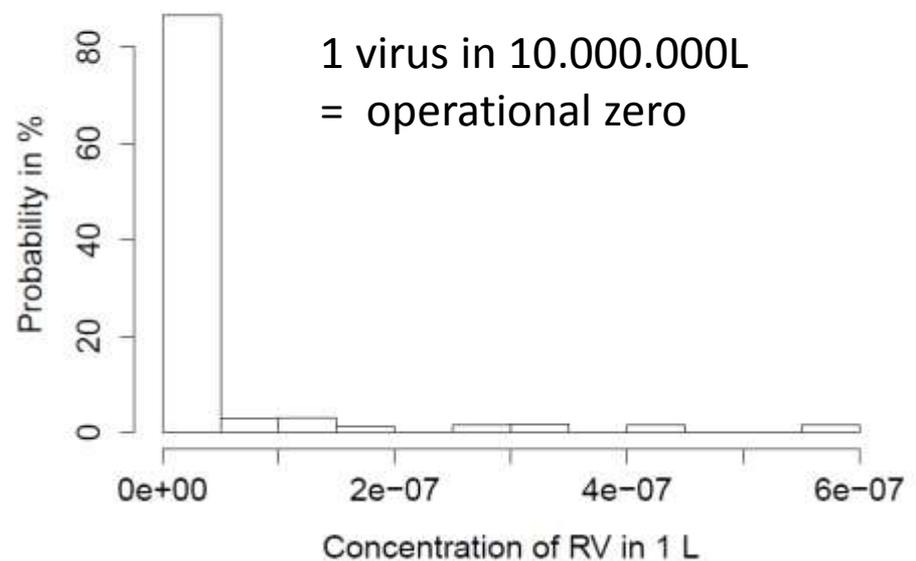
RA results for RV: first tier estimation

Risk from Rotavirus (drinking water) pppy



WHO goal: < 1 μDALY

Rotavirus conc.in drinking water





Tasks for 2016

- Monitoring of operation
- Virus sampling
- Installation of activated carbon filter for TrOC removal
- Complete risk assessment with field data
- Life cycle assessment to compare approach with other option



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Modelled concentrations of pharmaceuticals in DW (if no TrOC removal step is included)

Predicted pharmaceutical concentration dilution and biodegradator

