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Federal Department of the Environment, Transport,
Energy and Communications DETEC
Federal Office for the Environment FOEN
Soil and Biotechnology Division

The Swiss situation: PFAS background levels and hotspots in soils and groundwater

25 March 2025

Early cases - 1

Construction of regional prison (St. Gallen)

- The site was used by the civil defence and fire brigade as a training ground in the past.
- Between February 2020 and February 2021, the Cantonal Construction Department examined the building site, as it was known that the soil was contaminated.
- The investigation showed a much greater level of contamination with PFAS than expected: up to 130 µg/ kg PFOS and 5 µg/kg PFOA.
- A remediation concept was drawn up.
- A total of around 36,000 cubic metres of soil was excavated.
- The contaminated excavated material was transported in closed containers to Linz (A). The material was processed in a soil washing plant, the process water treated. The filter cake was disposed of thermally in a hazardous waste incinerator in Vienna (A).
- Additional costs of 17 Mio CHF.

Kanton St. Gallen

Early cases - 2

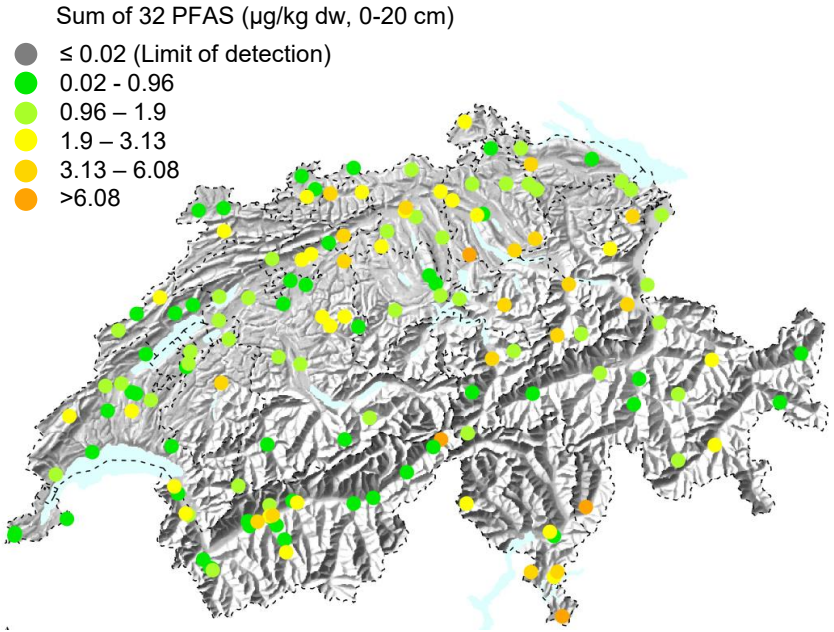
Lonza (Visp, Wallis)

- The site was used by fire brigades as a training ground in 1988-1997 (AFF foaming agents).
- The ground was remediated between summer 2020 and 2022 by excavating the sources of the contamination.
- 41’200 m^3 (80’000 t) of contaminated material was treated.
- The groundwater downstream of the site is also contaminated. The groundwater is being cleaned up by pumping it out and treating it in a modern plant built specifically for this purpose (for 5 years).
- The investigation showed contamination by PFOS (mostly): highest values of 120 mg/kg and 210 mg/kg PFOS in hotspots.
- The contaminated excavated material is transported in closed containers to Austria.
- Costs of 25 Mio CHF.

