the Forever Pollution Project

Mapping PFAS pollution across Europe

Stéphane Horel Le Monde

1st January 2024

PFAS Event, Antwerp

a cross-border investigation

Le Monde — France
Süddeutsche Zeitung, NDR, WDR — Germany
RADAR, le Scienze — Italy
The Investigative Desk, nrc — The Netherlands
Knack — Belgium
Deník Referendum, DR — Czechia
POLITIKEN — Denmark
yle — Finland
Reporters United — Greece
Latvijas Radio — Latvia
DATADISTA — Spain
SRF — Switzerland
WATERSHED, The Guardian — United Kingdom

12 countries, 16 media
February-July 2023

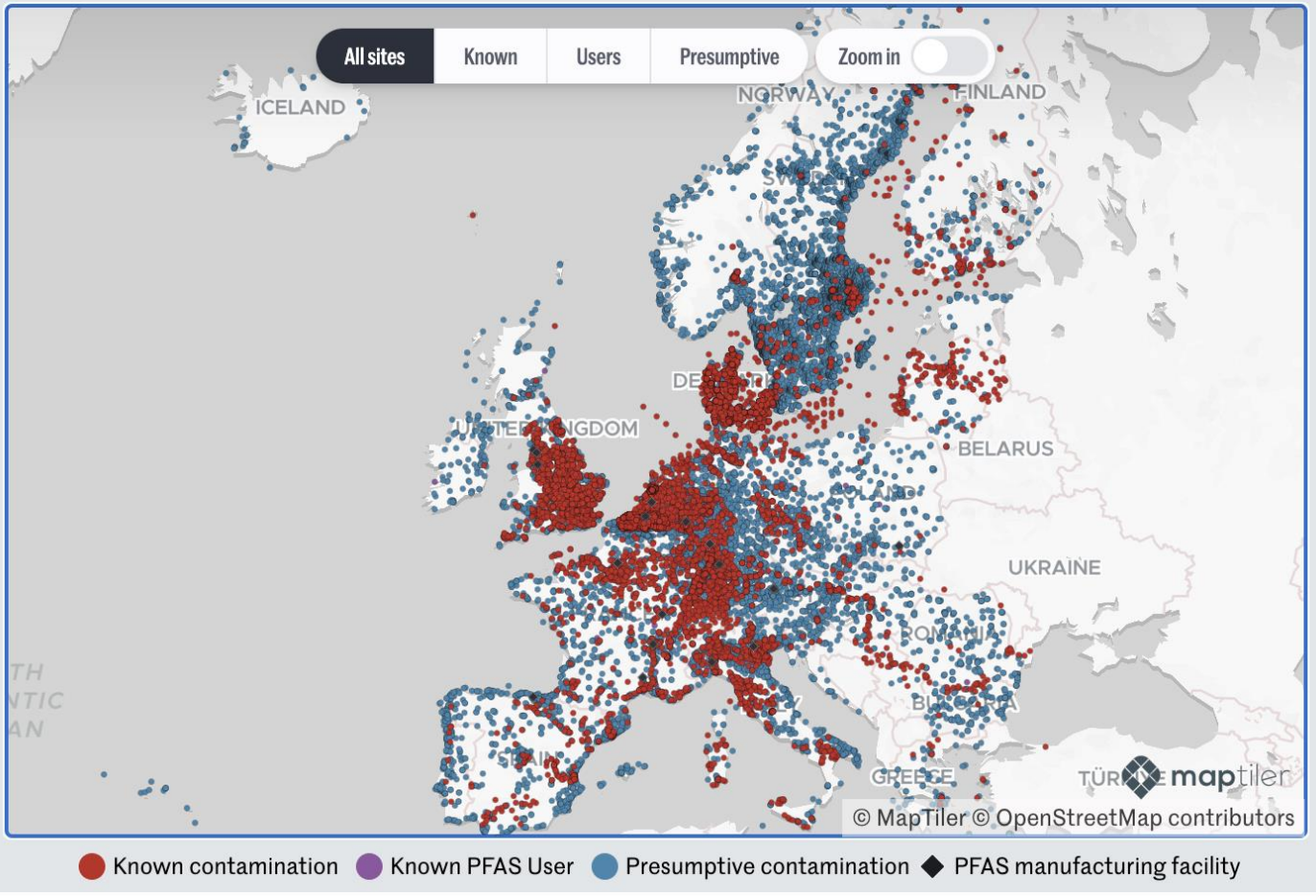
Work grants
journalismfund.eu
IJ4EU

Coordination
Arena for journalism in Europe

Map design
Le Monde

Mapping partner
maptiler

the map of Forever Pollution in Europe



how it started (April 2022)

