CONTAMINANTS OF EMERGING CONCERN

Revision of operational Trigger Values in Austria

Acknowledgements:
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Dietmar MÜLLER-GRABHERR; 7. October 2025

OUTLINE

- **Policy frame & legislation in Austria**
- **Overviewing Threshold Values**
  - ***'Trigger Values' - an important building block for risk-informed & stepwise approaches***

- ***Understanding the systemic context*** *(or 'painting by numbers'?)*
- ***Understanding natural systems*** *(how to deal with irreversibility?)*

LEGISLATIVE FRAMES
undergoing changes

- ✓ **ALSAG (2024)**

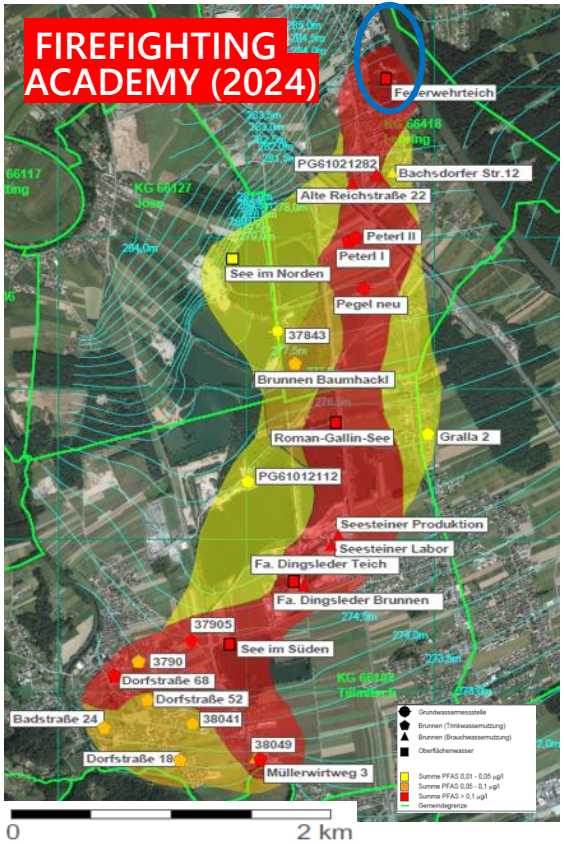
- ➢ **DRINKING WATER (2024)**

PFAS-20: 0,1 µg/l

- *[EFSA: PFAS-4: 0,002 µg/l]*
- *[proposal EU Water EQS)*
  - *PFAS-24: 0,0044 µg/l]*
  - *Relative Potency Factors*

LEAD: 5 µg/l (until 2036)

