

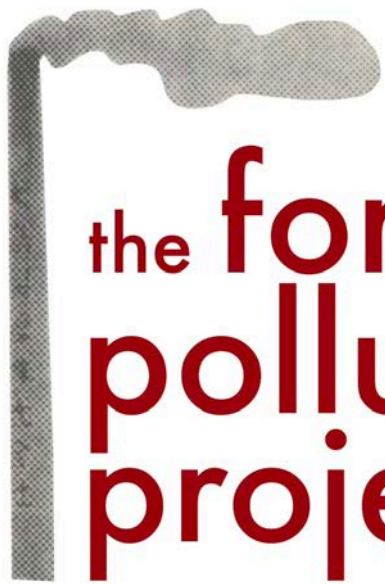


Stéphane Horel
Le Monde
20.01.2026

the **Forever Pollution Project:** **making visible the invisible** **through collaboration**



Expert-Reviewed Journalism
Introductory webinar



the forever pollution project

2023-2025

foreverpollution.eu



Peeeeeef what? PFAS!

- PFAS are poly- and perfluoroalkyl substances
- Man-made chemicals 1940/50 – Manhattan Project
- Extremely persistent and toxic
- 12.000+ compounds
- > 200 applications



Non stick cookware (Teflon)
Waterproof clothing (eg. Gore-Tex)
Stain-proof textile treatments (Scotchgard)
Food packaging
Pesticides
Fire-fighting foams
etc.

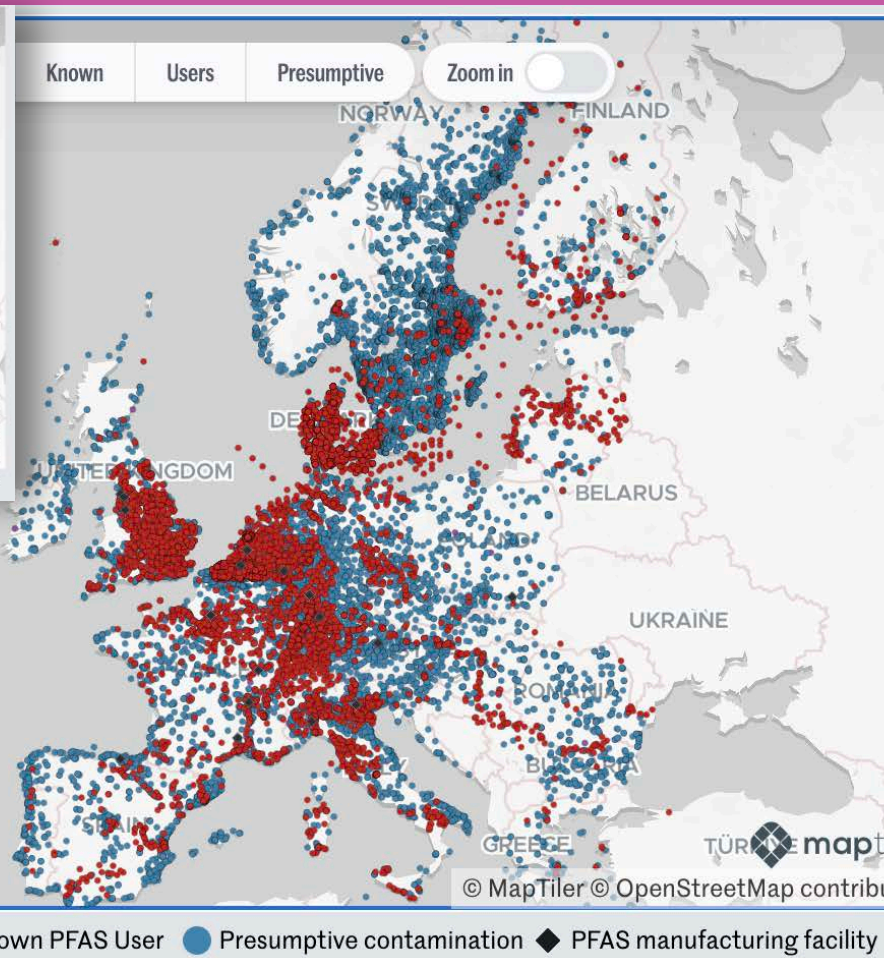
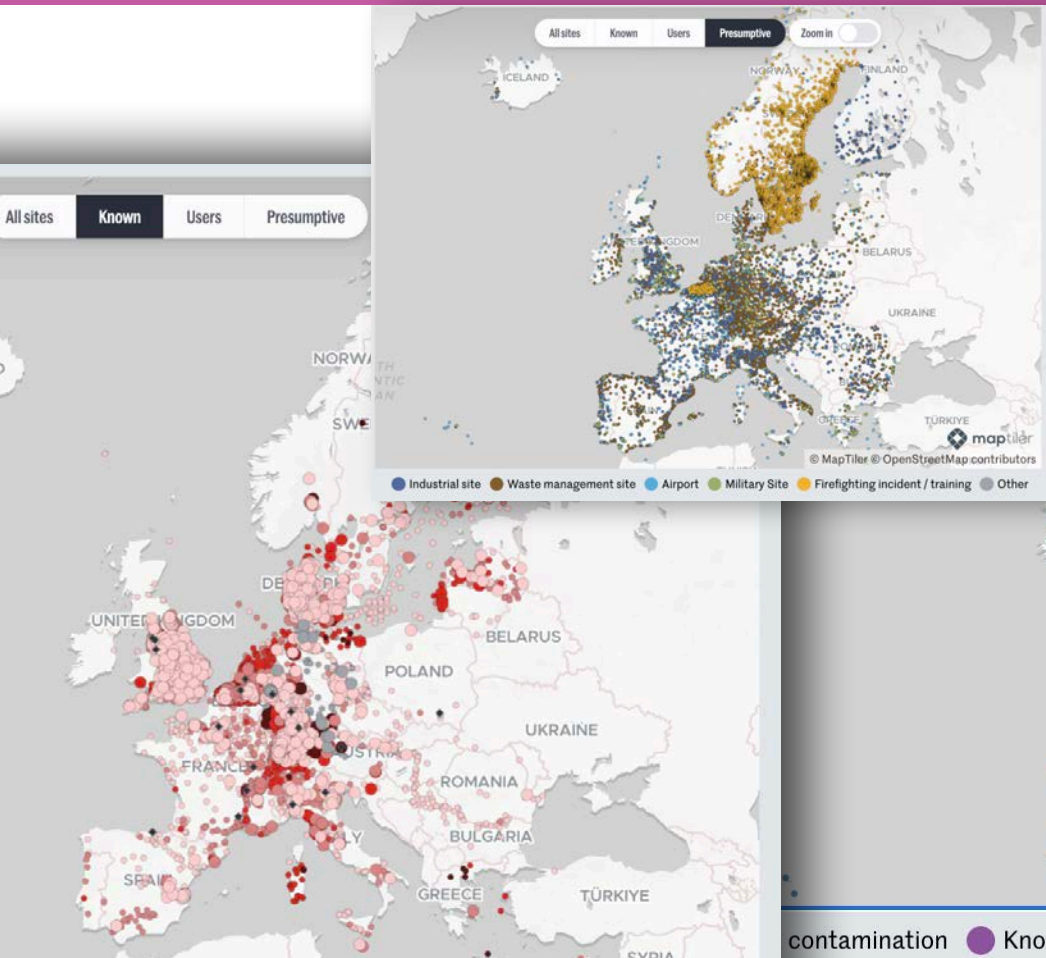


