VOLUNTARY GROUNDWATER WATCH LIST
CONCEPT & METHODOLOGY

based on final draft 12.3
agreed by WG GW and presented at SCG meeting in November 2018

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Policy background: Recital 4 of 2014 GWD

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.
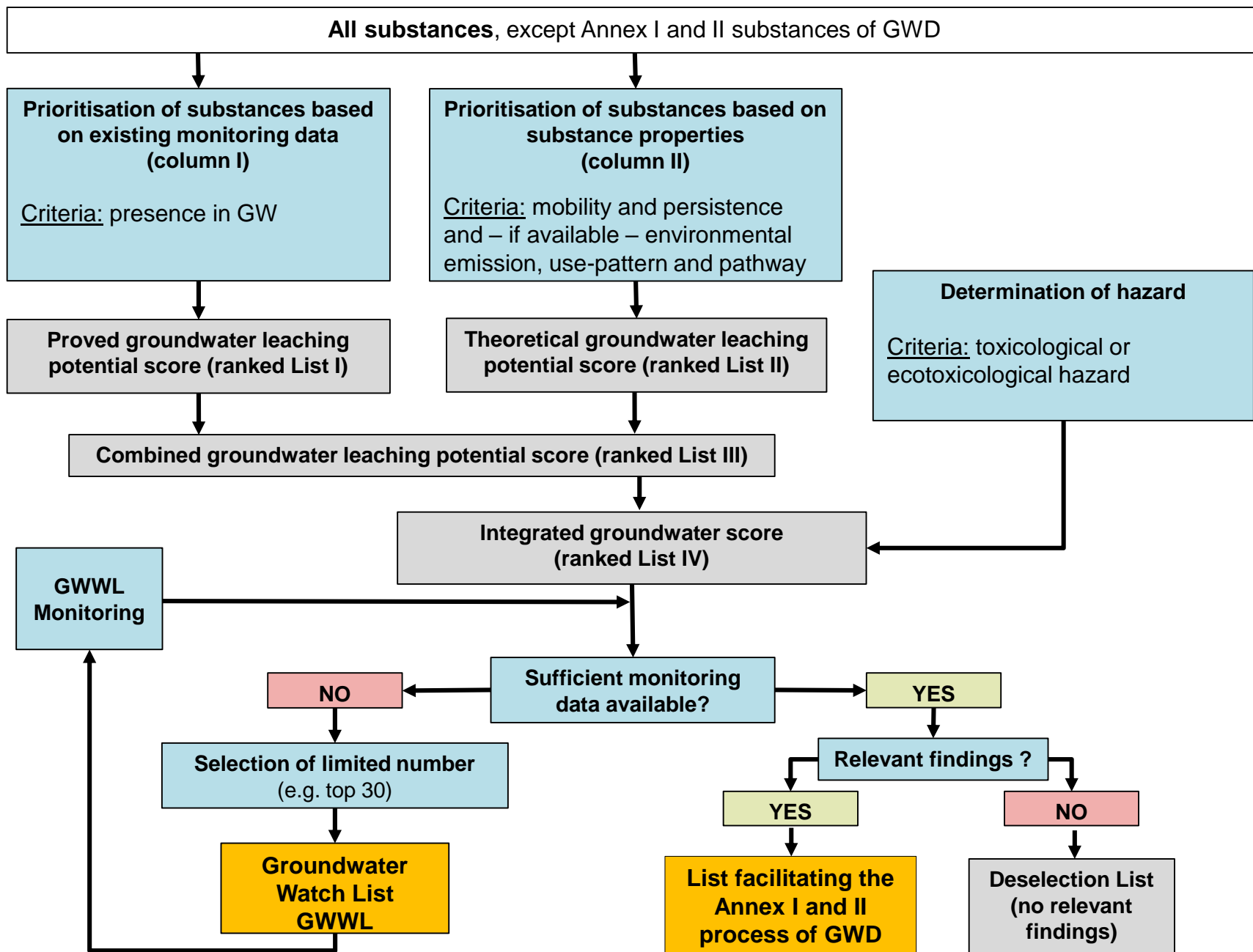
The Groundwater Watch List process is a voluntary activity!

