

# Improving emissions to water Ineris / France

09/09/2020

# Foreword and experience

Ineris, in collaboration with the French Office for Biodiversity, provides technical support to the Ministry of ecology

- Development of environmental quality standards (EQS)
- Monitoring for surface water quality
- knowledge of uses for the reduction of micropollutants
- Characterization of urban discharges into aquatic environments
- Guidance documents

Ineris has proposed a **Methodological Guidance Document** to the Water Agencies (in French)

Local districts are free to follow the methodology :

- Availability of local data
- Modelling tools
- Transverse analysis in progress



# Quick overview of the different diffuse pathways : P1

## P1 : Atmospheric Deposition directly to Surface Waters

Method similar to the draft

$$MP1(X) = S \times F(X)$$

S = Surface area of watercourses on a given territory (km<sup>2</sup>)

F(X) = Annual flux of atmospheric deposition of X (kg/km<sup>2</sup>/yr)

- / Cd, Cr, Ni, Zn, Pb, Hg, Cu, PAHs
- / Most data come from EMEP
- / Methodological limits : inconsistencies with PAHs

3 out of 6 districts applied it for the 3rd WFD RBMP

The 3 others did not include this pathway in their inventories

# Quick overview of the different diffuse pathways : P3

## P3 : Surface Runoff from Unsealed Areas

### Metals

Methodology partly derived from International Commission for the Protection of the Rhine

$$\text{MP3 met (X)} = \text{S} \times \text{I(X)} \times \text{C runoff}$$

S = Agricultural land area

I(X) = Average input to agricultural land (in kg/ha) of X

C runoff = Proportion of input reaching surface water by runoff

- / As, Cd, Cr, Cu, Hg, Ni, Pb, Zn
- / Data published in 2007 – should be updated
- / C between 0,1 and 1%

### Fertilizers

$$\text{MP3 fert (X)} = \text{Q BNVD} \times \text{SU} \times \text{C runoff}$$

Q BNVD = Quantities of the active plant protection substance sold on the territory

C runoff = Runoff coefficient (= 0,5%)

SU = Sales to Use correction coefficient (= 95%)

4 out of 6 applied the methodology

1 did not (methodology not known yet)

1 did not know at the time of the interview (results to be updated)

# Quick overview of the different diffuse pathways : P5

## P5 : Agriculture : Direct Discharges and Drifting

Only substances from PPPs are covered

**MP5 fert (X) = Q BNVD x SU x C drifting x S Waters / district**

Q BNVD = Quantities of the active plant protection substance sold on the territory

SU = Sales to Use correction coefficient

/ SU = 95%

C drifting = Average drifting coefficient

/ C drifting = 5%, as default value, based on different values depending on cultural types

S Waters / district = Share of watercourses areas in the district

3 out of 6 applied the methodology

1 did not (methodology not known yet)

2 did not know at the time of the interview (results to be updated)

# Quick overview of the different diffuse pathways : P6/7

P6/7 : Surface Runoff from Sealed Areas / Storm Water Outlets, Combined Sewer Overflows and Unconnected Sewers

## Runoff from highways

$$\text{MP6 highway (X)} = \text{C(X)} \times \text{T} \times \text{Shighway} \times (1 - \text{Eff})$$

T = Number of vehicles per day

/ Average numbers are provided

C(X) = Average annual load (kg/vehicles/m<sup>2</sup>/yr)

/ Zn, Cu, Cd, PAHs (data from CEREMA)

/ Two sets of values, depending on T < or > 10 000 vehicles/day

Shighway = Sealed highway area

Eff = Abatement efficiency of motorway works for the protection of water resources

/ 65% for Zn, Cu, Cd ; 50% for PAHs

# Quick overview of the different diffuse pathways : P6/7

P6/7 : Surface Runoff from Sealed Areas / Storm Water Outlets, Combined Sewer Overflows and Unconnected Sewers

## Urban runoff

### Option #1 : Collected rain waters are not treated

$$MP6 \text{ urban } (X) = \Sigma [X]_{\text{rain waters}} \times V_{\text{runoff}}$$

$[X]_{\text{rain waters}}$  = Total concentration of X in rainwaters in separate sewer systems

- / Cr, Cu, Pb, Zn, BaP, Fluoranthene, 4-nonylphenol, DEHP, ...
- / Literature review
- / Local data

$V_{\text{runoff}}$  = Volume of runoff waters (based on rainfall heights, urban surfaces, and impermeability)

