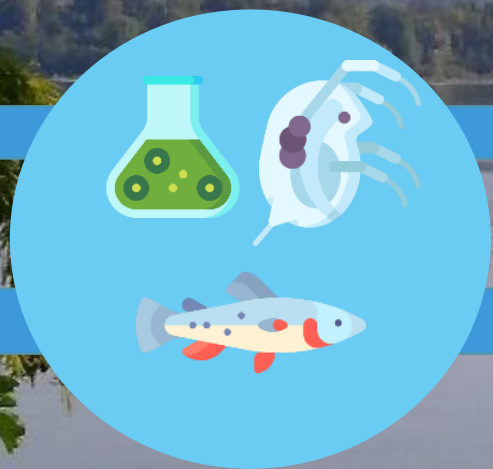


# NGRA for the aquatic environment

Stephanie Bopp  
Joint Research Centre (JRC)

Workshop on the Commission roadmap towards phasing out animal testing for chemical safety assessments, 11/12 December 2023



**Testing at individual level**



**Protection Goal at population level**



**Protect aquatic+terrestrial environment  
Biodiversity**



**One Health**

# Context



Methods &  
Tools



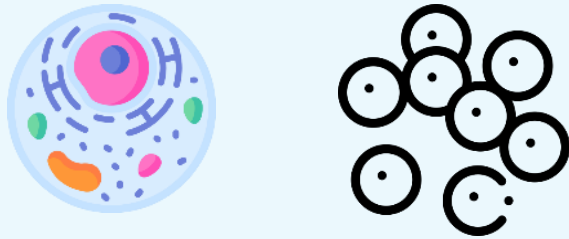
Ecological  
Relevance



Mixtures

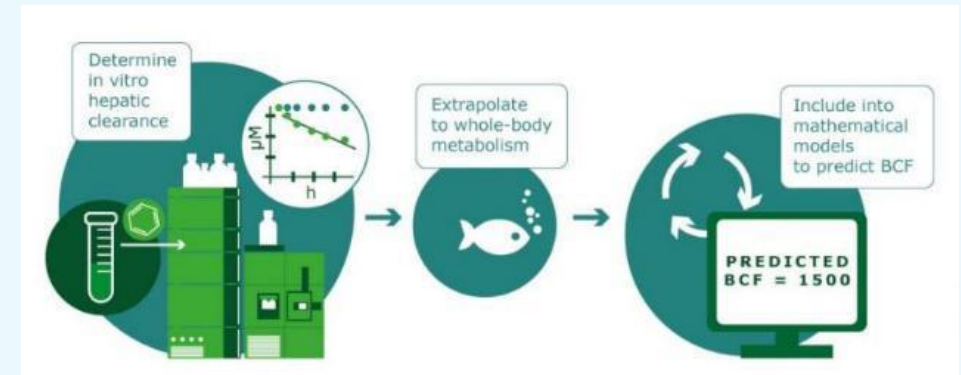
# Where are we right now?