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**

Activities to create the Watch List Concept and Methodology:

o Watch list process launched by WG GW (Brussels)   April 2015 ✓

o Meeting group of volunteers (Berne) → 1st draft   8./9.9.2015 ✓

o Presentation at SCG and Approval   9./10.11.2015 ✓

o 1st pilot study on Pharmaceuticals   2016 ✓

o Meeting group of volunteers (Vienna)   23./24.06.2016 ✓

o 2nd pilot study on PFAS   2017 ✓

o Meeting group of volunteers (Paris)   28.02.-01.03.2017 ✓

o Meeting group of volunteers (Paris)   August 2018 ✓

o Finalisation of GWWL methodology   October 2018 ✓

o Approval of GWWL Concept and Methodology (Vienna)   October 2018 ✓

o Presentation at SCG   November 2018 ✓

o **To do – next steps:**

o Launch of the watch list process   2019

o Support to EC review of Annexes I and II of GWD   2019

All substances, except Annex I and II substances of GWD

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

Criteria: presence in GW

Prioritisation of substances based on substance properties (column II)

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

Determination of hazard

Criteria: toxicological or ecotoxicological hazard

Proved groundwater leaching potential score (ranked List I)

Theoretical groundwater leaching potential score (ranked List II)

Combined groundwater leaching potential score (ranked List III)

Integrated groundwater score (ranked List IV)

GWWL Monitoring

Sufficient monitoring data available?

NO

YES

Selection of limited number (e.g. top 30)

Relevant findings ?

YES

NO

Groundwater Watch List GWWL

List facilitating the Annex I and II process of GWD

Deselection List (no relevant findings)

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

Prioritisation of substances based on substance properties (column II)

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

Proved groundwater leaching potential score (ranked List I)

Theoretical groundwater leaching potential score (ranked List II)

(Score N°PC) + (Score %° sites)] / 2

(Persistence score + Mobility score) / 2

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

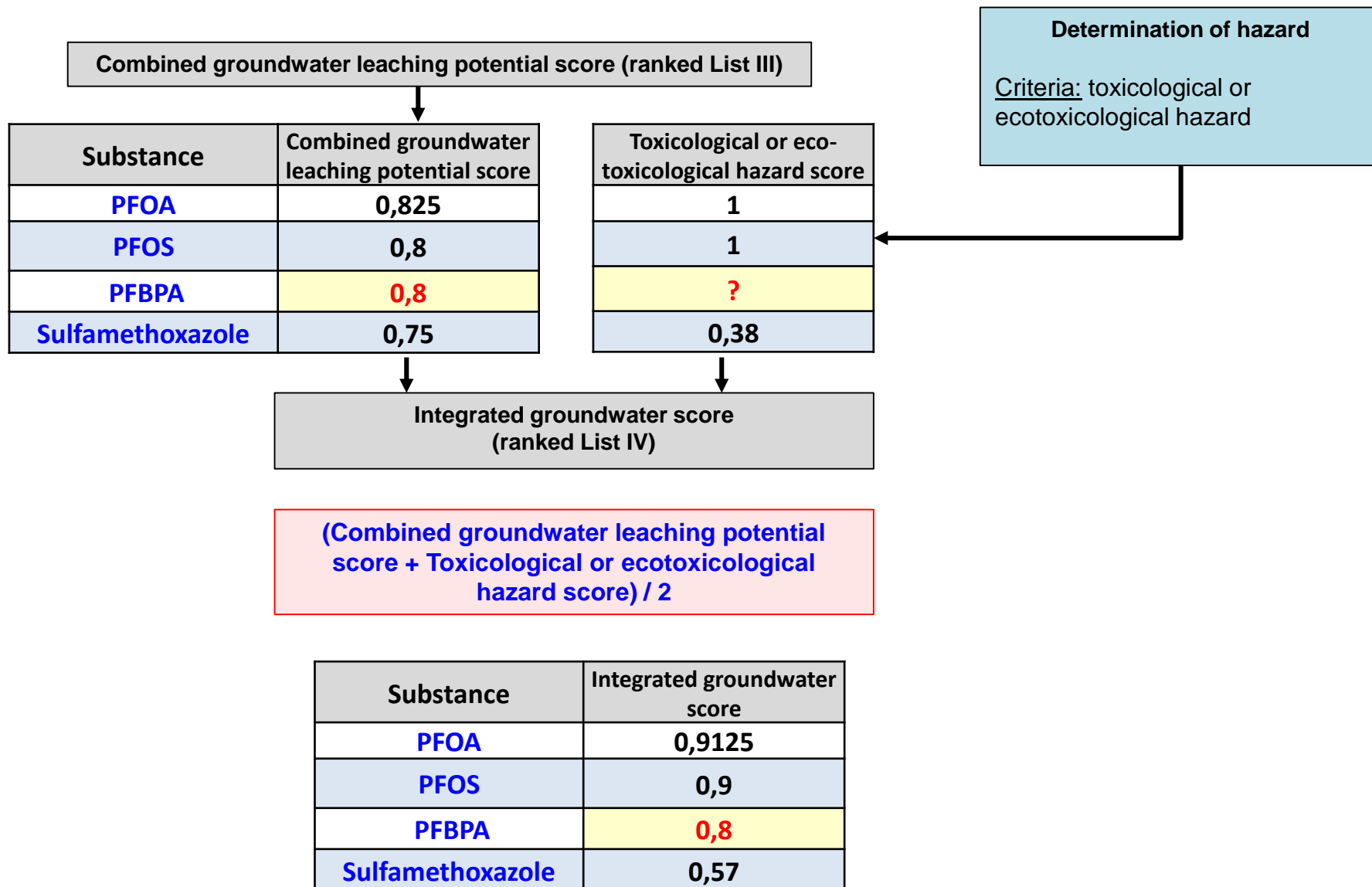| Theoretical groundwater leaching potential score |
|---|
| 0,8 |
| 0,65 |
| 0,8 |

