

## **Overview of WFD biota monitoring in France**

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### Salient figures (fresh waters)

- Biota monitoring started in 2017
- Fish sampling at nearly **200** surveillance monitoring sites (rivers and lakes)
  - > chub, barbel, roach, bream, perch
  - pooled samples analysed (8-10 ind. of similar size: 20-27 cm), fish fillet only
  - > every other year on a rolling basis
- Caged gammarids deployed at 400 sites (rivers and lakes)
  - > biotic parameters that may influence bioaccumulation are controlled (same size, gender, known exposure history)
  - > pooled samples analysed
  - > 3-week exposures, cages deployed on 3 occasions during the year (to account for seasonal variations)



# EQS biota essentially refers to wild-caught fish, but fish sampling is fraught with many challenges...

- Presence on site of targeted species in sufficient amount and of appropriate size range
- Contaminant concentrations in fish tissue could be highly variable (variability somehow reduced when using pooled sampled)
- Ethical issues: in contradiction with EU directive on animal welfare (Dir 2010/63/UE)
- Make use of alternative matrices to reduce the number of sites where fish are collected
  - > caged amphipods
  - > PSD





**Source:** Babut, M. *et al.* (2011). Transfert de contaminants hydrophobes du sédiment au biote: construction de modèles dans une perspective de gestion. Rapport final, 186 p.

# Predicting PS concentrations in fish tissue with caged gammarids



#### Predictions are correct if...

- > estimated concentrations are within the range of values actually observed in fish
- > rate of EQS exceedances are accurately predicted (with limited type II and type I error rates)

### A proof-of-concept study

#### **Contamination gradient**



INRAe

#### **Questions addressed**

> Choice of a relevant TMF (see Kidd et al. 2019)



 > Fillet-to-whole fish conversion factors (QSbiota,hh food vs QSbiota,secpois)



> Trophic level of caged gammarids? (since they are not part of fish diet)



# Ranking of site contamination with CB153 across analytical matrices (3 campaigns averaged)



Rank correlations (Kendall's Tau)

Matrix	Water	Fish fillet	Fish WB	Caged gammarids
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Water		0,708	0,708	0,752
Fish fillet	0,708		0,875	0,746
Fish WB	0,708	0,875		0,727
Caged gammarids	0,752	0,746	0,727	

## **Comparison between observed and predicted concentrations (3 campaigns averaged)**



### Estimating the risk of EQS exceedances

5 % lipids	Type I error (%)	Type II error (%)
C1, C2, C3 averaged	26.7	0
C1	28.6	0
C2	35.7	0
C3	14.3	7.1

2.5 % lipids	Type I error (%)	Type II error (%)
C1, C2, C3 averaged	20.0	0
C1	21.4	0
C2	14.3	0
C3	7.1	7.1



**Results for PFOS just published** 

Babut et al. Environ Sci Eur (2020) 32:131 https://doi.org/10.1186/s12302-020-00416-4 O Environmental Sciences Europe

#### RESEARCH

Monitoring priority substances in biota under the Water Framework Directive: how effective is a tiered approach based on caged invertebrates? A proof-of-concept study targeting PFOS in French rivers

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