Turning the Tide: PFAS Challenges and Europe's Water Resilience Strategy

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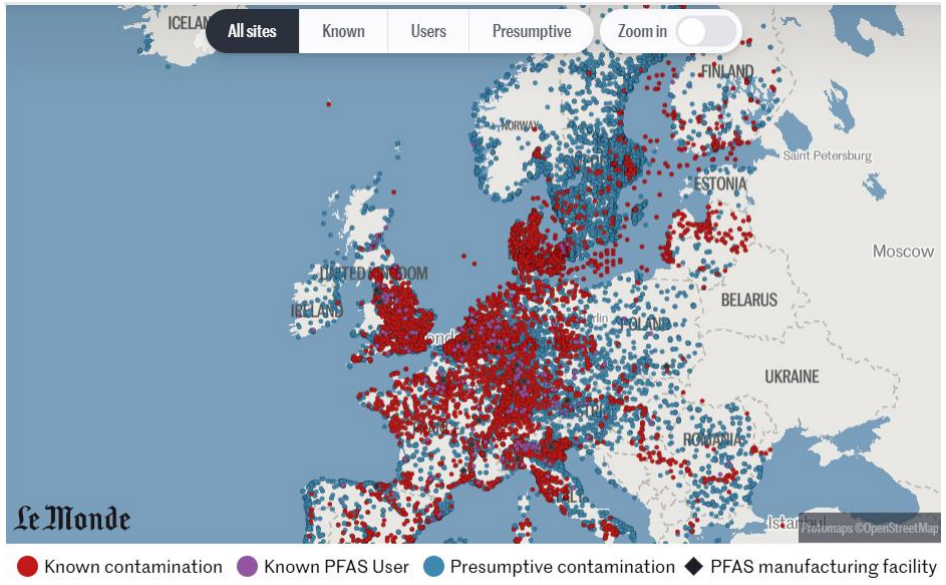
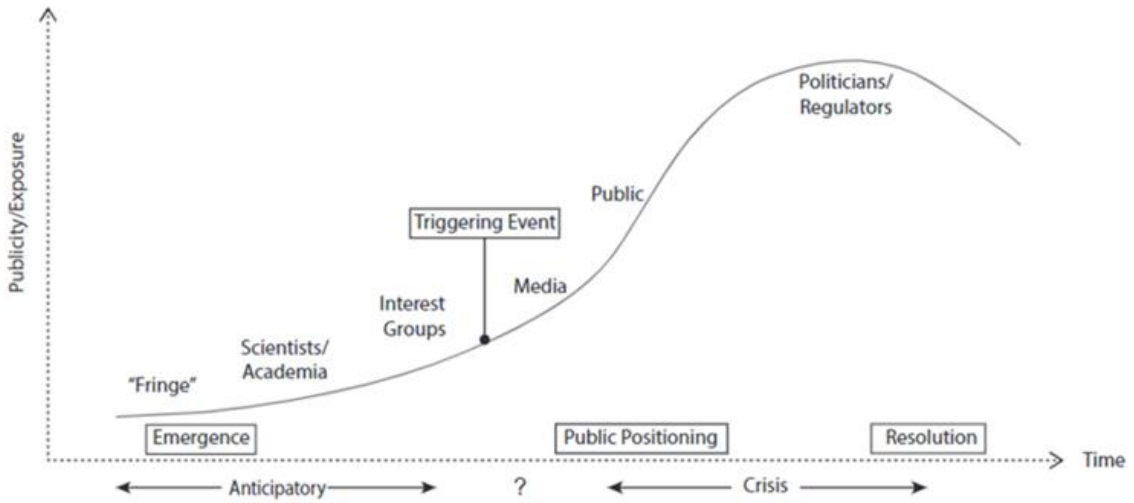
Content