Ewigkeitschemikalien PFAS – Steigende Belastung, wachsende Gefahr? - Puls - Play SRF

PFAS in Swiss Soils - Background levels

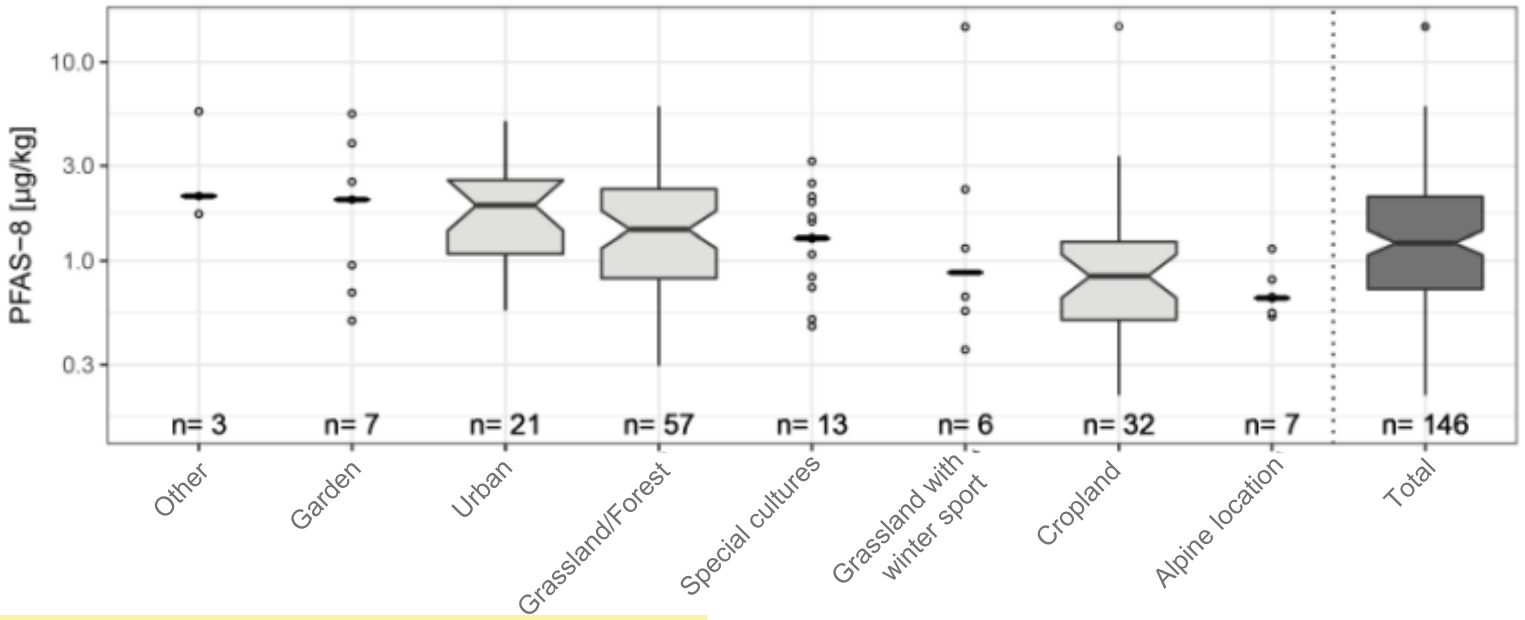
In 2022: Status of the background levels for PFAS in Switzerland (Publication*)



- 32 PFAS were analysed in 146 topsoil samples (0-20 cm) and in 49 subsoil samples (50-70 cm)
- PFAS detected in all topsoils
  Median: 1.4 µg/kg (min 0.2 µg/kg, max 15.1 µg/kg)
- Almost no PFAS in the subsoil
  Only in 9 samples and in low concentrations

Thalmann et al. (2022). Per- und polyfluorierte Alkylsubstanzen (PFAS) in Schweizer Böden. Altlasten spektrum 6