POLLUTION AS A REALITY

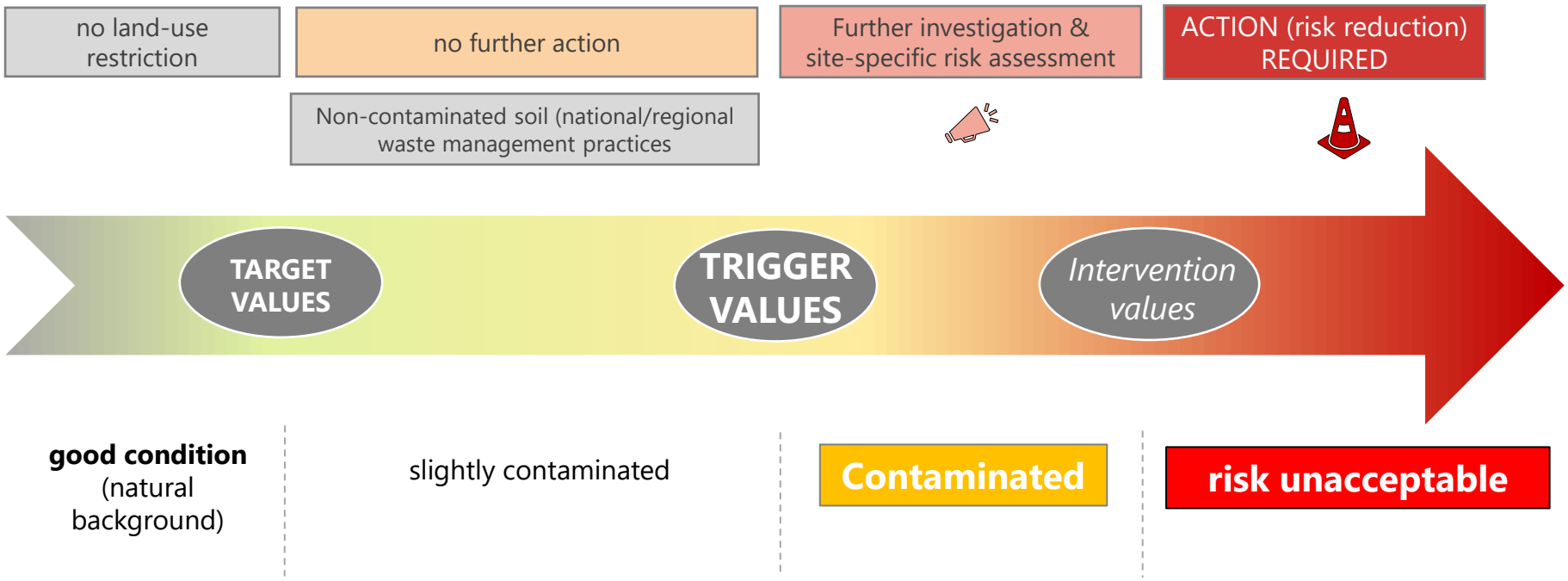


LEGISLATIVE FRAMEWORK IN AUSTRIA

- **Water Act (WRG 1959)**
  - **strict "zero-contamination"-policy** (2002 adopting EU WFD)
- **Waste Management Act (AWG 1990/2002)**
  - addressing contaminated soil
- **Soil legislation** (no legislation at federal level)

  ➔ ***soil protection responsibility of 9 provinces***
- **Contaminated Sites Remediation Act (ALSAG 1989)**
  - waste taxation system to finance **historically contaminated sites**
  - **'serious hazard' (1992) –** but not providing any threshold values

(generic) Threhold Values



THRESHOLD VALUES – AUSTRIA: How we started …

TECHNICAL GUIDANCE: Austrian Standards

- **ÖNORM S 2088-1 (1998): Groundwater**
  - **rather strict "zero-contamination"-policy (+ WFD since 2002)**
  - **trigger values (= DWS * 0,6) & intervention values (= DWS)**
    - **difference threshold values (!): to verify input & account for local background**
- **ÖNORM S 2088-2 (2000): Soil**
  - **protecting soil functions (to control humans exposure & plants uptake)**
  - **trigger values: children & playgrounds, residential**
  - **intervention values": children & playgrounds**
  - **agriculture; recreational, industry (HHRA): no TV's**
- **ÖNORM S 2088-3 (2004): Vapour and landfill gas migration**

Contaminated Sites Remediation Act (ALSAG 2024)

Assessment criteria (ALSAG 2024; Art. 14 (4) & (7))

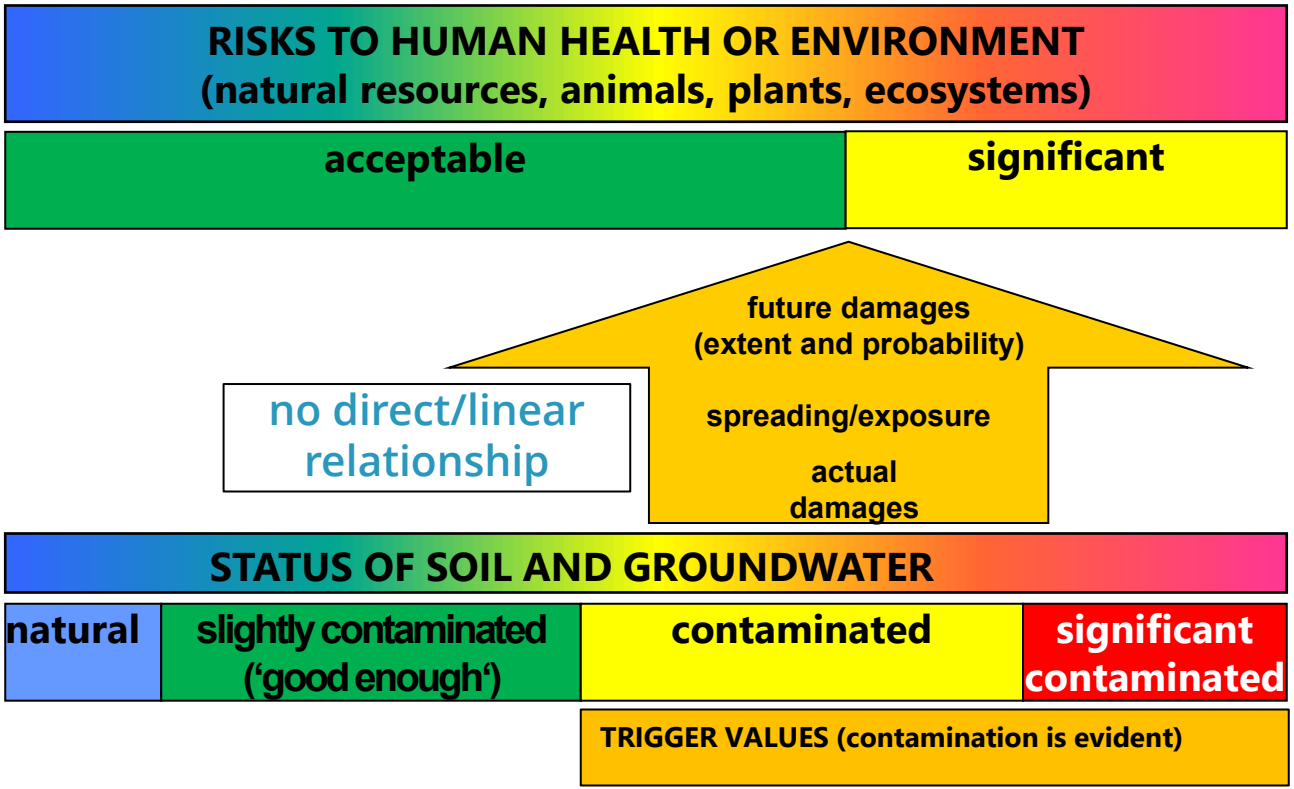
i. Contaminants of Concern (**Properties**)
ii. Intensity/concentration & **extent** of the '**source**'
iii. ground-/water: contaminant mass flow