1. PFAS : Riding the wave of disruption

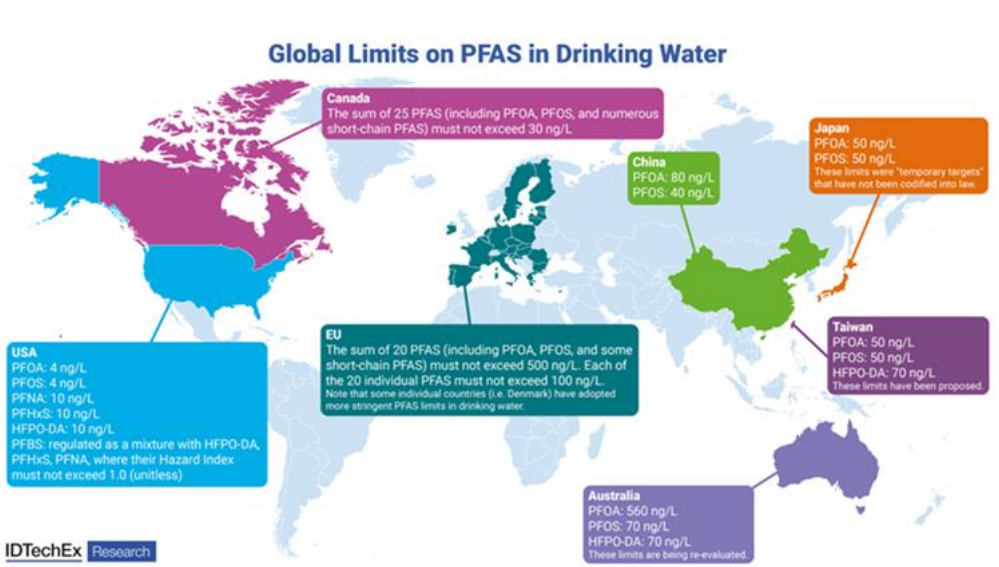
- **Increasing evidence of widespread PFAS use and persistence** has intensified regulatory actions at various levels.
- Recent studies emphasize the **potential threats PFAS** pose to **human health, ecological systems, and the environment**.
- **PFAS pollution** originates from both **industrial sources and diffuse contributors** such as specific pesticides, land-applied biosolids, and the atmospheric breakdown of fluorinated gases, leading to extensive environmental contamination.
- **Rising PFAS concentrations in groundwater and drinking water** have become more common, **driving enhanced monitoring efforts across Europe** and **corrective measures to reduce PFAS input into the ecosystem**.
- **Growing evidence** indicates that **human exposure** is **not solely linked to environmental factors**; rather, intake of PFAS through **food and household products,** as well as **dust,** currently represents **significant pathways of exposure**.
- **Increased societal and media scrutiny** underscores the critical need to address PFAS-related challenges.
- **Regulatory actions** are being implemented across European, national, and local levels in **response to growing concerns surrounding PFAS**.

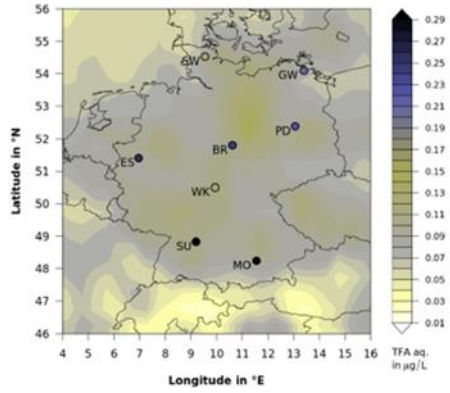


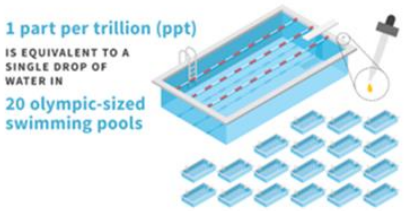


2. Navigating environmental risk assessment challenges

- Countries are increasingly requiring **PFAS manufacturers and users to conduct baseline assessments and maintain comprehensive inventories**.
- **Environmental baseline investigations** are evolving to become more **complex and comprehensive**. They now encompass exposure assessments through various pathways, alongside the testing of food produce, plants, animals, and human biomonitoring.
- **Interpreting laboratory results** can be **challenging**, especially with the **emergence of lesser-known PFAS compounds** that **lack comprehensive toxicological data**. Additionally, some of these compounds, such as the **ultrashort PFAS** TFA, have a **diffuse and widespread impact**, often linked to fluorinated gases and pesticides.
- The **legal framework surrounding PFAS is rapidly evolving**, driven by advancements in science and policy decisions at both the regional (EU) and national levels.