## acute toxicity to fish



RTgill assay & FET assay  
IATA for acute fish tox

## bioaccumulation



in vitro hepatic clearance  
HYBIT

## chronic fish toxicity



# Chronic aquatic / fish toxicity

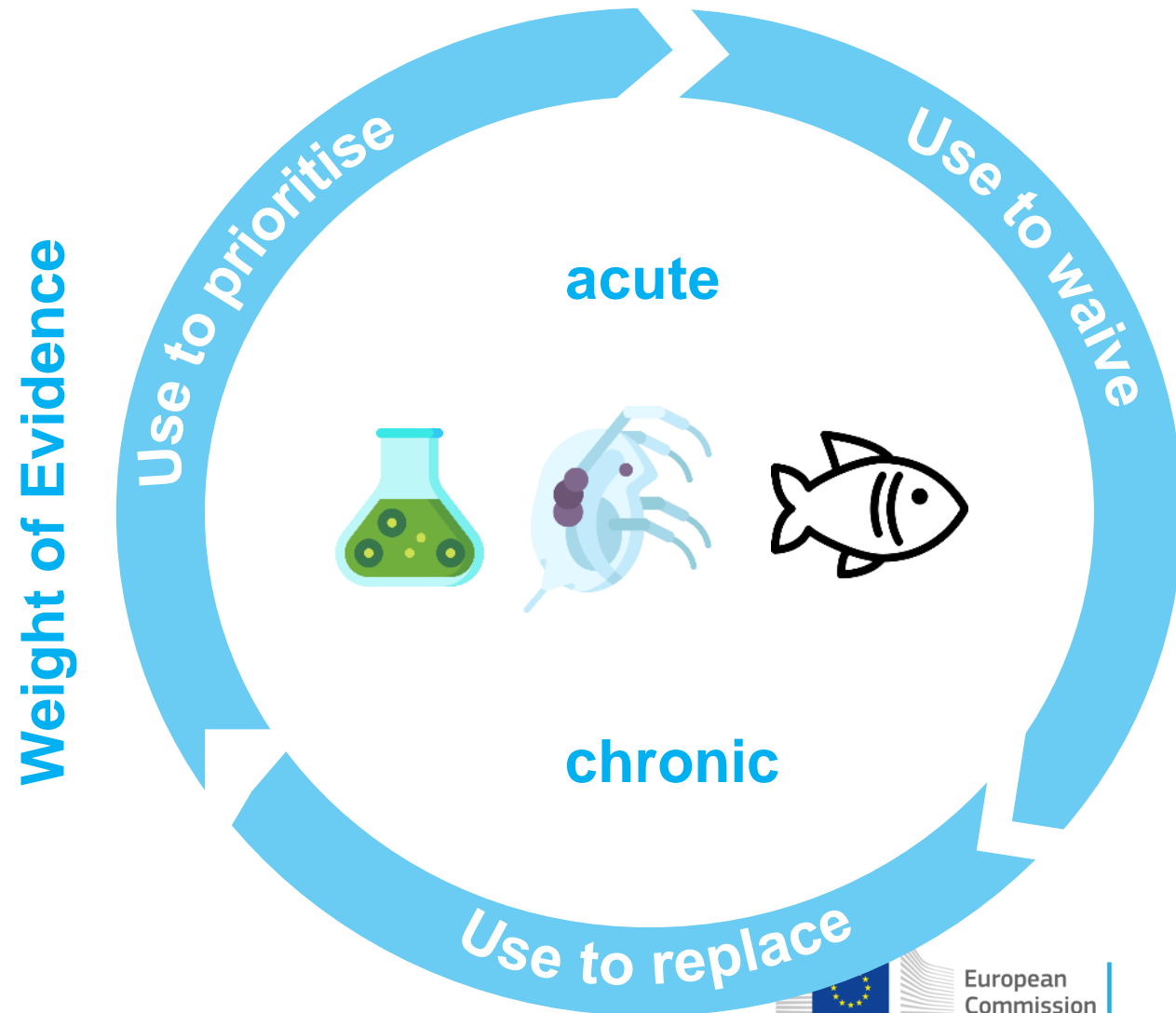
## Mechanistic considerations

Consider all species data  
Look at sensitivities, SSDs

Use data on acute toxicity (ACR)  
*Kienzler et al 2017: [10.1080/02772248.2016.1246663](https://doi.org/10.1080/02772248.2016.1246663)*