The worst pollution crisis humanity has ever faced

- Water
- Rain
- Soil
- Sediments
- Air
- Food
- Wildlife 🦘
- All humans



Making visible the invisible | Part 1 the Environment



The Map of Forever Pollution (2023)

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

United Kingdom

**The
Guardian**

foreverpollution.eu/map

16 media
12 countries

Work grants

 **journalismfund.eu**

Coordination

**IJ4
EU**

Arena
for
journalism
in Europe

Map design

Le Monde

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 (Zwijndorf)	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”.

How we got lost (July 2022)

Company Name	Country	Location (town)	Type	HQ	Latitude	Longitude	Trade name	PFAS produced	Evidence/notes on production or use
3M	BE	Zwijndrecht	Producer	USA	51.23427349	4.334542406	Novec™ Fluorinert™		Emitted PFOS until 2004, now PFOA, PFBS, PFHpA, PFHxA, PFHxS, PFOSA, PFPA and PFBA (emission norm for waste water in the river Scheldt 0,1 µg/l). 3M Belgium produces a wide range of products like Post-It's, glue, coatings. See: https://www.3mbelgie.be/3M/nl_BE/p/ 3M itself writes: "M's innovative solutions that rely on PFAS include 3M's™ Novec™ Engineered Fluids, 3M™ Fluorinert™ Electronic Liquids, 3M™ Performance Fluids and fluoropolymer products." Novec and Fluorinert are both Fluon ® PTFE/ETFE Fluoropolymers
AGC (Asahi Glass Company)	UK	Thornton-Cleveleys	Producer	UK	53.87914403	-2.999966481	Fluon®	PTFE, ETFE	Fluon ® PTFE/ETFE Fluoropolymers
Archroma	DE	Gendorf	Producer				Novec™ Fluorinert™		Emitted PFOS until 2004, now PFOA, PFBS, PFHpA, PFHxA, PFHxS, PFOSA, PFPA and PFBA (emission norm for waste water in the river Scheldt 0,1 µg/l). 3M Belgium produces a wide range of products like Post-It's, glue, coatings. See: https://www.3mbelgie.be/3M/nl_BE/p/ 3M itself writes: "M's innovative solutions that rely on PFAS include 3M's™ Novec™ Engineered Fluids, 3M™ Fluorinert™ Electronic Liquids, 3M™ Performance Fluids and fluoropolymer products." Novec and Fluorinert are both Fluon ® PTFE/ETFE Fluoropolymers
Arkema							Fluon®	PTFE, ETFE	Confirmed by email: https://drive.google.com/drive/folders/1CcNjHUZcj2ya-uyy5vD2xx29OFoA5P85
Arkema	ES	Zaramillo	Legacy Producer				Nuva®	C6	Archroma is the "only European producer of C6 fluorinated telomer products, a sub-category of PFAS. Archroma's production facility is located in Germany (Gendorf, Bavaria)." [FOI DG GROW document]
Chemours	NL	Dordrecht	Producer						"At the GENDORF Chemical Park, Archroma's approx. 70 employees produce and develop new products based on short chain fluortelomers, which are sold to the global market as

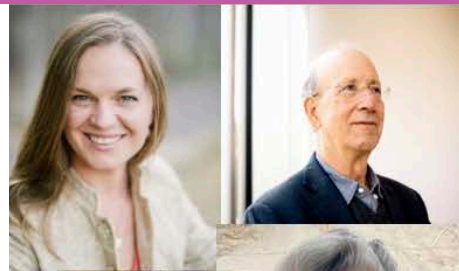
Define: PFAS production facility

Methodology | “Expert-reviewed journalism” (XRJ)

Sociologists

Alissa Cordner (Whitman College, Walla Walla, USA)

Phil Brown (Northeastern University, Boston, USA)



Environmental scientists

Ian Cousins (Stockholm University, Sweden)

Martin Scheringer (ETH Zürich, Switzerland)

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

Derrick Salvatore (Massachusetts Department of Environmental Protection, USA)



Environmental lawyer

Gretta Goldenman (Global PFAS Science Panel, Bruxelles)



XRJ | Adaptation of Salvatore 2022



pubs.acs.org/journal/estclu



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. Technol. Lett.* 2022, 9, 983–990



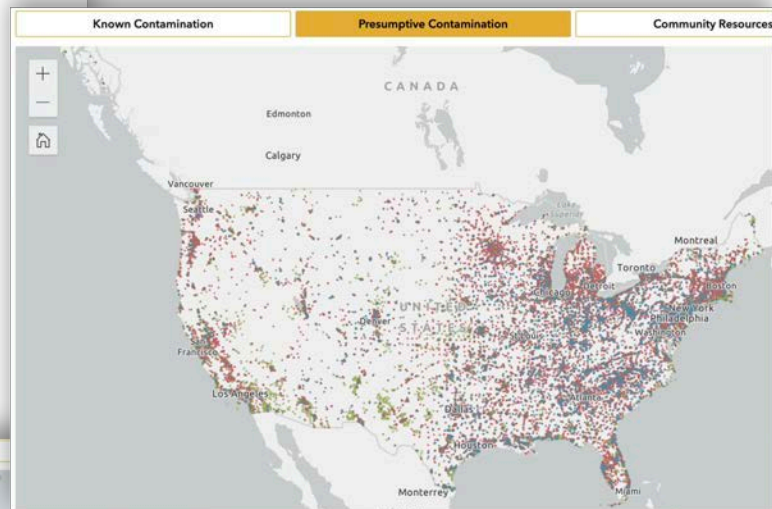
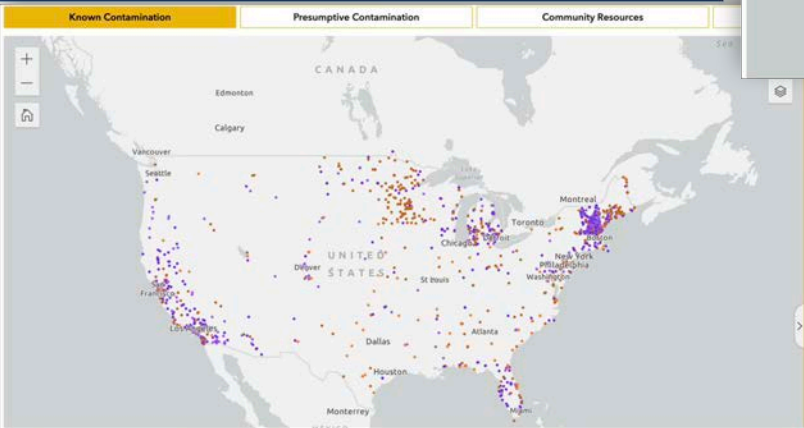
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Metric