Combined groundwater leaching potential score (ranked List III)

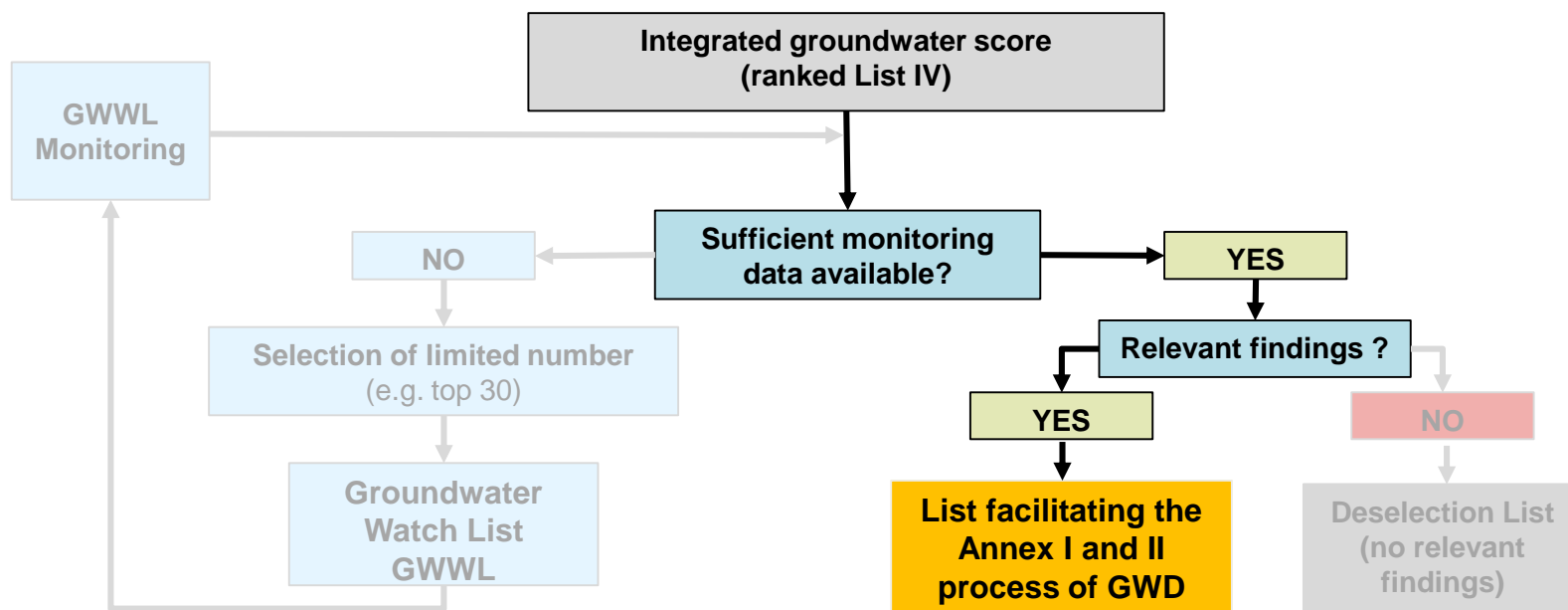**(Proved groundwater leaching score + Theoretical groundwater leaching score) / 2**