significant contamination

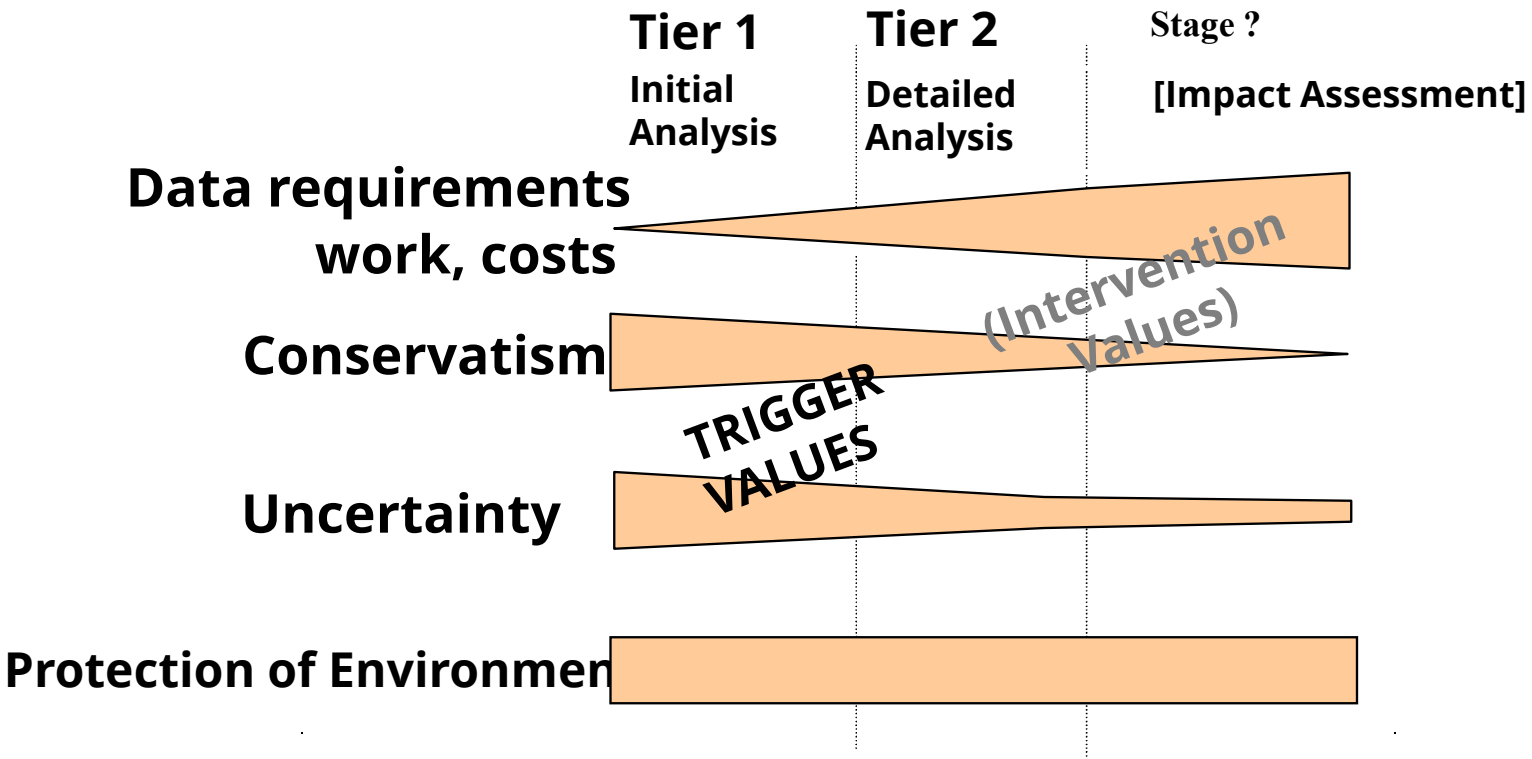
iv. length and trends of contaminant plumes
v. Impacts on soil functions, water resources and uses
vi. Human health risk analysis (contaminant exposure)