ABSTRACT: While research on PFAS contamination has increased, data are incomplete about the scale, scope, and location of contamination in the United States. To address this, we analyzed quality testing data, PFAS contamination facilities: (1) fluorinated aqueous phase extraction (FQAP) facilities, (2) certain industrial facilities, and (3) are incomplete on all three types of data. We integrate available geocoded, national contamination sites in the United States: 49,145 industrial current or former military sites, allows governments, industries, and potential exposure sources.

KEYWORDS: per- and polyfluorinated PFAS waste and disposal



Presumptive Contamination Sites (n=57,412)



	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	
1			chemical universe										OECD PFAS database							
			Substance Name	EC	CAS	Registrat ion type	Highest register ed tonnage	Position in the chemical universe	Infocard URL	ID	CAS Number	Chemica l Name	Synony ms	Molecul ar formula	SMILES	Previous ly used CAS Number	Structur e Category	Structure Category Name	Number of Function al Groups	Perfluor oalkyl Chain Length
2																				
3			0 Octafluoropropane	200-941-5	76-19-7	active reg	>100 tpa	not yet as https://echa.eu		4718	76-19-7	Propane,	Propane,	C3 F8	FC(F)(F)C	218599-6	604	perfluoroalkanes & aromatics	1	3
4			1 Octafluoropropane	200-941-5	76-19-7	active reg	>100 tpa	not yet as https://echa.eu		4718	76-19-7	Propane,	Propane,	C3 F8	FC(F)(F)C	218599-6	604	perfluoroalkanes & aromatics	1	3
5			2 Octafluoropropane	200-941-5	76-19-7	active reg	>100 tpa	not yet as https://echa.eu		4718	76-19-7	Propane,	Propane,	C3 F8	FC(F)(F)C	218599-6	604	perfluoroalkanes & aromatics	1	3
6			3 Octafluoropropane	200-941-5	76-19-7	active reg	>100 tpa	not yet as https://echa.eu		4718	76-19-7	Propane,	Propane,	C3 F8	FC(F)(F)C	218599-6	604	perfluoroalkanes & aromatics	1	3
7			4 Octafluoropropane	200-941-5	76-19-7	active reg	>100 tpa	not yet as https://echa.eu		4718	76-19-7	Propane,	Propane,	C3 F8	FC(F)(F)C	218599-6	604	perfluoroalkanes & aromatics	1	3
8			5 Octafluoropropane	200-941-5	76-19-7	active reg	>100 tpa			AB							AC		AD	
9			6 Octafluorocyclobutane	204-075-1	115-25-3	active reg	<100 tpa													
10			7 Octafluorocyclobutane	204-075-1	115-25-3	active reg	<100 tpa													
11			8 Octafluorocyclobutane	204-075-1	115-25-3	active reg	<100 tpa													
12			9 Octafluorocyclobutane	204-075-1	115-25-3	active reg	<100 tpa													
13			10 Octafluorocyclobutane	204-075-1	115-25-3	active reg	<100 tpa													
14			11 Perflunafene	206-192-4	306-94-5	active reg	<100 tpa													
15			12 Perflunafene	206-192-4	306-94-5	active reg	<100 tpa													
16			13 Perfluorooctane	206-199-2	307-34-6	active reg	<100 tpa													
17			14 Heptadecafluorooctanesulphonyl fluoride	206-200-6	307-35-7	cease mai	not dis													
18			15 1,1,2,2,3,3,4,4,5,5,6-decafluoro-4,6-bis(trifluoro)	206-386-6	335-27-3	active reg	<100 tpa													
19			16 2,2,3,3,4,4,5,5,6,6,7,7-dodecafluoroheptan-	206-406-6	335-99-9	active reg	intern													
20			17 Perfluamine	206-420-2	338-83-0	active reg	>100 tpa													
21			18 Perfluoro[methylcyclohexane]	206-573-5	355-02-2	active reg	<100 tpa													
22			19 1,1,1,2,2,3,3,4,4,5,5,5-undecafluoro-4-(trifluoro)	206-575-6	355-04-4	active reg	>100 tpa													