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

Relation between monitoring data (Column I) and leaching potential (Column II)

Combined groundwater leaching potential score (ranked List III)

Determination of hazard

<u>Criteria:</u> toxicological or ecotoxicological hazard

Substance	Combined groundwater leaching potential score	Toxicological or eco-toxicological hazard score
PFOA	0,825	1
PFOS	0,8	1
PFBPA	0,8	?
Sulfamethoxazole	0,75	0,38

Integrated groundwater score (ranked List IV)

(Combined groundwater leaching potential score + Toxicological or ecotoxicological hazard score) / 2

Substance	Integrated groundwater score
PFOA	0,9125
PFOS	0,9
PFBPA	0,8
Sulfamethoxazole	0,57

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

Quantified in 4 or more MS <u>and</u> found at more than 10 sites in each of these countries

Substances that can go to the „**List Facilitating Annex I/II process of GWD"** based on data of the Pharmaceutical and PFAS studies.

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

Which substances should go to the Voluntary Groundwater Watch List?
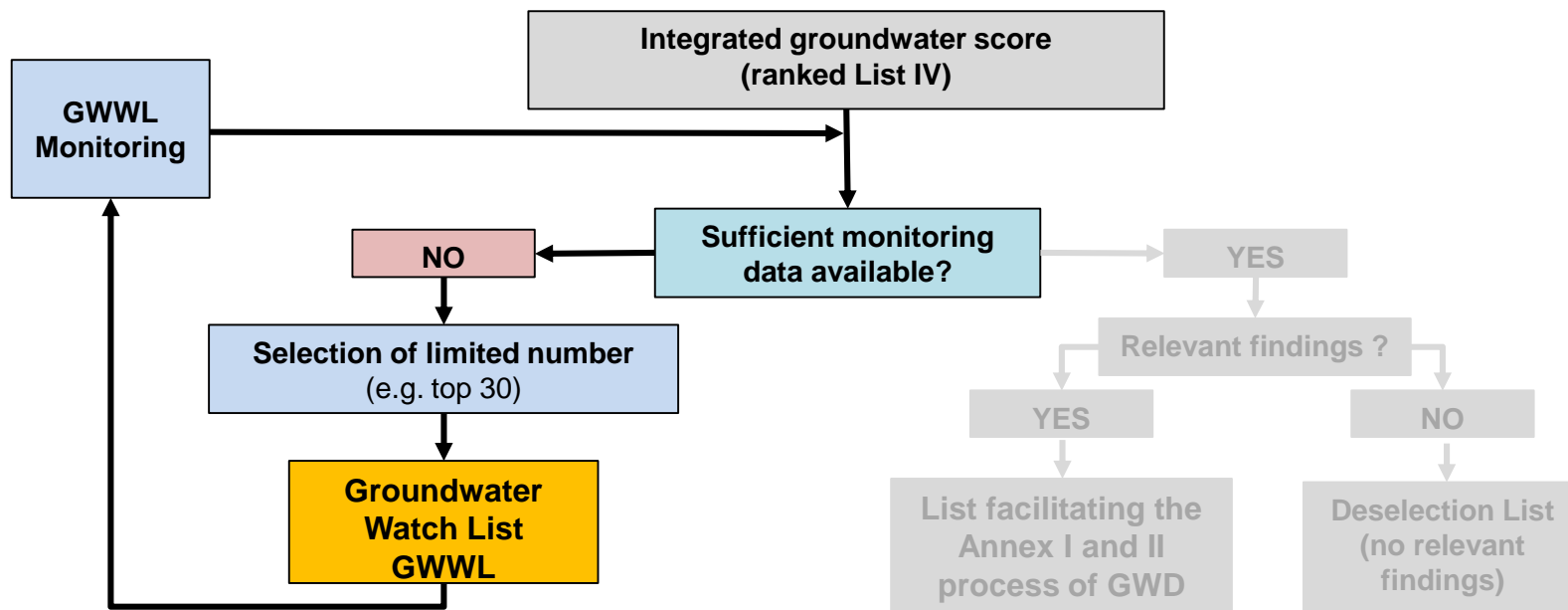
There are still **42 PFAS** and about **280 Pharmaceuticals** left on the ranked List IV.

Criteria for selecting substances for the GW Watch List

a) Order of ranking (GWWL score)

b) …………

!! under discussion!!

