The

VOLUNTARY

European Groundwater Watch List

CONCEPT & METHODOLOGY & FIRST RESULTS

Rüdiger Wolter

Members and *former members* of the Watch List Group (2015-2021)

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Policy background: Recital 4 of 2014 GWD

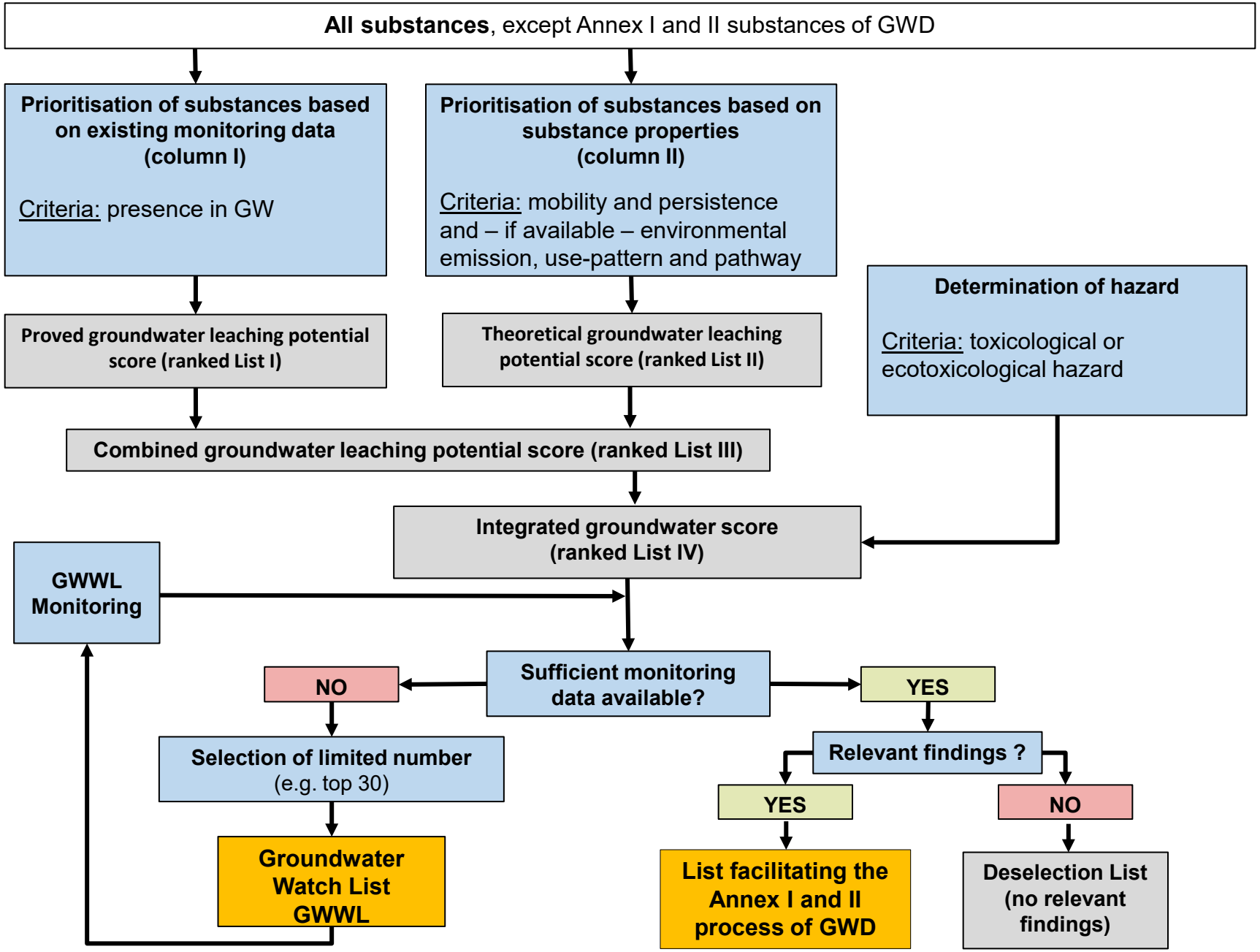
(4) - The need to obtain and respond to new information on other substances posing a potential risk should be acknowledged. Therefore, a **watch list** for pollutants of groundwater should be established under the Common Implementation Strategy for Directive 2000/60/EC of the European Parliament and of the Council (2) to **increase the availability of monitoring data** on substances posing a risk or potential risk to bodies of groundwater, and thereby facilitate the **identification of substances**, including emerging pollutants, for which groundwater **quality standards** or **threshold values should** be set.