Use QSARs, *in silico* models

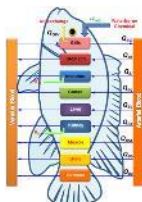
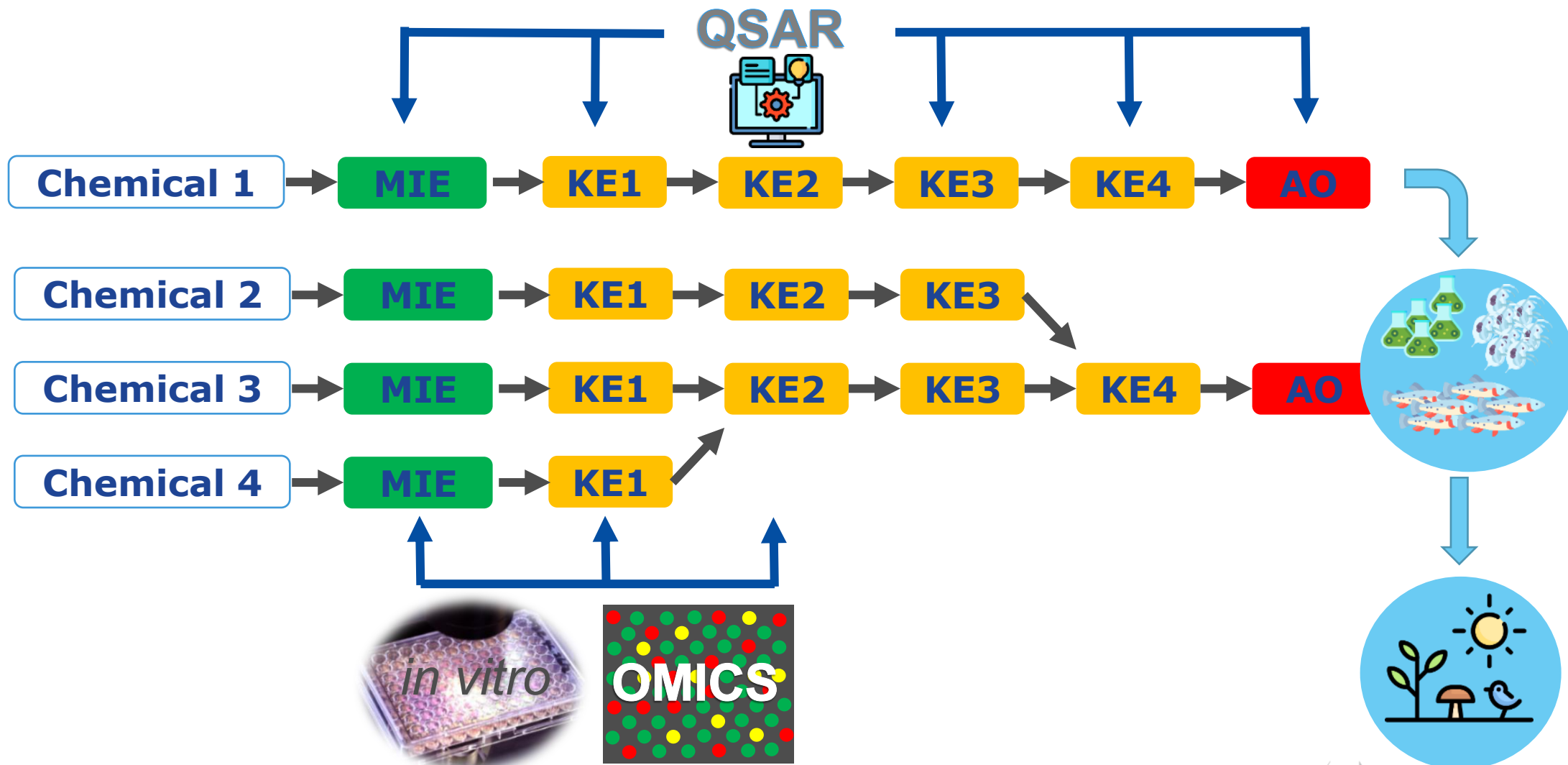
specific *in vitro* approaches  
e.g. fish cell population growth  
*Stadnicka-Michalak et al. 2015: [10.1126/sciadv.1500302](https://doi.org/10.1126/sciadv.1500302)*