PFAS in Swiss Soils - Background levels

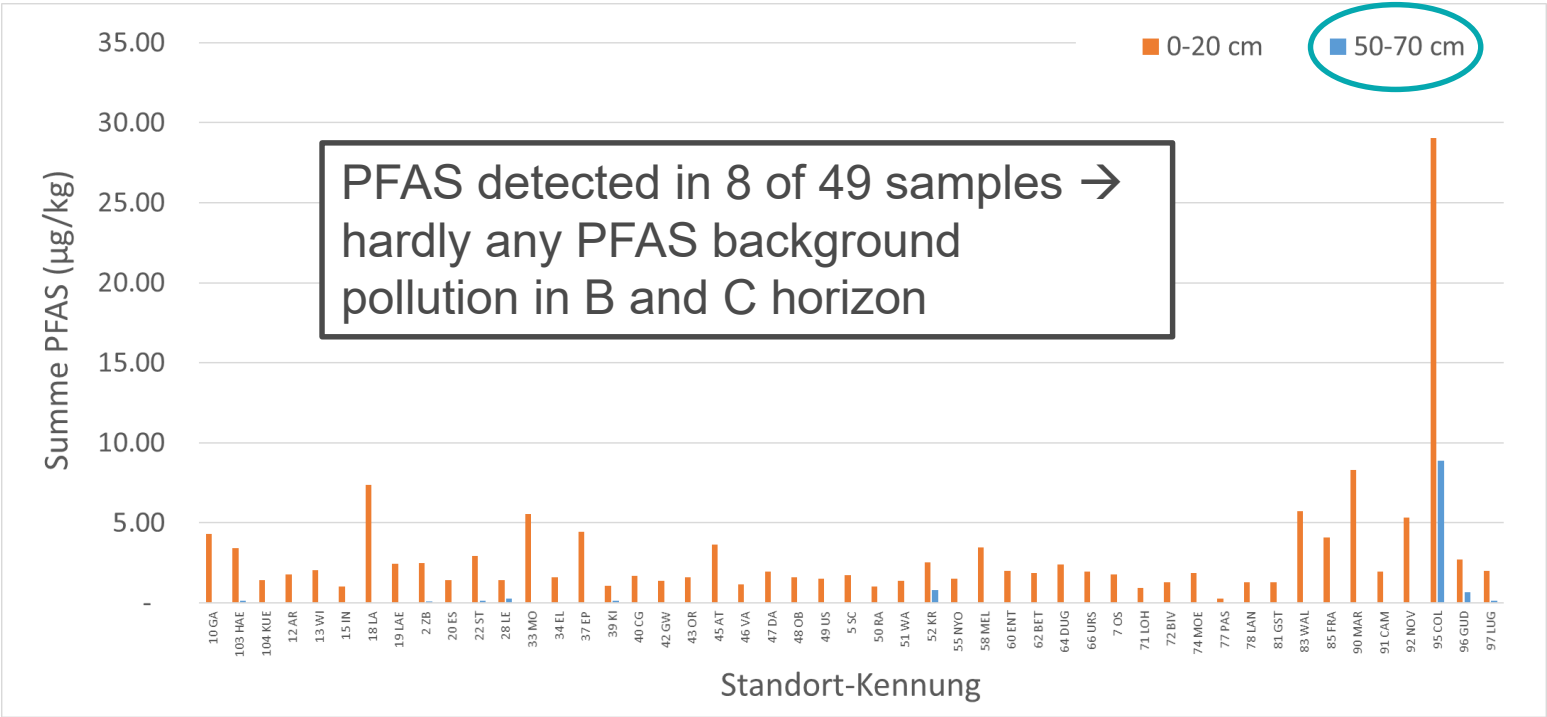


- Indications of differences between urban locations and cropland, as well as alpine locations
- Individual sites with elevated PFAS concentrations: no clear source could be identified

PFAS in all 146 samples (0-20cm)
Median: 1.4µg/kg
95 % of samples below 5 µg/kg

PFAS in Swiss bedrock

No background pollution in subsoil / bedrock (50-70 cm)



PFAS in Swiss Soils - Hotspots

Example of Hotspot: St. Gallen

[PFAS im Kanton St.Gallen | sg.ch]

