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Eidgenössisches Departement für
Umwelt, Verkehr, Energie und Kommunikation UVEK

Bundesamt für Umwelt BAFU

**Abteilung Hydrologie
Sektion Hydrogeologische Grundlagen**

PFAS-Austausch

Grundwasser

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BAFU - Abt. Hydrologie

Skype, 07.12.2020



WFD CIS: Voluntary Groundwater Watch List Activity

PFAS as emerging concern in groundwater

- Background: Directive 2014/80/EU amended annex II of the **Groundwater Directive GWD**.

Recital 4: need of a groundwater watch list to increase monitoring data on substances posing risk, including emerging pollutants.

- Process launched in 2015 within the Water Framework Directive, Common Implementation Strategy CIS. **Pilot exercise on PFAS in 2017**. CIS Working Group Groundwater / Groundwater Watch List group





WFD CIS: Voluntary Groundwater Watch List Activity

PFAS im Grund- und Trinkwasser

Pilot exercise CIS WFD in Groundwater, results

- A total of 11 Member States or participating countries provided monitoring data on voluntary basis on PFAS.
 - 6500 sites analysed
 - PFOA and PFOS most frequently detected
 - 20 - 50% PFAS > LOQ
 - 14% PFAS > 0.1 µg/l
- List facilitating Annex I and II (substances to be considered for the future review of the Groundwater Directive Annexes):
 - **10 Per- and Polyfluoroalkyl Substances (PFAS).**
- First voluntary Groundwater Watch List (substances to be monitored)
 - **2 PFAS.**



WFD CIS: Voluntary Groundwater Watch List Activity

WFD CIS Voluntary Groundwater Watch List Process

Study on Per- and Polyfluoroalkyl Substances (PFAS)

Monitoring Data Collection and Initial Analysis –
Report available under:

<https://circabc.europa.eu/ui/group/9ab5926d-bed4-4322-9aa7-9964bbe8312d/library/a547839e-c8ef-4a0d-b4f5-0cb877cdd17e/details>

WFD CIS Voluntary Groundwater Watch List Process

Study on Per- and Polyfluoroalkyl substances (PFAS)

– Monitoring Data Collection and Initial Analysis –
(Draft V.2.5 / 31st March 2020)

Short summary

The Voluntary “Groundwater Watch List” (GWWL) Group requested MS and AC to provide available monitoring data on 52 selected PFAS compounds in GW across Europe. Nineteen MS/AC provided GW data on 27 out of 52 PFAS compounds on the questionnaire. PFAS were widely detected in European GW above limits of quantification. The percentage of detections in groundwater were highest for PFBA (46.4 %) and PFHxS (37.5 %) followed by PFPeA (28.6 %), PFBS (26.1 %), PFHxA (25.2 %), PFOA (24.2 %) and PFOS (20.6 %). The concentrations of PFBA and PFPeA exceeded 0.1 µg/L at more than 14 % and 12 % of the sites, respectively.



WFD CIS: Voluntary Groundwater Watch List Activity

List facilitating Annex I/II review process of the GWD

No of MS/AC with findings	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



WFD CIS: Voluntary Groundwater Watch List Activity

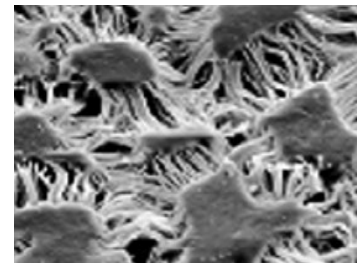
First Voluntary Groundwater Watch List

Substance Name	CAS #	Group of substance	Acronym	Sub-group
Perfluorododecanoic Acid (L)	307-55-1	PFAS	PFD _o A	PFCAs
Perfluoroundecanoic Acid (L)	2058-94-8	PFAS	PFUnA	PFCAs
<u>Further candidates</u>				
<i>4:2 Fluortelomerphosphatemonoester (S)</i>	150065-76-2	PFAS	4:2 monoPAP	monoPAP
<i>Perfluorodecyl Phosphonic Acid (L)</i>	52299-26-0	PFAS	PFDPA	PFPAs
<i>Perfluorooctyl Phosphonic Acid (L)</i>	40143-78-0	PFAS	PFOPA	PFPAs
<i>6:2 Fluortelomerphosphatemonoester (S)</i>	57678-01-0	PFAS	6:2 monoPap	monoPAP



NAQUA-Pilotstudien seit 2015

- 1,4-Dioxan (WVZ) 2015
- Glyphosat (WVZ, Kantone, Agroscope) 2016 / 2017
- Test Passivsammler (BRGM) 2017 / 2018
- Screening Mikroverunreinigungen (eawag) 2017 - 2020
- Perchlorat (BLV) 2018
- Spurenelemente (BLV) 2018
- Hauptinhaltsstoffe (Labor Veritas, Kantone) 2018 – 2019
- **Poly-/Perfluorierte Alkylverbindungen PFAS** **2021**
- Pyrrolizidinalkaloide (TREND) 2021
- TFA Trifluoracetat (TREND) 2021
- PSM-Rückstände im Karst (eawag, Kantone) 2020 - 2023