significant risk

RISK ASSESSMENT to allow for INFORMED DECISIONS



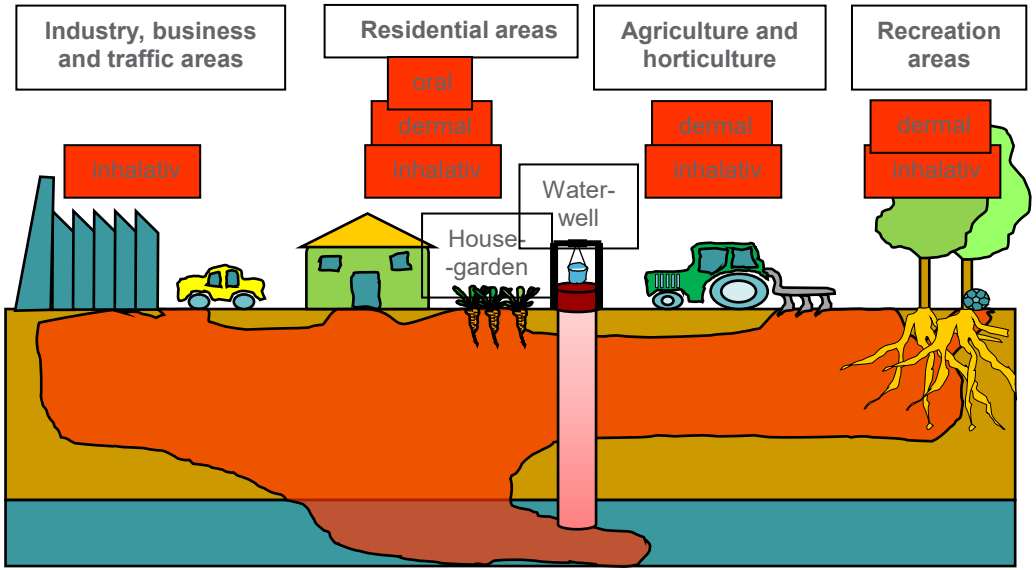
STEPWISE (TIERED) APPROACHES
… to support risk-informed decisions



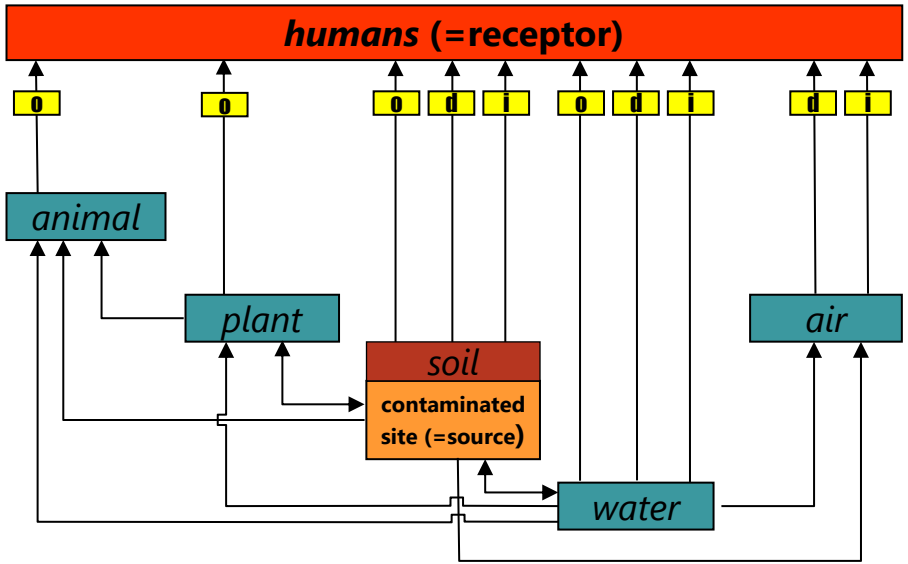
Soil contamination and human health

Use- & Site-specific characterisation

- **Contaminants (e.g. physico-chemical characteristics, toxicological profiles) and 3-dimensional distribution (-> *Conceptual Models*!)**
- **Land use & "activities"**



Soil contamination & Soil Trigger Values in HHRA SIMPLIFIED (no modelling): activity, pathway & user group



… which pathways are relevant for specific land uses?