The Groundwater Watch List process is a voluntary activity!

What is the purpose of a Watch List Process?

- **Identify new / emerging pollutants** - based on new information - which have the potential to cause a failure of a WFD environmental objective
  - improved analytical and monitoring methods
  - generate new knowledge about substance properties
- Support review of WFD/GWD - create a **List facilitating Annex I/II review process of GWD**
- Support MS selecting pollutants which should be monitored **- share information on monitoring data of (potential) pollutants**

The Watch List Concept



Implementation of the Watch List Process (Methodology)

1) **Selection of substances / group of substances for the Watch List process**
   - Member States (MS) / Associated Countries (AC) and European Commission were asked to identify "relevant" substances/group of substances
     - **Pharmaceuticals**
     - **Per- and Polyfluoroalkyl Substances (PFAS)**
     - **Non-relevant metabolites of pesticides (nrM)**
     - **Persistent, mobile and toxic substances (PMT) – sub group "solvents and chelating agents"**
2) **Preparation of a questionnaire**
   - MS /AC are asked to report monitoring data and additional information (e.g. LOQ, analytical technique, type of monitoring, national thresholds or guiding values …)
3) **Data collection and assessment**
   - The Groundwater Watch List group – subgroup of the CIS Working Group Groundwater (WG GW) – is responsible for the data collection and assessment
4) **Preparation of a "List Facilitating review of Annex I/II of the GWD" (LF) and a "Watch List"**
   - The Watch List group prepares the LF and the Watch List
   - The CIS WG GW has to approve the LF and the Watch List
5) **MS/AC are asked to monitor the Watch List substances and report monitoring results**

All substances, except Annex I and II substances of GWD

Prioritisation of substances based on existing monitoring data (column I)

Criteria: presence in GW

Proved groundwater leaching potential score (ranked List I)

(Score N°PC) + (Score %° sites)] / 2

Substance	No of PC	score
PFOA	10	1
PFOS	10	1
PFBPA	n.a.	?

Substance	% of sites	score
PFOA	27,0	0,7
PFOS	22,8	0,6
PFBPA	n.a.	?

Indicators	Sub-score : N PC
A) Number of countries with concentrations > LOQ (Score N°PC)	(Values between 0 and 1) no country = 0 1 country = 0.2 2 countries = 0.4 3 countries = 0.6 4 countries = 0.8 5 or more countries = 1

Indicators	Sub-score : % sites
B) Percentage of sites with concentrations > LOQ (Score % N° sites)	(Values between 0 and 1) 0% 0 ≤ 0,25% 0.1 ≤ 0,5% 0.2 ≤ 1% 0.3 ≤ 2.5% 0.4 ≤ 5% 0.5 ≤ 10% 0.6 ≤ 25% 0.7 ≤ 50% 0.8 ≤ 75% 0.9 ≤ 100% 1

Substance	Proved groundwater leaching potential score
PFOA	0,85
PFOS	0,8
PFBPA	?