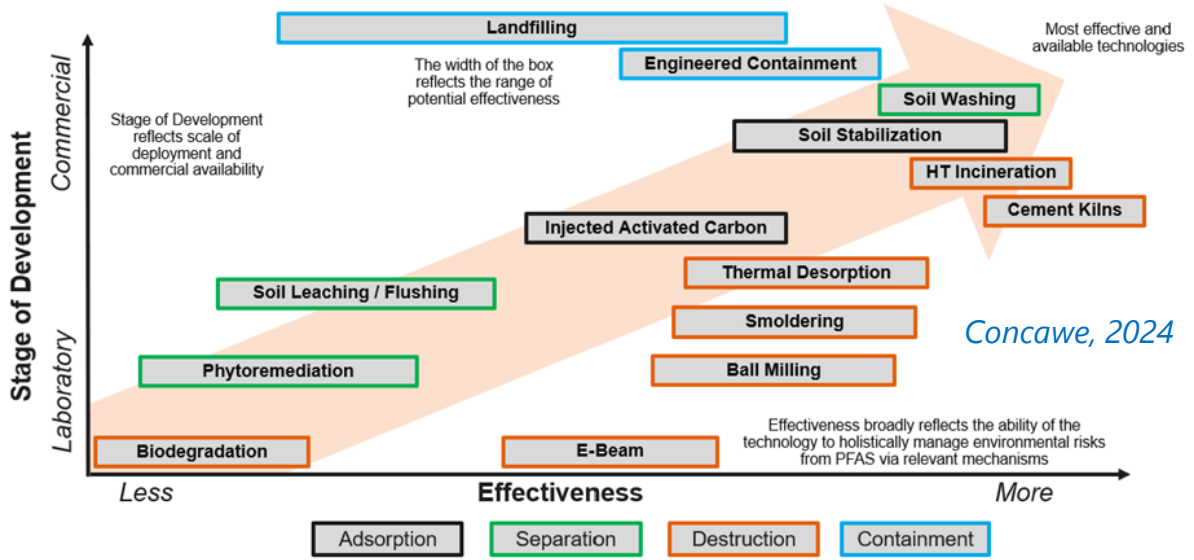




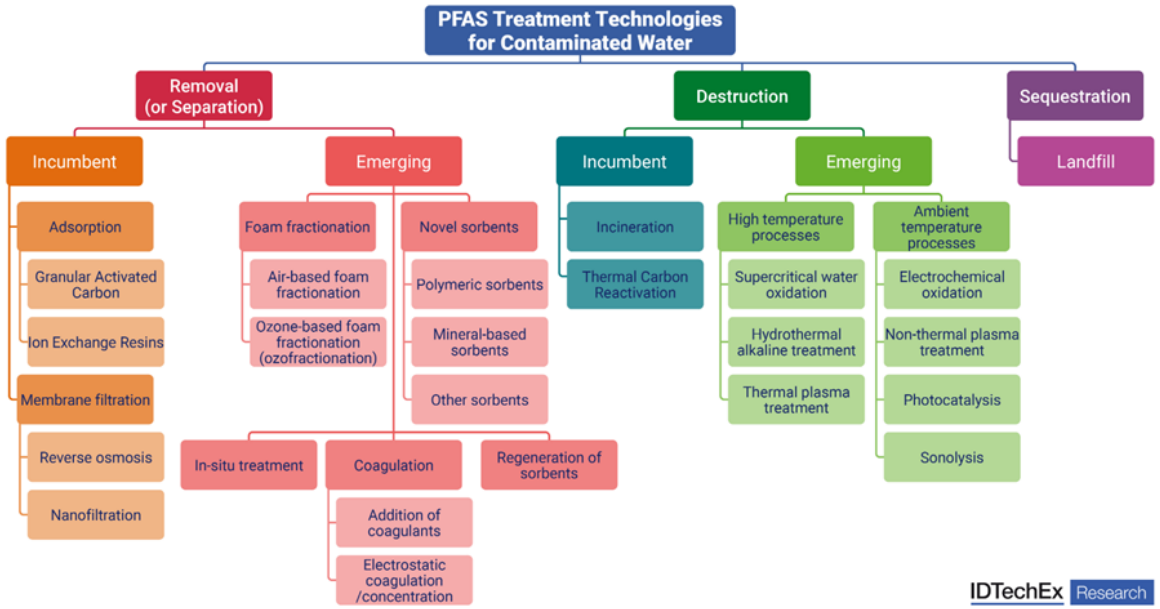
3. Cracking the code on remediation

- **PFAS** contamination **hotspots** are commonly near **manufacturing plants and areas with heavy firefighting foam use, such as training sites**.
- **Baseline inventory reports** indicate that PFAS impacts are **complex** due to factors like **industrial clusters, biosolids application, and pesticide use. Multiple sources** can **create commingled groundwater plumes** and **complicated liability issues**.
- Addressing PFAS contamination demands significant investment, with costs for **long-chain legacy PFAS** estimated at nearly **€100 billion over 20 years**, and **€2 trillion** for **(ultra)short-chain PFAS** in the same timeframe (**Forever Pollution Project, 2025**).