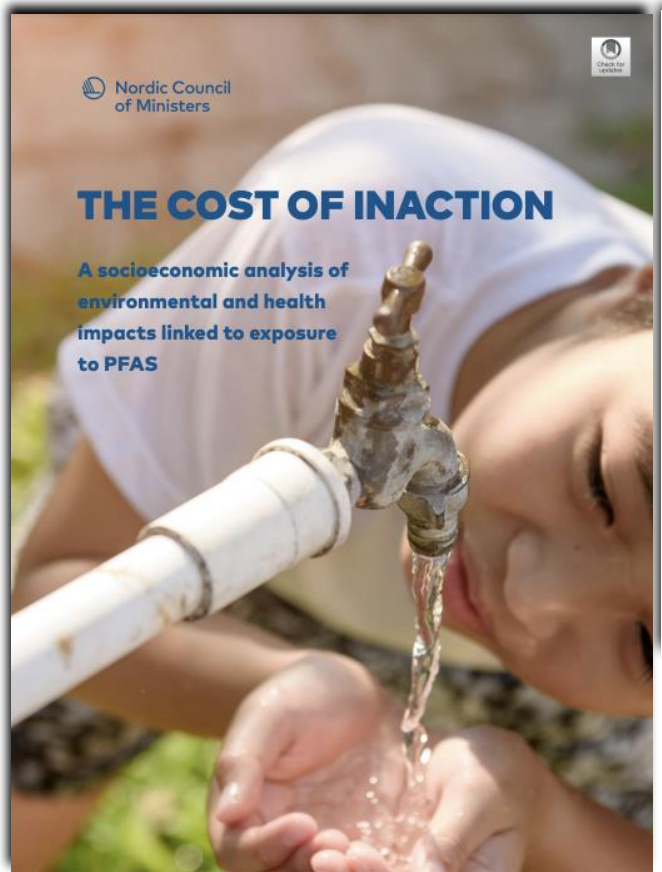
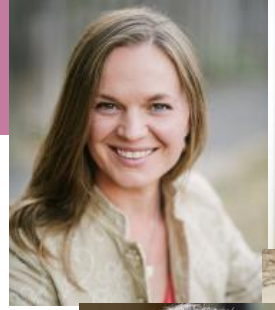


Table 10: List of manufacturers of fluorochemicals and/or fluoropolymers

Country	Company and site of plant	What is being produced
Belgium	3M (Zwijndrecht)	Fluorochemicals
France	Arkema (Pierre-Bénite)	Fluoropolymers (PVDF)
	Solvay Solexis (Tavaux)	Fluoropolymers (PVDF)
	Daikin Chemical France S.A.S.[1]	Fluorochemicals
Germany	Dyneon (Gendorf)	Fluorochemicals, fluoropolymers (PTFE, FEP, PFA, THV)
	BASF (Ludwigshafen)	n.a.
Italy	Solvay Solexis (Spinetta-Argeno	Fluoropolymers) – PTFE, MFA
	Heroflon S.p.A. (Collebeato)	Fluoropolymers (PTFE compounds and micropowders)
	Miteni (Trissino) [2]	Fluorinated intermediates; performance fluorinated products
Netherlands	Chemours (Dordrecht)	Fluoropolymers (PTFE, FEP)
	Daikin Chemical Netherlands (Oss) – Pre-compounding of fluoroelastomers	Fluorochemicals
United Kingdom	AGC (Blackpool)	Fluoropolymers – PTFE, PFA

"Based on this list, it is further assumed that the number of PFAS production sites in Europe is between 12 and 20 plants".