All substances, except Annex I and II substances of GWD

Prioritisation of substances based on existing monitoring data (column I)

Criteria: presence in GW

Proved groundwater leaching potential score (ranked List I)

(Score N°PC) + (Score %° sites)] / 2

Prioritisation of substances based on substance properties (column II)

Criteria: mobility and persistence and – if available – environmental emission, use-pattern and pathway

Theoretical groundwater leaching potential score (ranked List II)

(Persistence score + Mobility score) / 2

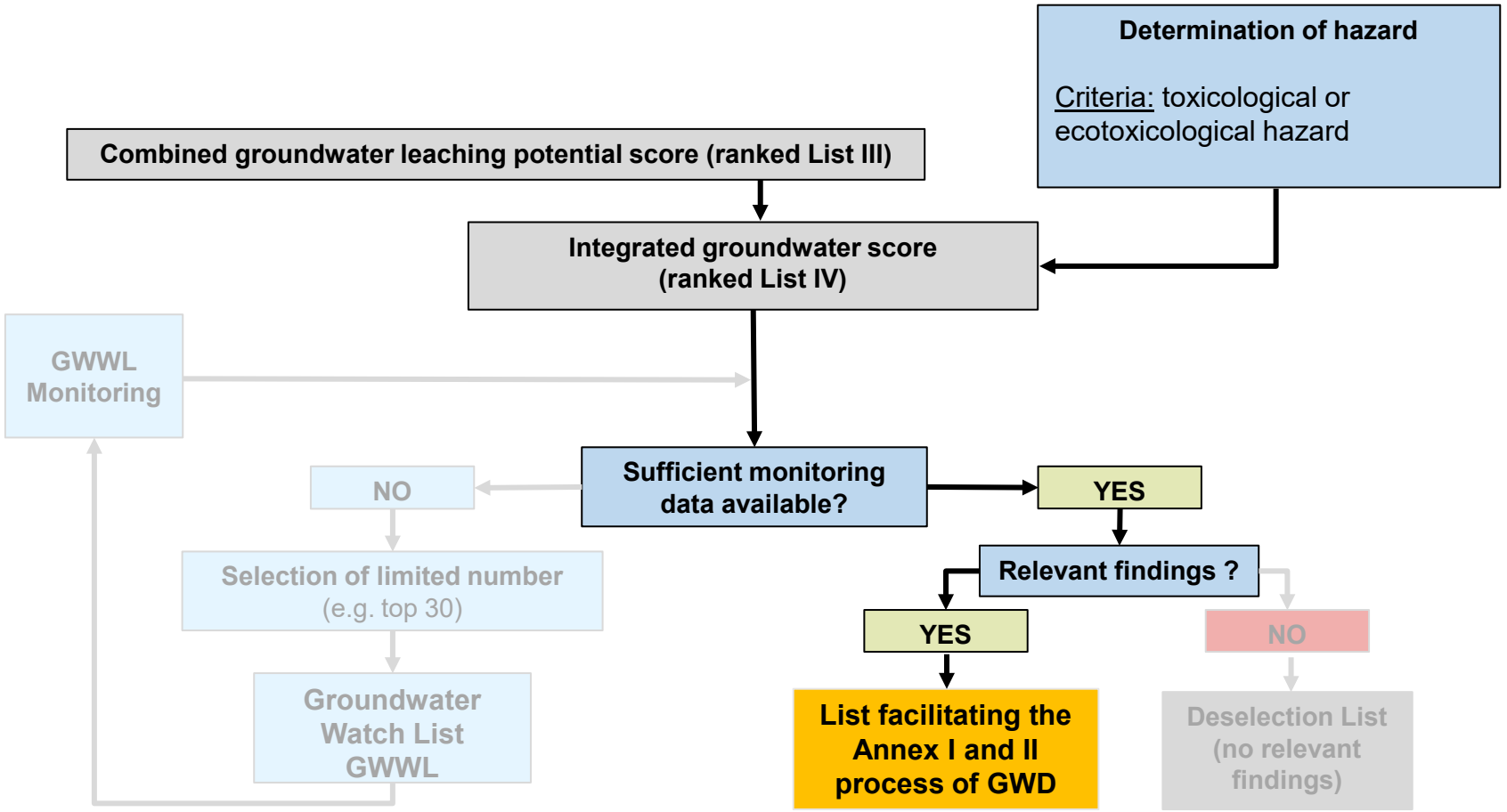
Substance	Proved groundwater leaching potential score
PFOA	0,85
PFOS	0,8
PFBPA	?