# Mapping information on AOP networks

T  
O  
X  
I  
C  
O  
K  
I  
N  
E  
T  
I  
C  
S

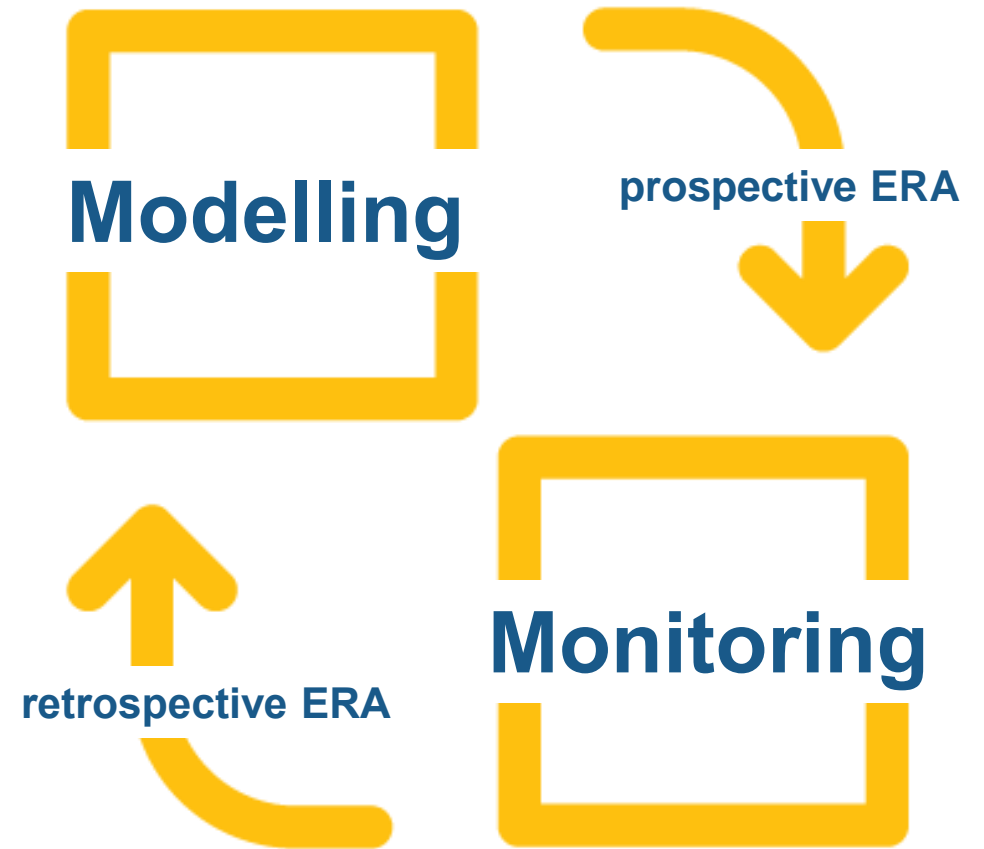


Adapted from Bopp et al 2019: [10.1080/10408444.2019.1579169](https://doi.org/10.1080/10408444.2019.1579169)  
Fish PBK model scheme from Chen 2016: [10.3389/fmars.2015.00114](https://doi.org/10.3389/fmars.2015.00114)

# Exposure considerations

## Understand real exposure patterns in the environment

- Understand fate and behaviour
- Helps identify relevant compartments, traits of sensitive organisms
- Complementary use of monitoring and modelling to improve exposure assessment/exposure based waiving
- Use monitoring data to understand co-exposures



# Exposure considerations

## Understand internal exposure

- Biota monitoring
- Use of TK to understand internal exposure
- Use of TK to interpret in vitro

## Exposure based triggers/waivers

- Think of ecoTTC
- Relevant compartments



Overview of data integration status in IPChem in 2023



Distribution of concentration measurements in 2023 by module (in millions)





# Thinking further...EPAA Designathon



...for aquatic assessments?

# Thank you



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All icons on Slide 4, 5, 6 by Freepik on Flaticon.com

Slide 6: PBK fish model graphic from <https://www.frontiersin.org/articles/10.3389/fmars.2015.00114/full>



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