7 “expert-reviewers”







Sociologists

Alissa Cordner (Whitman College, Walla Walla, USA)

Phil Brown (Northeastern University, Boston, USA)

Environment scientists

Kimberly K. Garrett (Northeastern University, Boston, USA)

Derrick Salvatore (Massachusetts Department of Environmental Protection, USA)

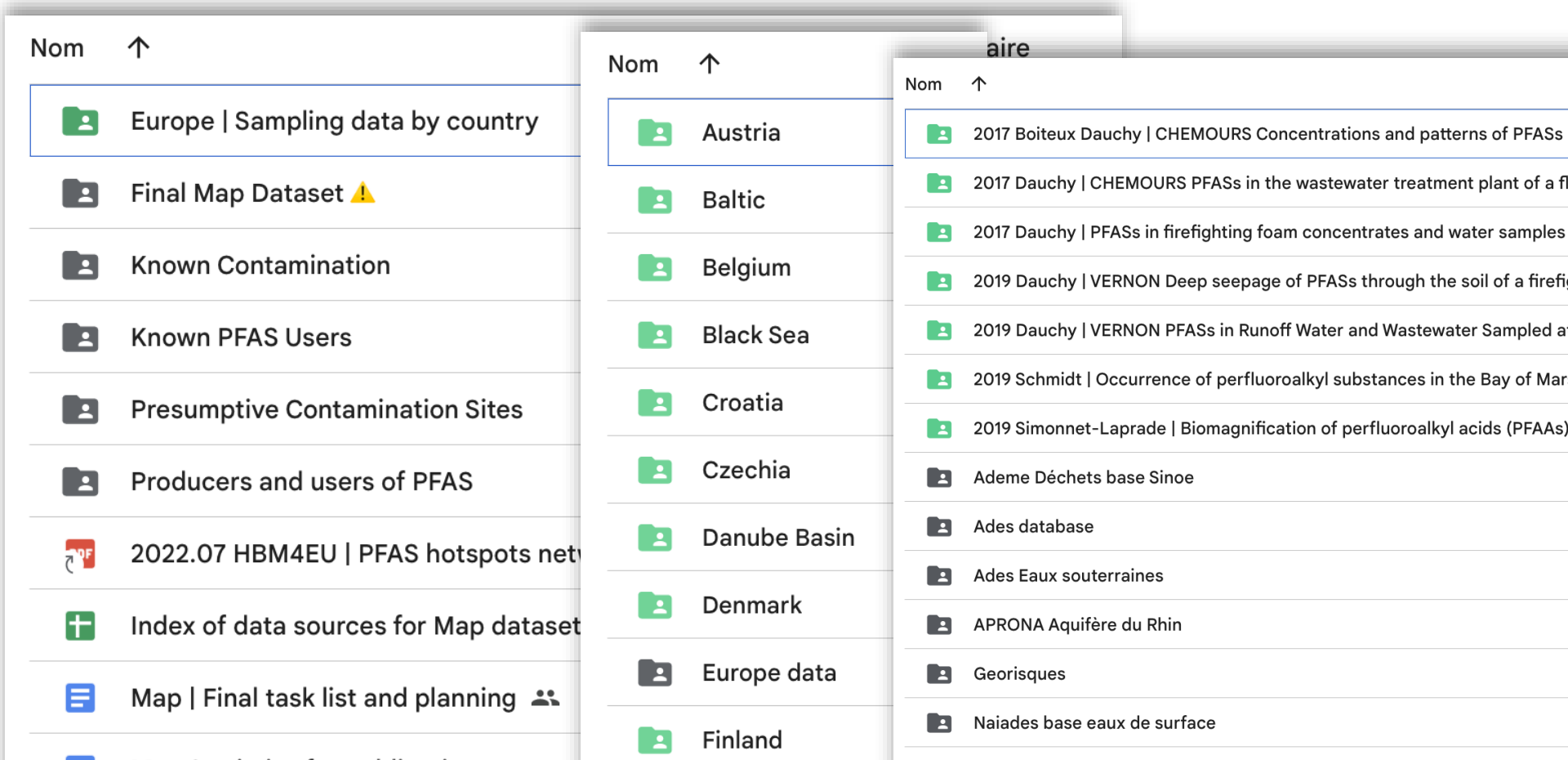
Ian Cousins (Stockholm University, Sweden)

Martin Scheringer (ETH Zürich, Switzerland)

Environmental lawyer

Gretta Goldenman (Global PFAS Science Panel, Brussels)