REVISING TRIGGER VALUES

DERIVATION (for transparency reported in Annexes):

- specified references (& tox-data sources)
- back-calculation:
  - Groundwater: allowing for 60 % of the DWS
  - Soil: simple exposure equations allowing for 20 % of the TDI
- ***'cross checks':***
  - *urban background values*
  - *other threshold value lists (EU member states)*

– *Rounding off*

➔ ***'systemic controls' (new):***

- *science (e.g. 'endpoints' in toxicity)*
- *policy – plausibility and systemic consistency*

SOIL TRIGGER VALUES ÖNORM S 2088-2 (2014)

Parameter	Dimension	Trigger value		
		playground	residential*	agriculture**
Antimony	mg/kg	5	60	2
Arsenic	mg/kg	20	50	20
Lead	mg/kg	100	500	100
Cadmium	mg/kg	2	2	0,5
Chromium	mg/kg	100	75	100
Cobalt	mg/kg	-	-	50
Copper	mg/kg	100	500	100
Molybdenum	mg/kg	-	-	2,5
Nickel	mg/kg	70	-	100
Mercury	mg/kg	1	10	0,5
Selenium	mg/kg	-	-	1
Thallium	mg/kg	-	-	1
Vanadium	mg/kg	-	-	100
Zinc	mg/kg	-	-	300
Fluoride	mg/kg	-	-	200
Cyanide	mg/kg	5	-	5
TPH	mg/kg	50	-	200
PCDD/F	ng TE/kg	50	600	10
PCB	mg/kg	0,2	2	0,1
PAH	mg/kg	4	10	2
Benz(a)pyren	mg/kg	0,1	0,5	-

REVISION (upcoming 2026)

☑ Lead (Pb)

Cross check:

- background value: 100 mg/kg

Systemic check

EFSA (2011): ref. value 0.5 mg/kg/day

- toxicological endpoint:
  - effects on childrens'
  - central nervous system (IQ loss)

PROPOSAL:

- playground: 50 mg/kg

☹ PFAS: policy consistency weak

- ´no generic trigger values (in CLM)

WATCH OUT: limit values for soil reuse

GROUNDWATER TRIGGER VALUES ÖNORM S 2088-1 (2025)

☑ Lead (Pb)

Cross check:

- background value: <2 µg/l

Systemic check

- ☑ DWS (2024): 5 µg/l
- ■ policy frame consistent mg/kg/day

Revised TV's:

- ➢ leachate: 5 µg/l
- ➢ groundwater: 3 µg/l

☹ PFAS:

Cross check:

- atmospheric deposition:
  - PFOS max. 0,01 µg/l
- background values (PFAS-20)
  - generally low
  - urban areas 0,005 – 0,01 µg/l

Systemic check

- DWS: PFAS-20 0,1 µg/l
- *[EFSA: PFAS-4: 0,002 µg/l]*
- *[proposal EU Water EQS)*
  - *PFAS-24: 0,0044 µg/l]*

PFAS: RELEVANT „VALUES“ IN AUSTRIA

ÖNORM 2088-1 (Groundwater, 4th edition)

- **Table 2 (total content): No trigger value (!)**
- **Table 3 (leachate): PFAS-20: 0.1 µg/l (in 2:1-eluate)**

Table 4 (groundwater)

Parameter	Dimension	Quant. Limit	dA	dB	Trigger Value
Σ PFAS 20 [m]	µg/l	0,001 [n]	300 %	100 %	0,05
PFAS (single compounds) [h (min: 28)]	µg/l	0,001	300 %	100 %	0,01

CONCLUDING REMARKS
Challenges in a new era of CLM

- Do we understand and translate new scientific findings well?
- Are robust sampling & analytical means available?
- Do we need & how to consider/account for:
  - uncertainties (conservatism & safety factors)
  - ubiquituous background concentrations?
  - fate, transport & bioaccumulation of contaminants?

IRREVERSIBILITY: We want to prevent, but how to know when do we will need to accept?

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ENVIRONMENT AGENCY AUSTRIA

Contact & Information

QUESTIONS AND REMARKS WELCOME !

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MANY THANKS!

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ENSOr 6
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