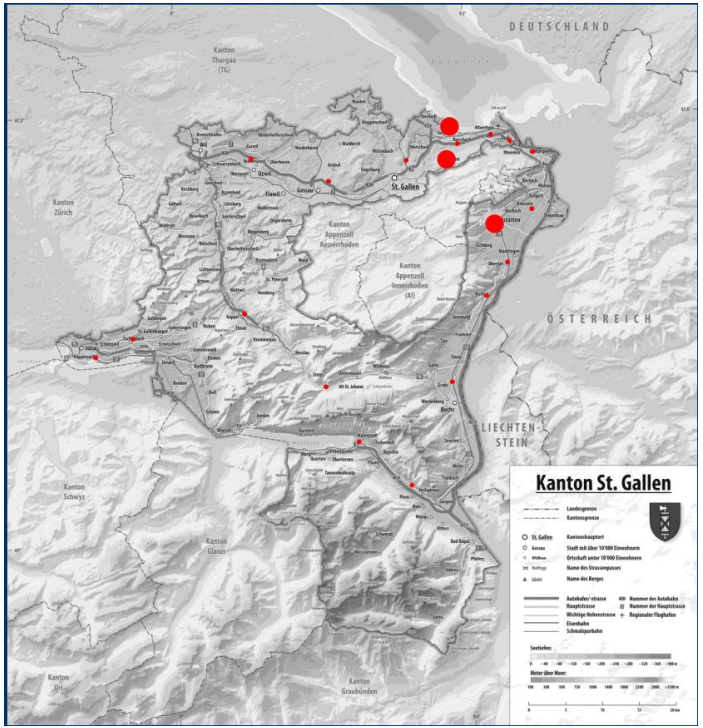
PFAS in Swiss Soils - Hotspots

Example of Hotspot: St. Gallen

In 2021 increased concentrations of PFOS in drinking water were detected. Also in surface waters.

Cantonal investigations:

- Diffuse and widespread PFOS contamination in agricultural soil (max. 100 µg/kg PFOS)
- Source of pollution: (most probably) application of sewage sludge in the past



PFAS im Kanton St.Gallen | sg.ch

PFAS in Swiss Soils - Hotspots

Example of Hotspot: St. Gallen

Cantonal investigations:

- Elevated levels of PFAS residues were found in the milk and meat of cows, cattle and calves, some of which exceeded the newly applicable maximum levels

Jahresbericht 2023.pdf

Ban on the use of sludge as a fertiliser

Bern, 26.03.2003 - The use of sludge as a fertiliser is to be banned throughout Switzerland; in the future sludge will have to be incinerated using an environmentally friendly method. The Swiss Federal Council will modify the Ordinance on Materials accordingly on 1 May 2003. The ban will be introduced in stages: from May this year, sludge may no longer be used in the production of fodder crops and vegetables. A period of transition lasting until 2006 at the latest has been accorded for other types of cultivation which until now have been fertilised using sludge; in individual cases the cantonal authorities may extend this period until 2008. This decision is part of the Federal Council's implementation of precautionary provisions for the protection of soils and public health.

Ban on the use of sludge as a fertiliser

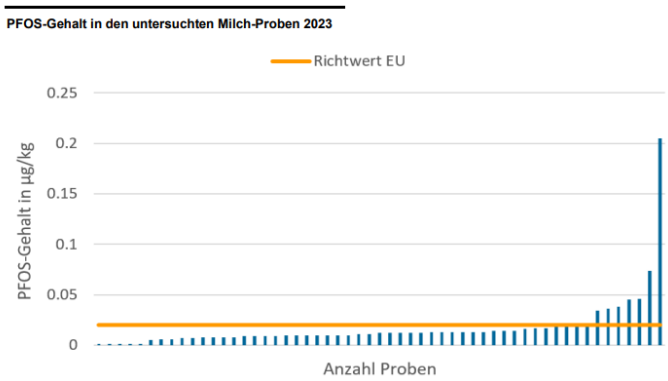
PFAS in Swiss Soils - Hotspots

Example of Hotspot: St. Gallen

Cantonal investigations:

- Many farmers in the regions with high levels of PFOS in milk were able to confirm the earlier application of sewage sludge.
- The Canton assumes that PFOS enters milk primarily through pasture land contaminated with sewage sludge, and then into the food chain via the consumption of grass, hay and drinking water (drinking trough).
- Beef, eggs and milk are affected