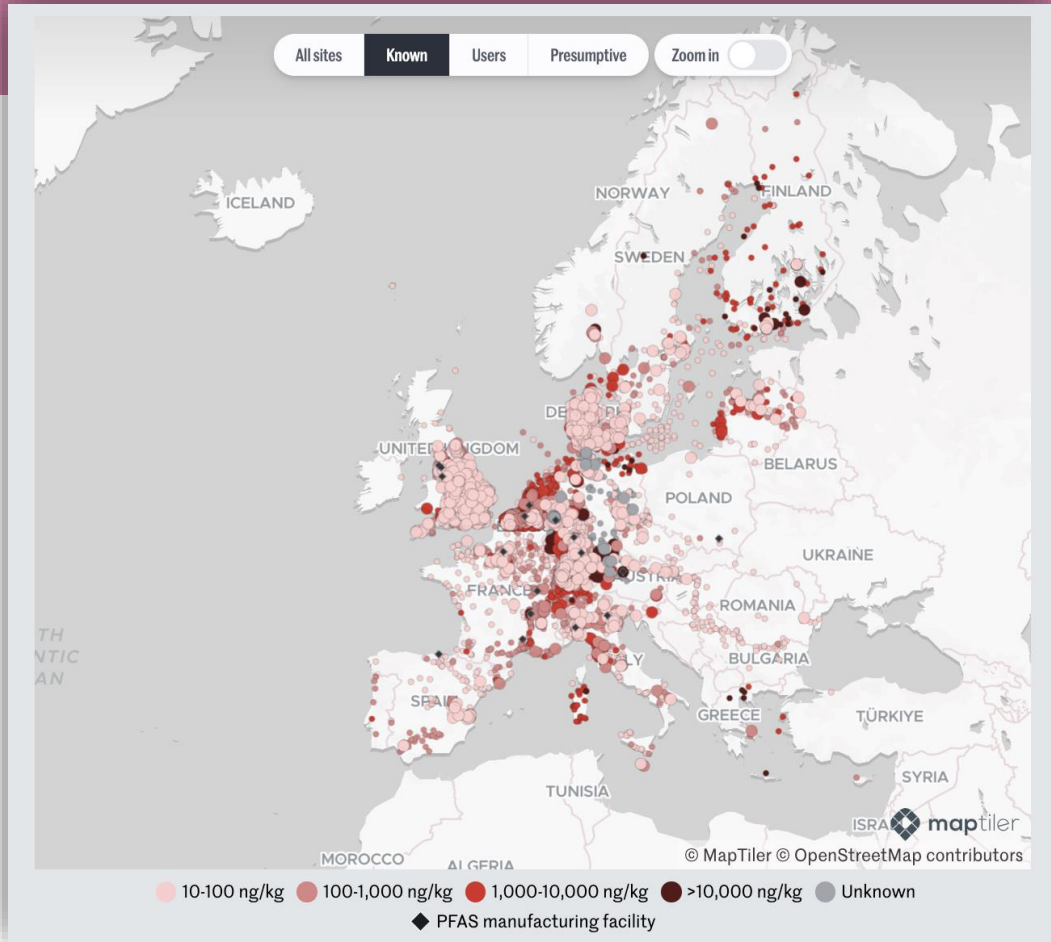
Known contamination sites



20,176 known contamination sites
2,200 hotspot clusters

EU limit value
= 100 ng/l (20 PFAS)
= 500 ng/l (sum PFAS)

Hotspot according to experts
= 100 ng/l



20 PFAS manufacturing facilities

Company	Town	Country
Dyneon / 3M	Gendorf	🇩🇪
Solvay	Bad Wimpfen	🇩🇪
Archroma	Gendorf	🇩🇪
Gore	Gendorf	🇩🇪
Daikin refrigerants	Frankfurt am Main	🇩🇪
Lanxess	Leverkusen	🇩🇪
Arkema	Pierre-Bénite	🇫🇷
Daikin	Pierre-Bénite	🇫🇷
Solvay	Tavaux	🇫🇷
Solvay	Salindres	🇫🇷
Chemours	Villers Saint-Paul	🇫🇷
AGC	Thornton-Cleveleys	🇬🇧
F2	Preston	🇬🇧
Mexichem/Koura	Runcorn	🇬🇧
Miteni	Trissino	🇮🇹
Solvay	Spinetta-Marengo	🇮🇹
3M	Zwijndrecht	🇧🇪
Chemours	Dordrecht	🇳🇱
Grupa Azoty	Tarnów	🇵🇱
Arkema	Zaramillo	🇪🇸

Adapting the map of contamination in the U.S.

