

NORMAN cross working group activity on passive sampling

# Workshop on Passive sampling in support of chemical monitoring in biota for the Water Framework Directive

3<sup>rd</sup> December 2020

9-13h

The logo for NIVA (Norges Miljøovervåkningsvesen) is displayed in blue.The NORMAN logo features the word "norman" in a stylized green font. Below it, the text "Network of reference laboratories, research centres and related organisations for monitoring of emerging environmental substances" is written in a smaller green font.

ternavn MUNI | RECETOX

The INRAE logo consists of the letters "INRAE" in a bold, green, sans-serif font. Below it, the tagline "science for people, life & earth" is written in a smaller green font.

# Background for this workshop

2013 - NORMAN expert group meeting at Masaryk University in Brno, Czech Republic, to

→ investigated how Environmental Quality Standards (EQS) values relate to results obtained from passive sampling and vice versa

2014 - NORMAN/AQUAREF “Workshop on Passive Sampling techniques for monitoring of contaminants in the aquatic environment” at Irstea, Lyon, France

→ Defined a roadmap of further actions to be fostered by NORMAN

→ Recommendations and concrete actions proposed to enable the future use of passive sampling for regulatory monitoring of contaminants

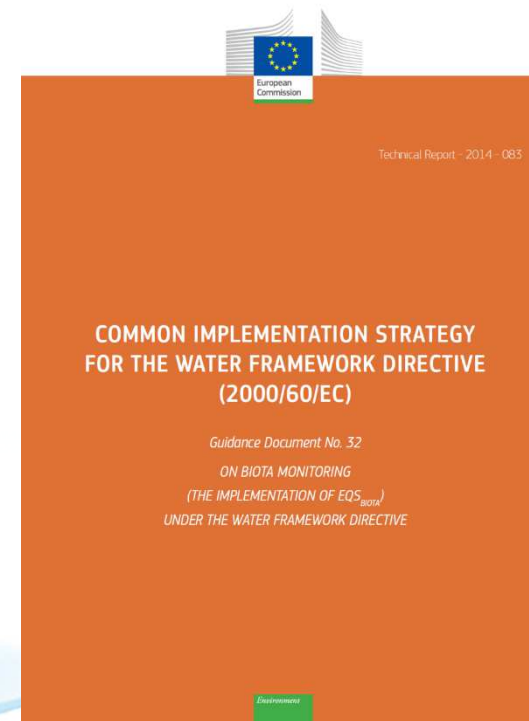
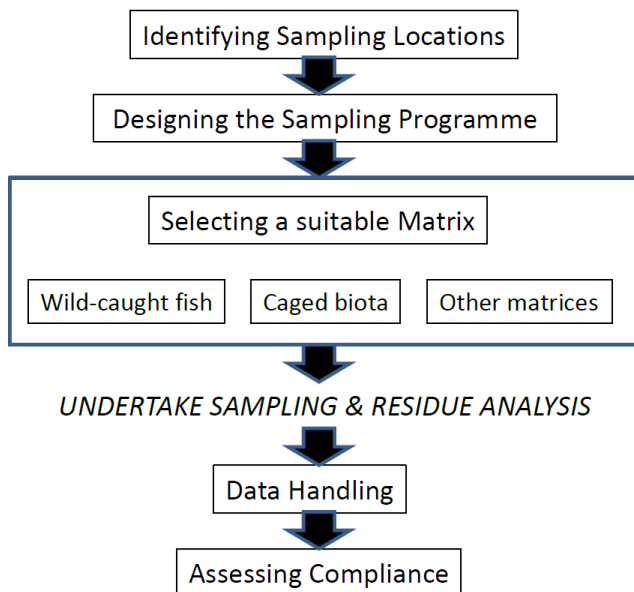
2016 – NORMAN satellite workshop of the IPSW conference (Prague, Czech Republic)

→ A common data repository for passive sampling and its combination with biota monitoring

## Priority Substances with EQS<sub>biota</sub>

Chemical substance	Type/Use	Receptors at risk	EQS value (µg/kg f.w.)	Matrix
Hg	Chlor-alkali process	Top predators	20	Fish
HCB	Fungicide	Humans	10	Fish
HCBD	Industrial chemical and PPP (fumigant)	Top predators	55	Fish
PBDE	Flame-retardant	Humans	0.0085	Fish
PFOS	Industrial chemical	Humans	9.1	Fish
HBCDD	Flame-retardant	Top predators	167	Fish
Dioxins and dioxin-like compounds	By-products of thermal combustion	Humans	0.0065 TEQ <sub>2005</sub>	Fish, crustaceans, molluscs
Heptachlor/Heptachlor epoxide	Organochlorine insecticide	Humans	6.7 10 <sup>-3</sup>	Fish
Fluoranthene	By-products of thermal combustion	Humans	30	Crustaceans, molluscs
PAHs (B[a]P as a marker)	Incomplete combustion of hydrocarbons, chemical intermediate	Humans	5	Crustaceans, molluscs
Dicofol	Organochlorine PPP	Top predators	33	Fish
Chloroalkanes, C <sub>10-13</sub>	Industrial chemical	Top predators	16.6 10 <sup>3</sup>	
DEHP	Plasticizer	Top predators	3.2 10 <sup>3</sup>	
Pentachlorobenzene	Fungicide (wood preservative)	Top predators	367	

# A guidance document to progress in the implementation of chemical monitoring with biota



# Objectives of the workshop

## Address

- Current situation and remaining challenges for the inclusion of biota-based WFD monitoring for trends and compliance assessment of priority and river basin specific substances.
- Strategies for biota species selection and procedures to translate biota data into data suitable for comparison with EQS<sub>biota</sub>.
- How such biomonitoring is tackled in different EU countries
- Recent advances in the interpretation of the accumulation of chemicals into biota with the help of passive samplers.
- Examples of the application of passive sampling and monitoring of chemicals with biota alongside.