- **Proportional, risk-based solutions are essential** for protecting sensitive receptors, with **a focus on containing and removing PFAS hotspots**, and **reducing fluxes towards sensitive receptors**.
- The **market demands swift development of flexible, affordable treatment technologies and strategies,** alongside **regulatory support to tackle environmental challenges**.

Figure 1 PFAS Treatment Technologies for Soil evaluated in terms of their likely effectiveness and the stage of development



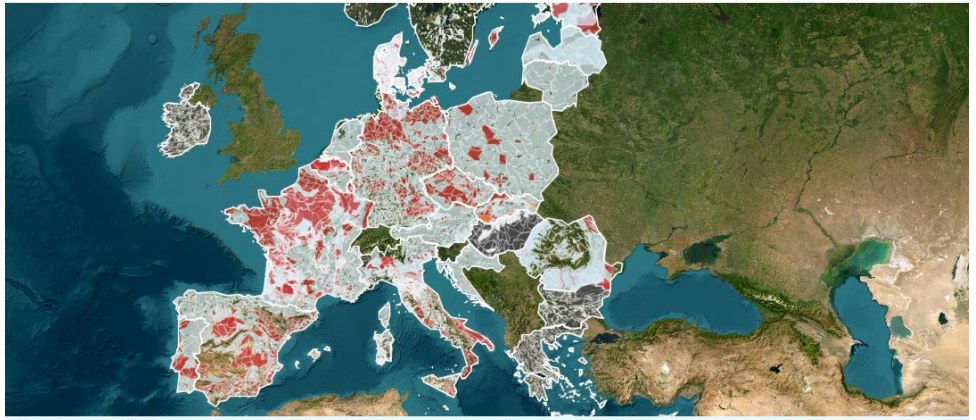
Concawe, 2024



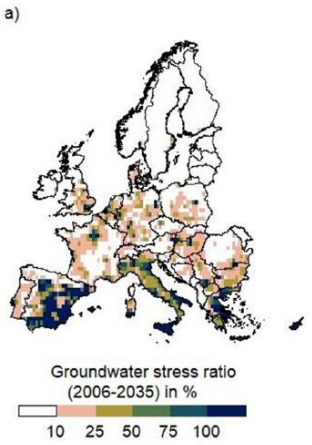
https://www.idtechex.com/en/research-report/pfas-treatment-technologies/1040