Environmental Science & Technology Letters

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Letter

Presumptive Contamination: A New Approach to PFAS Contamination Based on Likely Sources

Derrick Salvatore, Kira Mok, Kimberly K. Garrett, Grace Poudrier, Phil Brown, Linda S. Birnbaum, Gretta Goldenman, Mark F. Miller, Sharyle Patton, Maddy Poehlein, Julia Varshavsky, and Alissa Cordner*

Cite This: *Environ. Sci. Techno*

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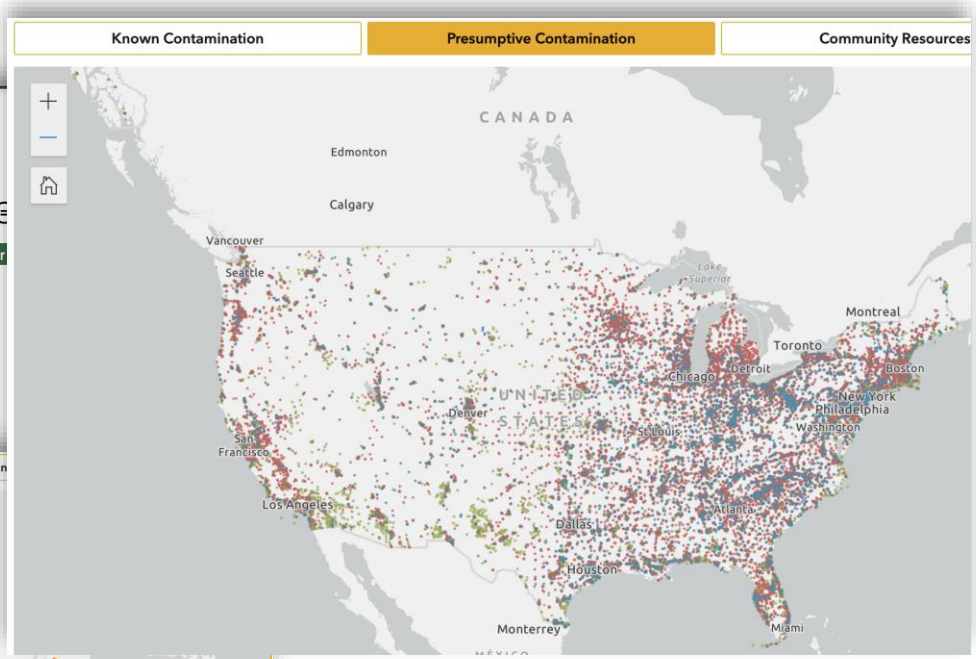
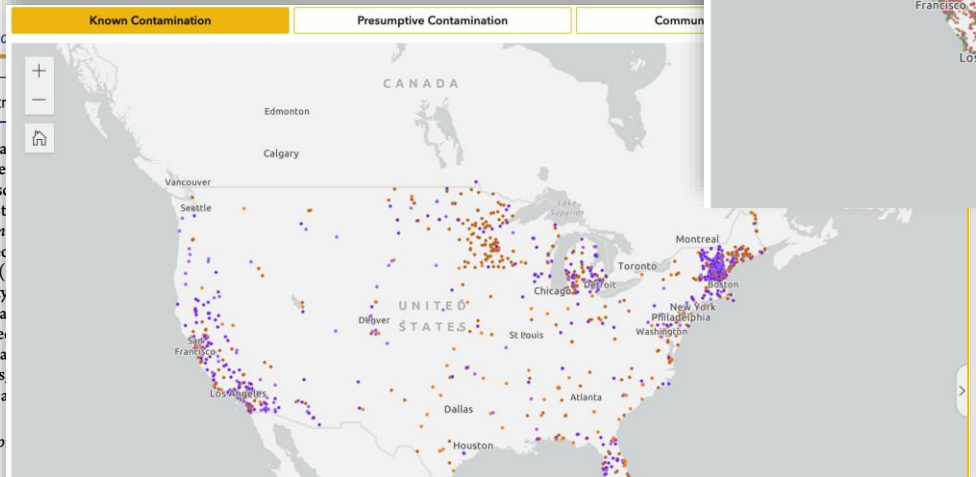
ABSTRACT: While research a
substances (PFAS) has increase
incomplete about the scale, s
contamination in the United St
quality testing data, *PFAS con*
facilities: (1) fluorinated aquec
certain industrial facilities, and (
are incomplete on all three ty
integrate available geocoded, na
contamination sites in the Unite
contamination: 49,145 industria
current or former military sites
allows governments, industries, a
potential exposure sources.