Quelle: Schweizer Bauer



Jahresbericht 2023.pdf
PFAS im Kanton St.Gallen | sg.ch

PFAS in Swiss Soils - Hotspots

Example of Hotspot: St. Gallen

One Health

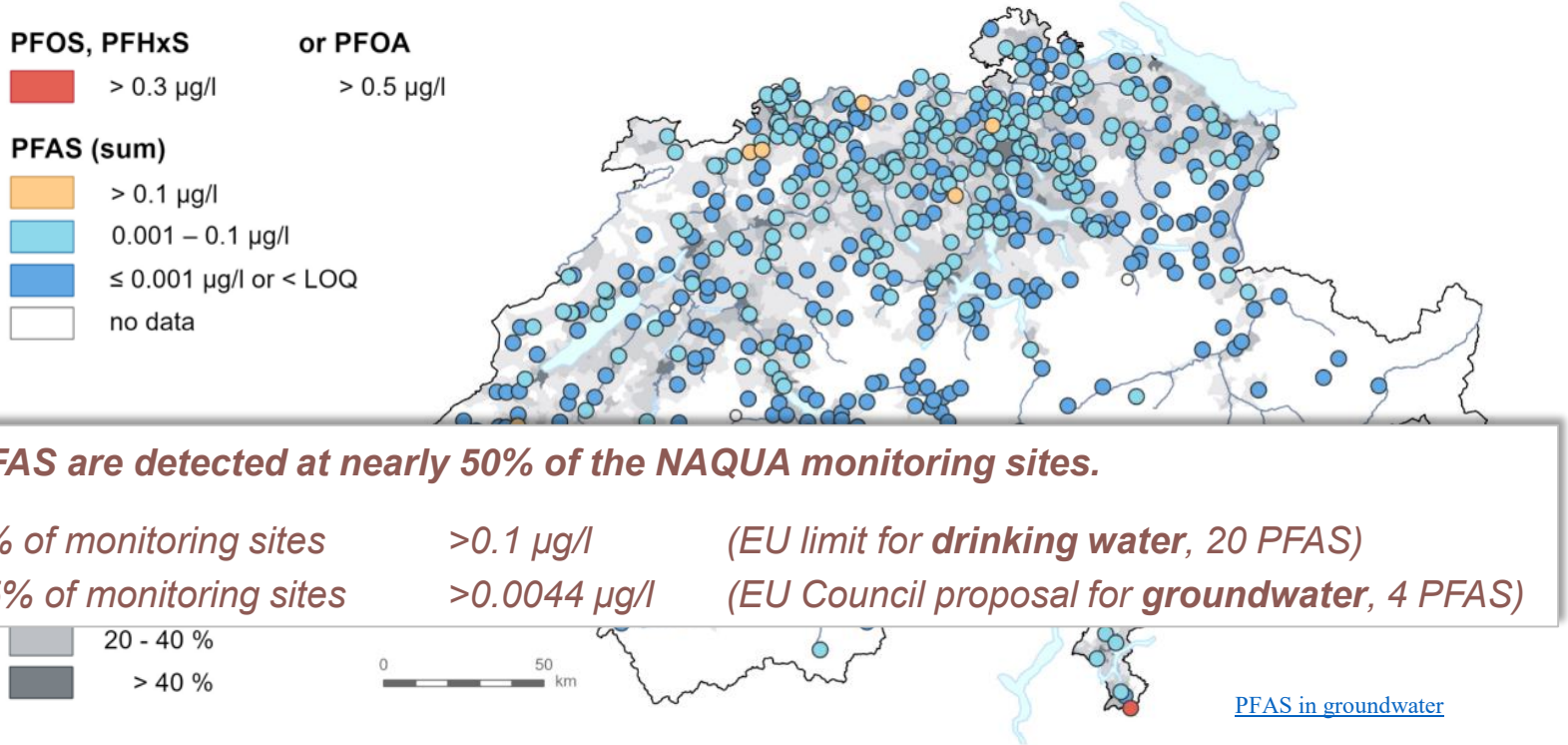
Cantonal measures:

- development of a sampling concept
- the maximum levels for meat have to be complied, otherwise the meat concerned may no longer be placed on the market
- financial support for the affected farms. From 1 March 2025, the Canton can support farms with a total of 5 Mio CHF. The cantonal parliament has approved a special fund for this purpose.
- prohibition of relocation of polluted soils (e.g. constructions projects)

Quelle: Schweizer Bauer

PFAS im Kanton St.Gallen | sg.ch

PFAS in Swiss groundwater (NAQUA)



PFAS are detected at nearly 50% of the NAQUA monitoring sites.