# Today' programme

9.00 Introduction

9.10 Stefano Polesello (IRSA, IT)

Biomonitoring and WFD: vision and remaining challenges

9.35 Olivier Perceval (OFB/Fr)

WFD and biota monitoring – A French perspective

9.45 Karin Deutsch (Ministry of Life/AT)

WFD and biota monitoring – An Austrian perspective

9.55 Georgia Buchmeier (Bavarian Environment Agency/GE)

WFD and biota monitoring – A German perspective

10.05 Catherine Munschy (Ifremer, FR)

Coastal monitoring with biota

10.15 Discussion

Break

10.45 Foppe Smedes (RECETOX/Cz)

PS in support of fish monitoring – A new approach

11.10 Branislav Vrana (RECETOX/Cz)

Application of the approach in case studies and in Danube survey

11.20 Cecile Miege (INRAE/Fr)

Application of the approach to in case studies in France

11.30 Ian Allan (NIVA/No)

PS and biota monitoring – Data from Norway

11.40 Discussion

13.00 Workshop end

Next slides not part of the intro

Discussion at 10:15

## Critical issues in biota monitoring (Stefano P.)

### STATISTICAL POWER AND FREQUENCY:

Minimum requirements of frequency (once per year) is not compatible with statistical power needed for a confident assessment.

How to get reliable results even with this constraint?

### FISH SPECIES CHOICE and REPRESENTATIVENESS

How to cope the representativeness at basin or local level with the need for comparability of status assessment at EU level.

Do we need to choose the same species all over Europe, or do we prefer to sample locally representative species?

### TMF and ASSESSMENT AT LOWER TIER TAXA

There is still uncertainty on reliable TMF derivation. TMF often depends on site-specific trophic chain and should be derived locally

Are available TMFs sufficiently reliable and of general use to guarantee a reliable and comparable assessment of chemical status when lower tier taxa are used for monitoring?



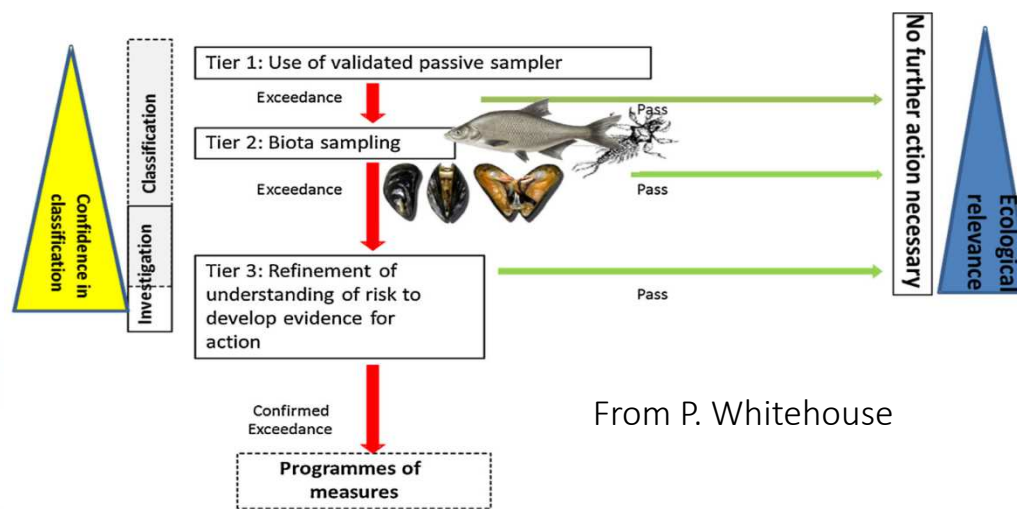
Discussion at 11:40

How do you see the utility of PS for the monitoring of substances with EQS in biota ?

=> for extrapolating the risk of failing to achieve the good chemical status to water bodies where biota monitoring is not feasible/suitable ?

Discussion at 11:40

What is your opinion on the proposition to possibly use PS at a first step of a graduated approach ?  
(assessment of the worst case)



In Trends in Environmental Analytical Chemistry 8 (2015) 20–26

Discussion at 11:40

- Is chemical monitoring in biota under the Water Framework Directive meant for assessing water quality or biota quality?
- Can levels of neutral hydrophobic organic contaminants in fish be predicted from passive sampling in water or sediment?
- Should we continue using biota monitoring if compliance to the EQS level can be confirmed without sacrificing fish?
- For some priority substances there are EQS values available for surface waters and biota matrix. PFOS is an example. There may be an apparent discrepancy in chemical status assessment when compliance is based on monitoring water or biota. Is this acceptable?

1. Do you think the passive sampling technology is sufficiently mature for use for monitoring for WFD priority substances with  $EQS_{biota}$ ?

-Yes

-No

2. If no, why not?

-No clear link between the passive sampling information and levels in biota

-No clear understanding of the passive sampling calculations

-No possible to use passive sampling data in relation to  $EQS_{biota}$

3. How would you use passive sampling data in relation to  $EQS_{biota}$ ?

-Estimate  $C_{free}$  and use literature BCF to recalculate concentration in biota at steady-state with the concentration

-Estimate a hypothetical concentration in lipids at equilibrium with the water phase

4. Do you think it is possible to use the procedure proposed in the CIS guideline on sediment and biota monitoring document to measure priority substance levels in fish at a certain trophic level to recalculate a fish concentration at another trophic level for comparison with  $EQS_{biota}$ ?

-Yes

-No

-If no, TMF that have to be used are not available or too uncertain