KEYWORDS: *per- and polyfluo*
PFAS waste and disposal





Presumptive contamination sites

ENVIRONMENTAL Science & Technology LETTERS

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Letter

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Cite This: *Environ. Sci. Technol. Lett.* 2022, 9, 983–990

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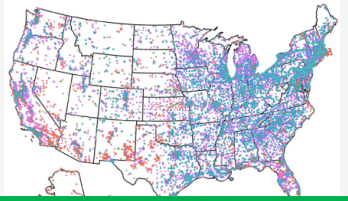
ABSTRACT: While research and regulatory attention to per- and polyfluoroalkyl substances (PFAS) has increased exponentially in recent years, data are uneven and incomplete about the scale, scope, and severity of PFAS releases and resulting contamination in the United States. This paper argues that in the absence of high-quality testing data, *PFAS contamination can be presumed* around three types of facilities: (1) fluorinated aqueous film-forming foam (AFFF) discharge sites, (2) certain industrial facilities, and (3) sites related to PFAS-containing waste. While data are incomplete on all three types of presumptive PFAS contamination sites, we integrate available geocoded, nationwide data sets into a single map of presumptive contamination sites in the United States, identifying 57,412 sites of presumptive PFAS

Presumptive Contamination Sites (n=57,412)



Sites without sampling results, but presumed to be contaminated based on scientific studies and expert advice.

Presumptive contamination sites

1– Fluorinated aqueous film-forming foam (AFFF) discharge sites

642 Military sites
978 Airports
1096 Firefighting training sites (Flanders, Sweden, Norway)
Firefighting incidents (10,774 in Sweden, 279 in Flanders)

2– Sites related to PFAS-containing waste

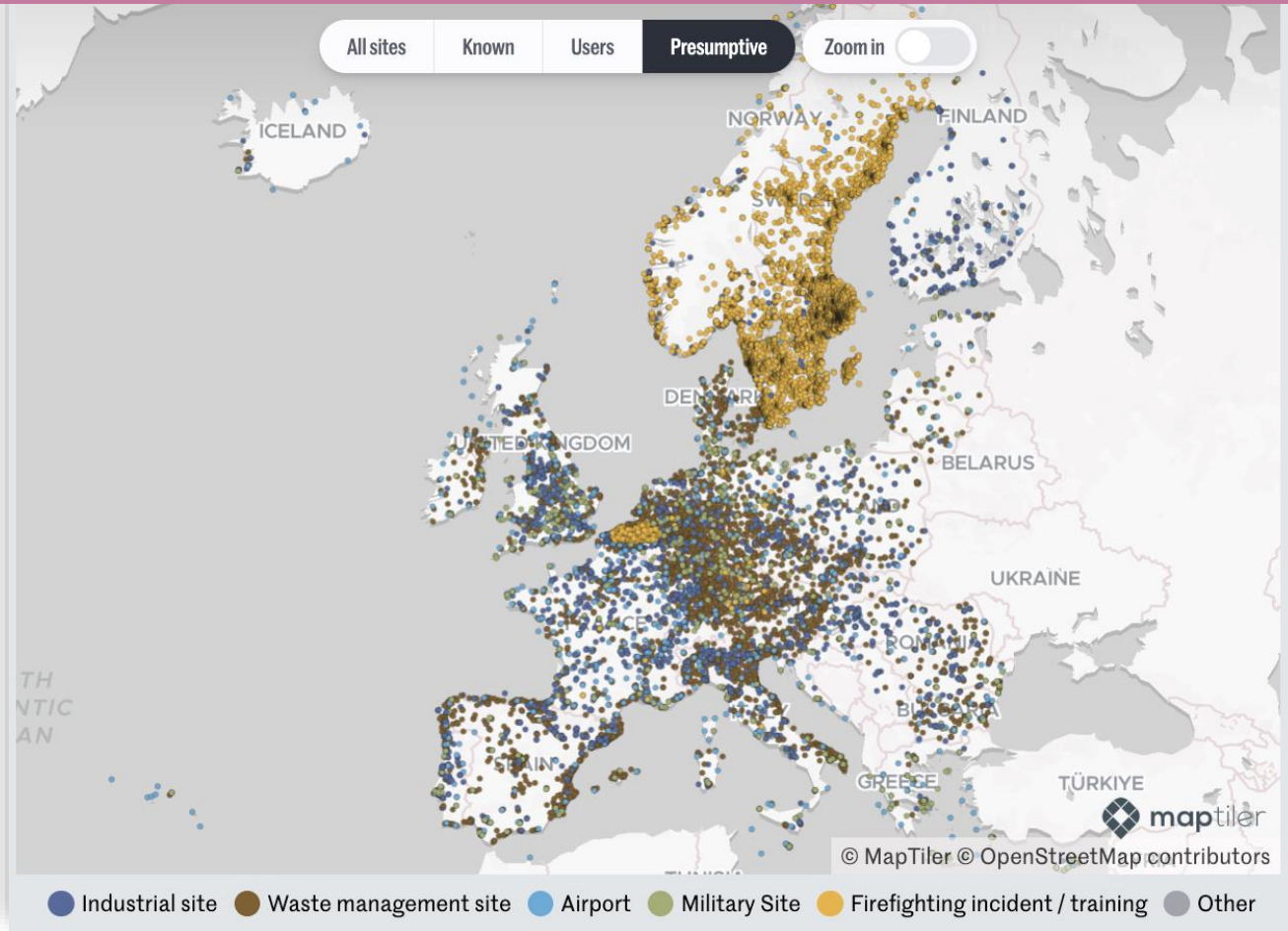
2,620 Wastewater treatment plants treating >3,700m3/day
2,167 Waste management sites (landfills for non-hazardous and hazardous waste and incinerators)