4. Where PFAS meets water resilience

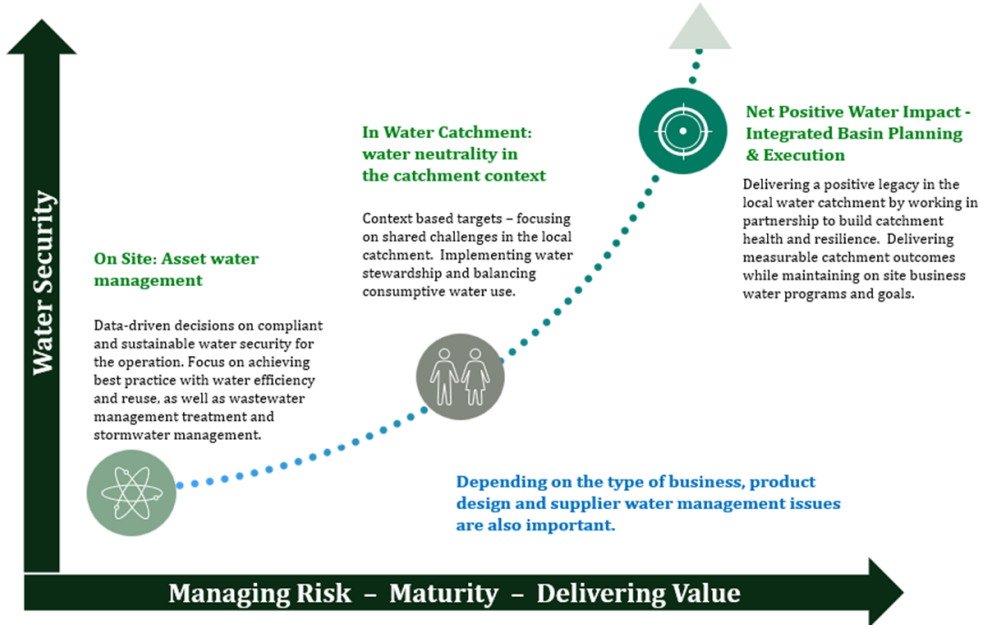
- The **European Commission** emphasizes that **groundwater is a finite resource** under **increasing pressure from pollution and over-abstraction**, and **remediation is extremely difficult once contamination occurs**,
- European regulators **are intensifying restrictions on PFAS**, particularly in drinking water, while advocating for a comprehensive EU-wide phase-out of the majority of PFAS applications.
- **These initiatives** are in **harmony with Europe's water resilience strategy (EWRS)**, which aims to protect water resources from pollution.
- **Implementing effective controls for PFAS is essential to safeguard the long-term integrity of our water supply**.
- **Key industries** such as food, beverage, and agriculture must **prioritize the treatment of water or the sourcing of PFAS-free inputs** to meet the growing demands of **stringent regulatory standards** and **safeguard future production and shareholder value**.
- **Drinking water production and wastewater treatment facilities** are encountering comparable challenges, as the introduction of more stringent regulations is expected to **increase significantly both capital investments and operational costs**.



Situation of 12,028 groundwater bodies according to third cycle plans (2022-2027) | **Source: European Environment Agency.** *Data updated as October 15, 2024*



Söller et al., 2024



5. Striking the perfect balance

- **Defining What Is “Safe”**
  A pressing societal debate: What exposure levels are acceptable when PFAS enters our lives not only through water, but also food, household products, and living environments? How do we weigh the cost of mitigation against public health protection?
- **Capture vs. Destroy – The Strategic Dilemma**
  Should Europe continue investing in proven PFAS capture and containment systems, or accelerate the adoption of next-generation destruction technologies that permanently eliminate these chemicals?
- **Engineered Solutions for Low-Level PFAS Soils**
  Deploy advanced soil treatment technologies—such as thermal desorption, in-situ stabilization, and engineered solutions.
- **Closing the Loop on Groundwater**
  Reinjection of treated groundwater back into the subsoil after bulk PFAS removal can restore aquifer integrity, reduce stress on water resources, and align with circular water management principles.
- **From Compliance to Collaboration**
  Move beyond regulatory box-ticking: enforce pragmatic, implementable rules while fostering cross-sector partnerships to accelerate innovation and scale solutions.
- **Call to Action**
  Invest in PFAS destruction R&D, harmonize EU-wide standards, and integrate water resilience into corporate risk frameworks—critical steps to safeguard ecosystems and industry.

6. Your questions, our insights

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Thank you

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