### Option #2 potential new option :

$$MP6 \text{ urban } (X) = \Sigma [X]_{\text{rain waters}} \times V'_{\text{runoff}} \times C_{\text{discharge}}$$

$C_{\text{discharge}}$  = Share of the flow reaching surface waters

= Estimated interception rate for municipalities with a separative sewer system

- / Estimated to 70%

## Overflows

$$MP7 (X) = \Sigma [X]_{\text{in UWWTP}} \times V_o$$

$[X]_{\text{in UWWTP}}$  = Median concentration of X coming in UWWTP

$V_o$  = Volume collected – Capacity of UWWTPs – Retention availability

# Quick overview of the different diffuse pathways : P9

P9 : Individual - Untreated-Household Discharges

$$MP_9(X) = 2,25 \times NH \times EH(X) \times TF$$

2,25 = average number of inhabitants per household

NH = Number of "collected but untreated" households

TF = Transfer factor

- / Assumed to be equal to average efficiency of drinking water distribution networks in France
- / Between 80 and 100%

EH (X) = Emission per inhabitant per year

- / Cd, Cr, Cu, Hg, Ni, Pb, Zn, BaP, Fluoranthene, 4-nonylphenol, DEHP



# Incompleteness ?

- Some pathways are not covered (P2, P4, P11, P13)
  - Future reserach ?
  - A working group regularly works on prioritisation of enhancement
- The aim of the methodology is to enable districts to share a common approach
  - In theory, « no incompleteness »
  - Not true for the 2<sup>nd</sup> RBMP...
  - The study has not yet been conducted for the 3<sup>rd</sup>



**Thank you for your attention**

Substances	Etat Chimique (EC) ou Etat Ecologique (EE)	CAS	SANDRE	P1. Retombées atmosphériques directes sur les eaux	P3. Ruissellement depuis les terres perméables	P5. Emissions directes de l'agriculture	P6. Ruissellement direct de l'agriculture	P8. Ruissellement urbain de traitement des eaux ménagères non raccordés	P9. Emissions de stations de traitement des eaux	P10. Emissions industrielles	P12. Emissions directes de la navigation intérieure
(4-nonyphénol)	EC	11066-49-2 / 90841-04-2	6598								
1,2 Dichloroéthane	EC	107-06-2	1161	X			X			X	
2,4 MCPA ou MCPA	EE	94-74-6	1212	X	X		X				
2,4 D	EE	94-75-7	1141	X	X		X				
Acide perfluorooctane-sulfonique et ses dérivés (per fluoro-octane sulfonate PFOS)	EC	1763-23-1	6560					X	X		X
Adonifène	EC	74070-46-5	1688		X	X	X				
Alachlore	EC	15972-60-8	1212	X	X					X	
Aldrine	EC	309-00-2	1103	X	X	X					
Aminotriazole	EE	61-82-5	1105	X	X		X				
AMPA	EE	77521-29-0	1907				X				
Anthracène	EC	120-12-7	1458				X	X		X	
Arsenic	EE	7440-38-2	1369	X			X	X		X	
Atrazine	EC	217-617-8	1107	X	X	X				X	
Azoxystrobine	EE	131860-33-8	1951	X	X	X					
Bentazone	EE	25057-89-0	1113	X	X	X					
Benzène	EC	71-43-2	1141				X			X	
Bifénox	EC	42576-02-3	1119	X	X	X					
Biphényle	EE	92-52-4	1584				X				
Boscalid	EE	188425-85-6	5526		X	X	X				
Cadmium et ses composés	EC	7440-43-9	1388	X	X		X	X	X	X	X
Chlordécone	EE	143-50-0	11360	X	X						
Chlorfenvinphos	EC	470-90-6	1464	X	X					X	
Chloroalcane C10-C13	EC	85535-84-8	1955				X	X		X	
Chlorprophame	EE	101-21-3	1474	X	X	X					
Chlorpyrifos (éthyl-chlorpyrifos)	EC	2921-88-2	1083	X	X	X				X	
Chlortoluron	EE	15545-48-9	1136	X	X		X				
Chrome	EE	7440-47-3	1389	X	X		X	X	X	X	X
Composés du tributylétain (tributylétain-cation)	EC	sans objet	sans objet								
Cuivre	EE	7440-50-8	1392	X	X	X	X	X	X	X	X
Cybutryne (repertoriée sous le nom de N'-TERT-BUTYL-N-CYCLOPROPYL-6-(METHYLTHIO)-1,3,5-TRIAZINE-2,4-DIAMINE)	EC	28159-98-0	1935				X				
Cyperméthrine	EC	52315-07-8	1140	X	X	X	X				
Cyprodinil	EE	121552-61-2	1359	X	X		X				
DDT total	EC	789-02-6 / 50-29-3	3268	X	X						
Di(2-éthylhexyl)phthalate (DEHP)	EC	117-81-7	6616				X	X		X	
Dichlorométhane	EC	75-09-2	1168				X	X		X	
Dichlorvos	EC	62-73-7	1170	X	X	X		X			
Dicofol	EC	115-32-2	1172	X	X	X		X			
Dieldrine	EC	60-57-1	1173	X	X	X					
Difféncanil	EE	83164-33-4	1814	X	X		X				
Dioxines et ses composés de type dioxine	EC	sans objet	sans objet	X							
Diphényléthers bromés	EC	sans objet	sans objet							X	
Diuron	EC	330-54-1	1177	X	X	X	X			X	
Endosulfan	EC	115-29-7	1743	X	X					X	