Presumptive contamination sites

3- 2,911 industrial sites

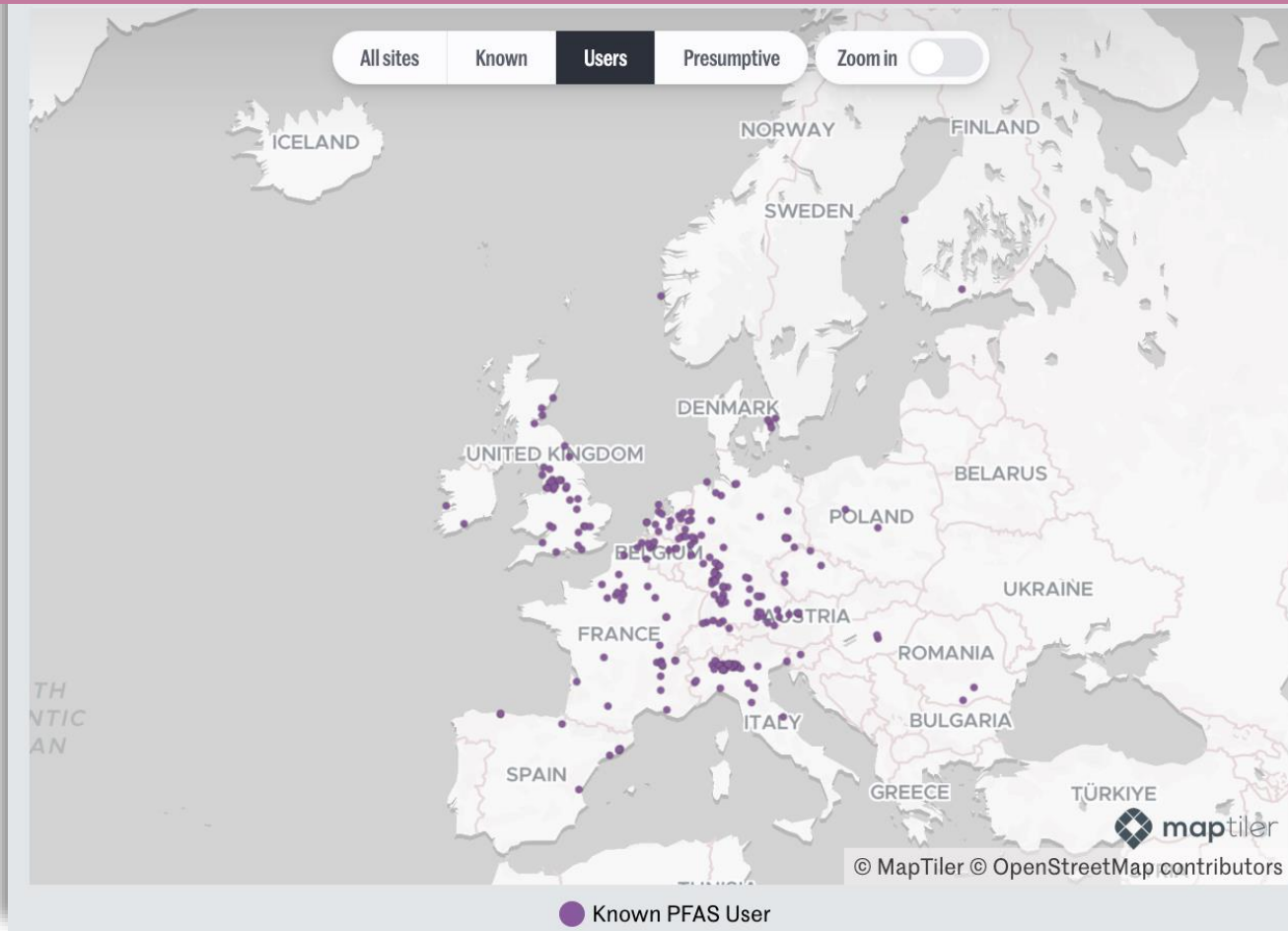
Industrial activity	Sites
Manufacture of pulp, paper and paperboard	1,120
Treatment and coating of metals	680
Manufacture of articles of paper and paperboard	302
Manufacture of plastics in primary forms	221
Manufacture of refined petroleum products	213
Manufacture of other fabricated metal products n.e.c.	132
Finishing of textiles	126
Manufacture of other organic basic chemicals	45
nan	45
Manufacture of rubber and plastic products	16
Tanning and dressing of leather; dressing and dyeing of fur	11
Treatment and disposal of hazardous waste	1