No.	Substance Name	GWWL Score	Column I Score	Column II Score	Leaching Score	Hazard Score
LF	Perfluorobutane Sulfonate	1	1	1	1	
LF	Perfluorooctanoic Acid	0,95	1	0,8	0,9	1
LF	Perfluorooctane Sulfonate	0,9125	1	0,65	0,825	1
LF	Perfluorohexanoic Acid	0,9	1	0,8	0,9	
LF	Perfluoropentanoic Acid	0,9	1	0,8	0,9	
LF	Perfluorohexane Sulfonate	0,9	1	0,8	0,9	
LF	Perfluorodecanoic Acid	0,825	1	0,65	0,825	
1	Perfluoroheptanoic Acid	0,825	1	0,65	0,825	
LF	Perfluorononanoic Acid	0,825	1	0,65	0,825	
2	Perfluorobutyl Phosphonic Acid	0,8		0,8	0,8	
3	Perfluorohexyl Phosphonic Acid	0,8		0,8	0,8	
4	Perfluorododecanoic Acid	0,75	1	0,5	0,75	
5	4:2 Fluortelomerphosphatemonoester	0,75		0,75	0,75	
6	Perfluoroundecanoic Acid	0,725	0,95	0,5	0,725	
7	Ranitidine	0,70	0,40	1,00	0,70	
LF	Sulfamethoxazole	0,66	0,90	1,00	0,95	0,38
8	Perfluorodecyl Phosphonic Acid	0,65		0,65	0,65	
9	Perfluorooctyl Phosphonic Acid	0,65		0,65	0,65	
10	Perfluoroheptane Sulfonate	0,6	0,7	0,5	0,6	
11	Sulfadiazine	0,60	0,65	1,00	0,83	0,38
LF	Carbamazepine	0,60	0,90	0,65	0,78	0,42
12	Atenolol	0,58	0,55	1,00	0,78	0,38
13	Ofloxacine	0,56	0,25	1,00	0,63	0,50

Timeline of the Groundwater Watch List GWWL process

Year	Activities and input of MS/AC to GWWL Group	Activities of GWWL Group	Output from GWWL Group to WG GW, EC, SCG, WD and MS/AC
	• Monitoring • Identification of groups of substances for further GWWL activities	Steering of Watch List Cycle • Selection of substances for data collection • Data collection • Data assessment • Substance selection for GWWL • Substance selection for List facilitating Annex I and II review process	• Groundwater Watch List • List facilitating Annex I and II review process
Year 1	Setup monitoring		
Year 2	Monitoring ——data——→	Assessment of monitoring data **results**→	Summary of data/results
Year 3	Monitoring ——data——→	Assessment of monitoring data **results**→	Summary of data/results
Year 4	Monitoring ——data——→	Assessment of monitoring data **results**→	Summary of data/results
Year 5	Monitoring ——data——→	Assessment of monitoring data **results**→	Summary of data/results
Year 6	Monitoring ——data——→	Set up of GWWL and List facilitating Annex I/II review process ——→	GWWL and List facilitating Annex I/II review process
		Following GWWL Cycle	

Next steps:

- Identification of substances for the "List Facilitating Annex I/II process of GWD" (based on results of pharmaceuticals and PFAS pilot studies)

- Set up of first GWWL (based on results of pharmaceuticals and PFAS pilot studies)

- Selection of substances / group of substance for the next data collection and assessment

- Presentation of Groundwater Watch List progress at WG GW and other meetings

First ideas for next data collection (substances or group of substances):

- Plasticizers
- Surfactants (different subgroups used for pesticides, health care products, ...)
- Non-relevant metabolites (large dataset available from Germany, Belgium, Switzerland).
- Microplastics
- Artificial Sweeteners
- 1,4-dioxine
- Biocides (includes pharmaceuticals, pesticides, surfactants)
- EDTA
- PAH (Polycyclic Aromatic Hydrocarbons)
- Veterinary medicines
- Solvents (e.g. 1,4-dioxine)
- Perchlorate (ClO^-_4.)

- **Existing lists**
  - SIN *(Substitute* It Now) list: (http://chemsec.org/sin-list/). The list comprises around 1000 compounds with substances which have to be banned, based on REACH
  - Indicators for WOI bombs (TNT, dinitrofenol)
  - Surface Water Watch List
  - Shortlist Drinking Water Group
  - PMT list (Persistent Mobile Toxic)

Thank you for your attention !