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Endrine	EC	72-20-8	1181		X	X				X	
Fluoranthène	EC	206-44-0	1191	X			X	X		X	
Glyphosate	EE	76-44-8 / 1024-57-3	1197 / 1748		X	X		X			
Heptachlore et époxyde d'heptachlore	EC	sans objet	sans objet		X	X		X		X	
Hexabromocyclododécane (HBCDD)	EC	sans objet	sans objet					X			
Hexachlorobenzène (HCB)	EC	118-74-1	1199	X				X		X	
Hexachlorobutadiène	EC	87-68-3	1652					X	X	X	
Hexachlorocyclohexane	EC	608-73-1	5537	X	X					X	
Hydrocarbures aromatiques polycycliques (HAP)	EC	sans objet	sans objet	X			X	X	X	X	X
Imidacopride	EE	138261-41-3	1877	X	X			X			
Iprodione	EE	36734-19-7	1206	X	X			X			
Isodrine	EC	465-73-6	1207							X	
Isoproturon	EC	34123-59-6	1208	X	X	X		X		X	
Linuron	EE	330-55-2	1209	X	X						
Mercur et ses composés	EC	7439-97-6	1387	X	X			X	X	X	X
Métaldéhyde	EE	9002-91-9	1796	X	X	X		X			
Métazachlore	EE	67129-08-2	1670	X	X			X			
Naftalène	EC	91-20-3	1517				X	X		X	
Nickel et ses composés	EC	7440-02-0	1386	X	X			X	X	X	X
Nicosulfuron	EE	111991-09-4	1310	X	X			X			
Nonyphénols	EC	sans objet	sans objet				X	X	X	X	X
Octylphénol (4-(1,1',3,3' - tétraméthyl-butyl)-phénol)	EC	sans objet	sans objet				X	X	X	X	X
Oxadiazon	EE	19666-30-9	1667	X	X			X			
Para-para-DDT	EC	50-29-3	1144	X	X						
Pendiméthaline	EE	40487-42-1	1234	X	X			X			
Pentachlorobenzène	EC	608-93-5	1888					X		X	
Pentachlorophénol	EC	87-86-5	1235					X	X	X	
Phosphate de tributyle	EE	126-73-8	1847					X			
Plomb et ses composés	EC	7439-92-1	1382	X	X		X	X	X	X	X
Quinoxifène	EC	124495-18-7	2028	X	X			X			
Simazine	EC	122-34-9	1263	X	X	X				X	
Tebuconazole	EE	107534-96-3	1694	X	X			X			
Terbutryne	EC	886-50-0	1269	X	X			X			
Tétrachloroéthylène	EC	127-18-4	1272					X	X	X	
Tétrachlorure de carbone	EC	56-23-5	1276					X	X	X	
Thiabenzazole	EE	148-79-8	1713	X	X			X			
Toluène	EE	108-88-3	1278					X	X	X	X
Trichlorobenzènes (tous les isomères)	EC	234-413-4	1774							X	
Trichloroéthylène	EC	79-01-6	1286					X	X	X	
Trichlorométhane (chloroforme)	EC	67-66-3	1135					X	X	X	
Trifluraline	EC	1582-09-8	1289	X	X					X	
Xylène	EE	1330-20-7	1780					X		X	
Zinc	EE	7440-66-6	1383	X	X	X	X	X	X	X	X