21,429 presumptive contamination sites



231 PFAS known users

Sites where there is evidence of PFAS use.
(New category)



methodology > submitted to scientific journal

Methodology | The Map of Forever Pollution

The Forever Pollution Project

Disclaimer

The purpose of the "Map of Forever Pollution" is to provide data ab
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5. Research methodology

5.1 Known contamination sites

5.1.1 Sites where PFAS have been detected

5.1.1.1 Research

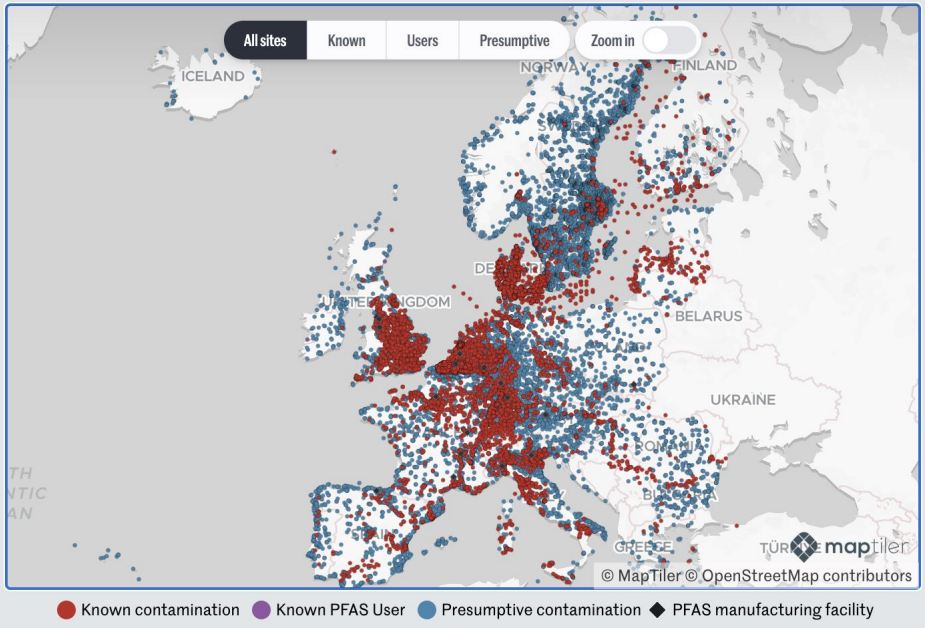
PFAS monitoring datasets were proactively collected from natio
regulatory agencies, national and regional databases (with data
organisations in total), research institutes, universities, scientifi
freedom of information requests across Europe.

Precisely 100 datasets were collected, harmonised and used in

– Scientific studies

We contacted scientists participating in the European research
Perforce3[32], NORMAN network[33], Zero PM[34] to ask them for da
Scheringer (ETH Zürich), Ian Cousins (Stockholm University) a

map > transmission to cnrs



http://foreverpollution.eu horel@lemonde.fr