2% of monitoring sites	*>0.1 µg/l*	*(EU limit for **drinking water**, 20 PFAS)*
25% of monitoring sites	*>0.0044 µg/l*	*(EU Council proposal for **groundwater**, 4 PFAS)*

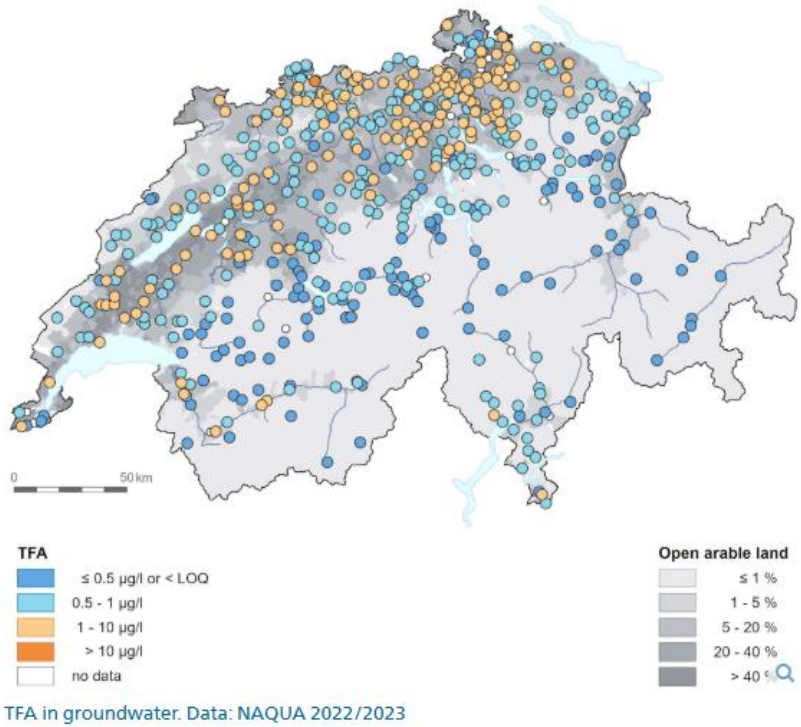
PFAS in groundwater

NAQUA Conclusions

- PFAS are **frequently** detected in Swiss groundwater.
  However - in contrast to soil - groundwater is not contaminated everywhere.
- Present drinking water limits are rarely exceeded.
- The use of **fire fighting foams** seems to be the major source of high-level PFAS contamination of groundwater. PFAS also enter groundwater from landfills, and via (industrial) wastewater and sewage sludge … and construction material.
- Identifying the relevant sources is a major challenge. Data on PFAS emissions and emitters are often missing.

PFAS in groundwater

Trifluoroacetic acid - TFA



TFA in groundwater. Data: NAQUA 2022/2023

TFA in groundwater

- TFA is present everywhere in groundwater.
- However, concentrations differ clearly depending on the location:
- TFA pollution is significantly higher under arable land. TFA enters groundwater on a large scale due to the use of plant protection products. At lower concentrations, TFA is also transferred to groundwater by precipitation.
- TFA found in precipitation originates primarily from gas refrigerants and propellant gases.
- In particular cases, the discharge of treated industrial wastewater into watercourses can lead to considerable contamination of groundwater with TFA.

Research identifies 134 ‘forever chemicals’ hotspots across Switzerland

Research identifies 134 ‘forever chemicals’ hotspots across Switzerland - SWI swissinfo.ch