Theoretical groundwater leaching potential score
0,8
0,65
0,8

Combined groundwater leaching potential score (ranked List III)

(Proved groundwater leaching score + Theoretical groundwater leaching score) / 2

Substance	Combined groundwater leaching potential score
PFOA	0,825
PFOS	0,725
PFBPA	0,8



Criteria for integration in "List Facilitating Annex I/II process of GWD"

Quantified in 4 or more countries (MS/AC) and found at 10 or more sites in each of these countries

Based on data of two studies on Pharmaceuticals and Per- and Polyfluoroalkyl Substances (PFAS) a first **„List Facilitating review of Annex I/II of the GWD"** was elaborated

No of MS/PC	Substance Name	Acronym	CAS #	Total number of sites analysed	No of sites with findings
10	Perfluorooctane Sulfonate	PFOS	1763-23-1	6278	1430
10	Perfluorooctanoic Acid	PFOA	335-67-1	5736	1549
8	Perfluorohexanoic Acid	PFHxA	307-24-4	4662	1175
7	Perfluoroheptanoic Acid	PFHpA	375-85-9	4224	817
7	Perfluorohexane Sulfonate	PFHxS	432-50-8	2328	873
6	Perfluorobutane Sulfonate	PFBS	375-73-5	2209	577
5	Perfluorodecanoic Acid	PFDA	335-76-2	2945	173
5	Perfluorononanoic Acid	PFNA	375-95-1	3752	195
5	Perfluoropentanoic Acid	PFPeA	2706-90-3	2452	701
4	Perfluorobutanoic Acid	PFBA	375-22-4	1189	552

No of MS/PC	Substance Name	Acronym	CAS #	Total number of sites analysed	No of sites with findings
8	Carbamazepine		298-46-4	3732	471
6	Sulfamethoxazole		723-46-6	2176	114

List of substances (nrM) fulfilling the criteria of "List Facilitating Annex I/II review process of the GWD" - detected in **four or more PC** and **at 10 or more sites** in each of these countries