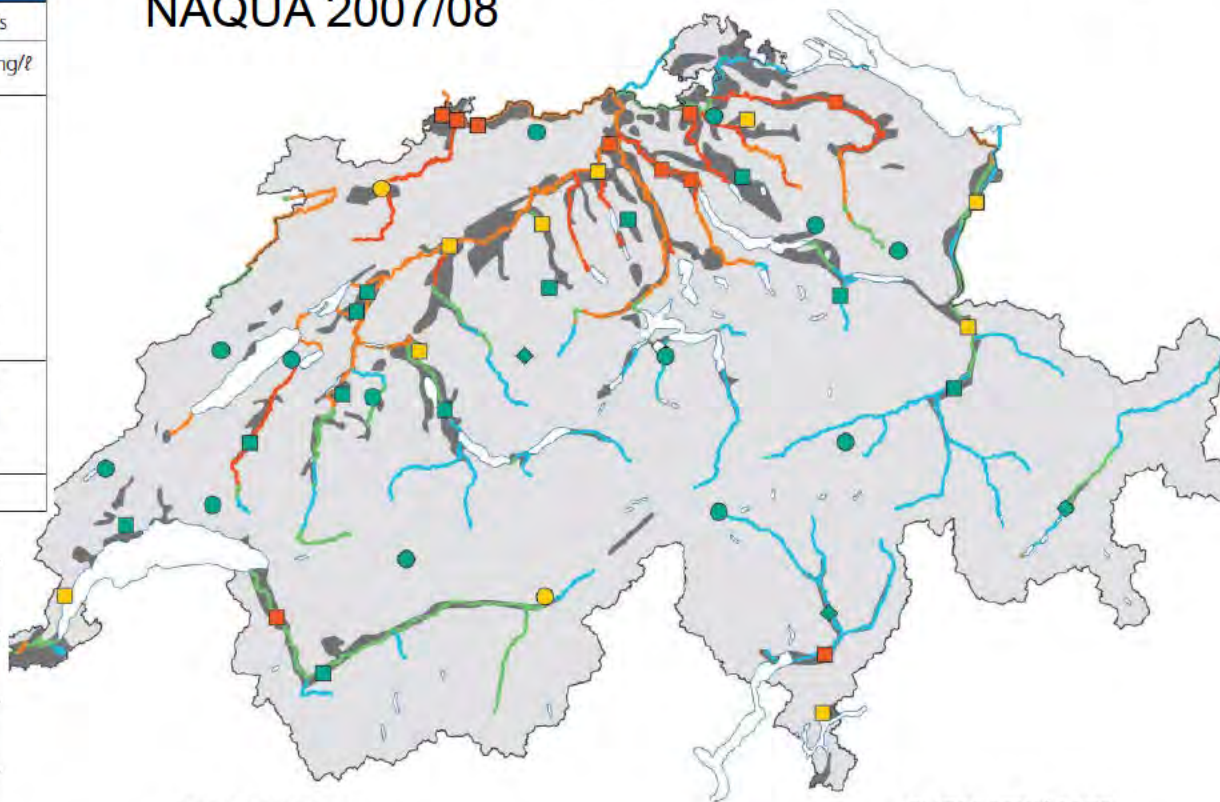
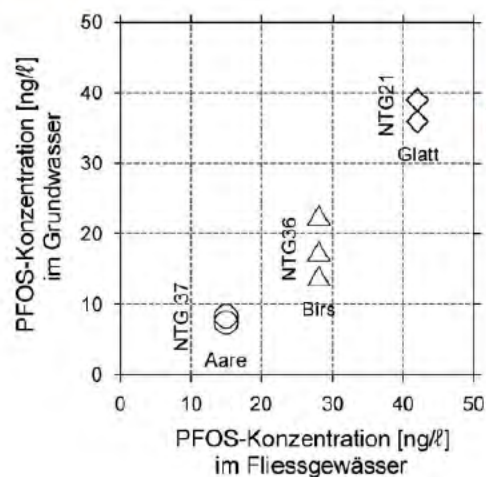




NAQUA-Pilotstudie PFAS 2007/08

Pilotstudie Nationale Grundwasserbeobachtung NAQUA 2007/08

Sub- stanz	Anzahl Messstellen			
	beprob	ohne PFC- Nachweis	mit PFC-Nachweis	
			$\leq 10 \text{ ng/l}$	$> 10 \text{ ng/l}$
PFPeA	49	41	8	–
PFHxA	49	38	10	1
PFHpA	49	43	6	–
PFOA	49	35	11	3
PFNA	49	49	–	–
PFDeA	49	49	–	–
PFUnA	49	49	–	–
PFBS	49	34	12	3
PFHxS	49	32	13	4
PFOS	49	32	11	6
PFOSA	49	49	–	–



GRUNDWASSER

Grundwasserleiter

- Lockergestein
- Festgestein

Messstellentyp

- Förderbrunnen
- Piezometer
- Quelle

PFAS-Konzentration

- nicht nachgewiesen
- $\leq 10 \text{ ng/l}$
- $> 10 \text{ ng/l}$
- nicht beprobt

FLIESSGEWÄSSER

Abwasseranteil

- $< 2\%$
- 2 - 5%
- 5 - 10%
- 10 - 20%
- $> 20\%$



NAQUA-Pilotstudie PFAS 2021

Pilotstudie 2021 im Rahmen der Nationalen Grundwasserbeobachtung NAQUA

- Beprobung Frühjahr und Herbst 2021
- 545 Grundwasser-Messstellen landesweit
- Etwa 20 Fließgewässer-Messstellen
- 22 Parameter, BG ca. 1 ng/l
- Zusammenarbeit mit Prüfstelle (Labor) des Bundesamtes für Umwelt Wien