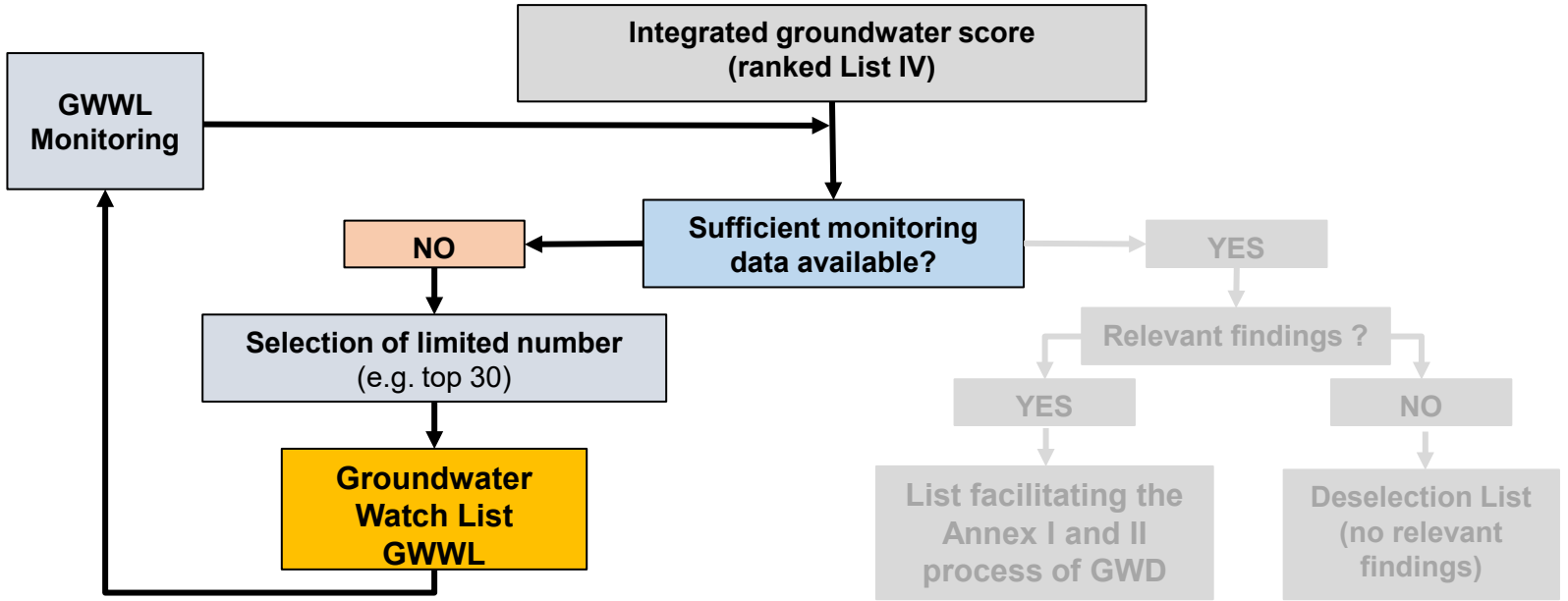
Substance (nrM/non-relevant metabolite)	CAS no.	Parent substance
Alachlor-t-sulfonic-acid (ESA) *	142363-53-9	Alachlor
Atrazine-2-hydroxy *	2163-68-0	Atrazine
Desphenyl-chloridazon (Metabolite B)	6339-19-1	Chloridazon
Methyl-desphenyl-chloridazon (Metabolite B1)	17254-80-7	Chloridazon
Chlorothalonil-SA (R417888 or VIS-01 / M12) (Chlorothalonilsulfone acid) **	1418095-02-9	Chlorothalonil
2,6-Dichlorbenzamid (2,6-D, BAM, M01, AE C653711)	2008-58-4	Dichlobenil; Fluopicolide
Dimethachlor CGA 369873	1418095-08-5	Dimethachlor
Dimethenamid-ESA	205939-58-8	Dimethenamid
Flufenacet-sulfonic acid (ESA)	201668-32-8	Flufenacet
Aminomethylphosphonic acid (AMPA)	1066-51-9	Glyphosate
Metazachlor-acid (OXA) (BH 479-4)	1231244-60-2	Metazachlor
Metazachlor ESA Metazachlor-SA (BH 479-8), Metazachlor-sulfonic acid (ESA)	172960-62-2	Metazachlor
Metolachlor ESA, Metolachlor-SA (CGA-354743)	171118-09-5	s-Metolachlor
s-Metolachlor-acid, (OXA, CGA 51202, CGA 351916)	152019-73-3	s-Metolachlor
NOA 413173	1418095-19-8	s-Metolachlor
N,N-Dimethylsulfamid (DMS)	3984-14-3	Tolylfluanid, Dichlofluanid

*** relevance classification status unknown (parent not approved anymore); ** non-relevant; relevance classification status currently under re-evaluation.**

Conclusions for nrM substances:

- The first List facilitating Annex I/II review process of GWD could be updated with 16 nrM substances.
- The GWWL group recommended European Commission (EC) to include nrM *(as a group similar to pesticides)* in Annex I of the GWD.
- Therefore there is no need to include nrMs in the Groundwater Watch List

Which substances should go to the Voluntary Groundwater Watch List?



There are still **42 PFAS** and about **280 Pharmaceuticals** left on the ranked List IV.

To keep the Watch List manageable only a limited number of (representative) substances (e.g. 30) should be selected for the Voluntary Groundwater Watch List

List of substances for the first Voluntary Groundwater Watch List

Substance Name	CAS #	Group of substance	Acronym	Sub-group
Perfluorododecanoic Acid (L)	307-55-1	PFAS	PFDoA	PFCAs
Perfluoroundecanoic Acid (L)	2058-94-8	PFAS	PFUnA	PFCAs
Clopidol	2971-90-6	Pharmaceutical		
Crotamiton	483-63-6	Pharmaceutical		
Amidotrizoic Acid	117-96-4	Pharmaceutical		
Sulfadiazin	68-35-9	Pharmaceutical		
Primidone	125-33-7	Pharmaceutical		
Sotalol	3930-20-9	Pharmaceutical		
Ibuprofen	15687-27-1	Pharmaceutical		
Erythromycin	114-07-8	Pharmaceutical		
Clarithromycin	81103-11-9	Pharmaceutical		

In 2019/2020 MS/AC were asked to report additional/new monitoring data for substances on the first Voluntary Groundwater Watch List

Data collection for Pharmaceuticals and PFAS of the First Voluntary Groundwater Watch List (intermediate results 2020)

Pharmaceuticals	Acronym	CAS #	Total number of sites	sites with detects	monitored (no. PC)	No of PC with detections	No of PC with detections at 10 or more sites
Amidotrizoic Acid		117-96-4	2833	251	7	**6**	3
Clarithromycin		81103-11-9	5003	182	15	**6**	1
Clopidol		2971-90-6	957	25	4	**2**	2
Crotamiton		483-63-6	361	27	5	**1**	1
Erythromycin		114-07-8	4985	199	17	**6**	3
Ibuprofen		15687-27-1	6630	399	17	**9**	3
Primidone		**125-33-7**	**2900**	**420**	**8**	**5**	**4**
Sotalol		3930-20-9	4243	89	11	**6**	3
Sulfadiazin		68-35-9	4242	330	13	**8**	2

PFAS	Acronym	CAS #	Total number of sites	sites with detects	monitored (no PC)	No of PC with detections	No of PC with detections at 10 or more sites
Perfluoroundecanoic Acid	PFUnA	2058-94-8	1551	446*	10	**7**	2
Perfluorododecanoic Acid	PFDoA	307-55-1	1452	521*	8	**7**	3

Up to now only Primidone meets the conditions of integration in the List Facilitating.

Next steps of "Voluntary Groundwater Watch List" activity

- **End 2021**
  - **Presentation of nrM report to Strategic Co-ordination Group (SCG)**
  - **Start of next data collection of groundwater monitoring data of "solvents and chelating agents" (sub-group of PMT-substances)**
- **Spring 2022**
  - **Summary and analysis of groundwater monitoring data reported for solvents and chelating agents.**
- **Autumn 2022**
  - **Update of Annex I and/or II of the Groundwater Directive**

(Inclusion of Pharmaceuticals, PFAS and nrM in Annex I or II of the GWD?)

Links:

Voluntary Groundwater Watch List Concept and Methodology. Technical Report. https://circabc.europa.eu/sd/a/d3fa0178-0134-4316-a11c-dcfd71efca69/Watch-List_Concept_Final.pdf.

Pilot exercise on pharmaceuticals is available in circabc: https://circabc.europa.eu/d/a/workspace/SpacesStore/a1e23792-6ecd-4b34-b86c-dcb6f1c7ad1c/1600204%20Pharm%20Pilot%20Study.docx

Pilot exercise on PFAS -Per-and Polyfluoroalkyl substances (2017). Specific report (2020)is available in circabc: https://circabc.europa.eu/ui/group/9ab5926d-bed4-4322-9aa7-9964bbe8312d/library/3f6900fe-107c-4551-bb13-393c9d9f600d/details

Pilot Exercise on non-relevant Metabolites (2021): http://circabc.europa.eu/ui/group/9ab5926d-bed4-4322-9aa7-9964bbe8312d/library/ea6fd51b-427a-485c-b572-163640d11cb6/details

First List facilitating Annex I and II review process of the GWD. V. 2.1 (June 2019). https://circabc.europa.eu/sd/a/b746afc1-3169-4135-95ec-312a4359676f/First%20List%20facilitating%20Annex%20I%20and%20II%20review%20process%20of%20the%20Groundwater%20Directive%20(Endorsed%20V2.1%20-June%202019).pdf

Thank you for your attention!
Questions?

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