23			20 Trideca-1,1,1,2,2,3,3,4,4,4,5,5,5,6-fluorohexa-	206-581-5	355-37-3	active reg	<100 tpa													
24			21 Tetradecafluorohexane	206-585-6	355-42-0	active reg	<100 tpa													
25			22 1,1,1,2,2,3,3,4,4,4,5,5,6,6-tridecafluoro-6-iodo-	206-586-6	355-43-1	active reg	intern													
26			23 1,1,1,2,2,3,3,4,4,4,5,5,6,6-tridecafluoro-6-iodo-	206-586-6	355-43-1	active reg	intern													
27			24 2,2,3,3,4,4,5,5-octafluoropent-1-ol	206-593-4	355-80-6	active reg	intern													
28			25 2,2,3,3,4,4,5,5-octafluoropent-1-ol	206-593-4	355-80-6	active reg	intern													
29			26 2,2,3,3,4,4,5,5-octafluoropentyl methacryla	206-596-6	355-93-1	active reg	<100 tpa													
30			27 2,2,3,3,4,4,5,5-octafluoropentyl methacryla	206-596-6	355-93-1	active reg	<100 tpa													
31			28 Methyl heptafluorobutyrate	206-600-6	356-24-1	active reg	<100 tpa													
32			29 2,2,3,3,4,4,4-heptafluorobutan-1-ol	206-782-1	375-01-9	active reg	intern													
33			30 1,1,2,2,3,3,4,4-octafluoro-1,4-diiodobutane	206-788-4	375-50-8	active reg	intern													
34			31 1,1,2,2,3,3,4,4-octafluoro-1,4-diiodobutane	206-788-4	375-50-8	active reg	intern													
35			32 1,1,2,2,3,3,4,4-octafluoro-1,4-diiodobutane	206-788-4	375-50-8	active reg	intern													
36			33 1,1,2,2,3,3,4,4-octafluoro-1,4-diiodobutane	206-788-4	375-50-8	active reg	intern													
37			34 1,1,2,2,3,3,4,4,4-nonafluorobutane-1-sulphi	206-792-4	375-72-4	active reg	intern													
38			35 1,1,2,2,3,3,4,4,4-nonafluorobutane-1-sulphi	206-792-4	375-72-4	active reg	intern													
39			36 1,1,2,2,3,3,4,4,4-nonafluorobutane-1-sulphi	206-792-4	375-72-4	active reg	intern													
40			37 1,1,2,2,3,3,4,4,4-nonafluorobutane-1-sulphi	206-793-1	375-73-5	active reg	<100 tpa													
41			38 1,6-diiodopentadecafluorohexane	206-794-7	375-80-4	active reg	>100 tpa													
42			39 2,2,3,3,5,5,6,6-octafluoro-4-(trifluoromethyl)	206-841-1	382-28-5	active reg	intern													
43			40 1-bromoheptadecafluorooctane	207-028-4	423-55-2	active reg	<100 tpa													
44			41 1-bromoheptadecafluorooctane	207-028-4	423-55-2	active reg	<100 tpa													
45			42 Trifluoro(trifluoromethyl)oxirane	207-050-4	428-59-1	active reg	<100 tpa													
46			43 Trifluoro(trifluoromethyl)oxirane	207-050-4	428-59-1	active reg	<100 tpa													
47			44 Trifluoro(trifluoromethyl)oxirane	207-050-4	428-59-1	active reg	<100 tpa													
48			45 Trifluoro(trifluoromethyl)oxirane	207-050-4	428-59-1	active reg	<100 tpa													
49			46 Trifluoro(trifluoromethyl)oxirane	207-050-4	428-59-1	active reg	<100 tpa													
50			47 3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctan-	211-477-1	647-42-7	active reg	intern													
51			48 3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctan-	211-477-1	647-42-7	active reg	intern	mediator regulatory https://echa.eu		348	647-42-7	1-Octanol 3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctan-	402,03 n:2 fluorotelomer alcohols (n:2 FTOHs) / t						1	
52			49 3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctan-	211-477-1	647-42-7	active reg	intern	mediator regulatory https://echa.eu		348	647-42-7	1-Octanol 3,3,4,4,5,5,6,6,7,7,8,8,8-tridecafluorooctan-	402,03 n:2 fluorotelomer alcohols (n:2 FTOHs) / t						1	

XRJ | What is a PFAS hotspot?

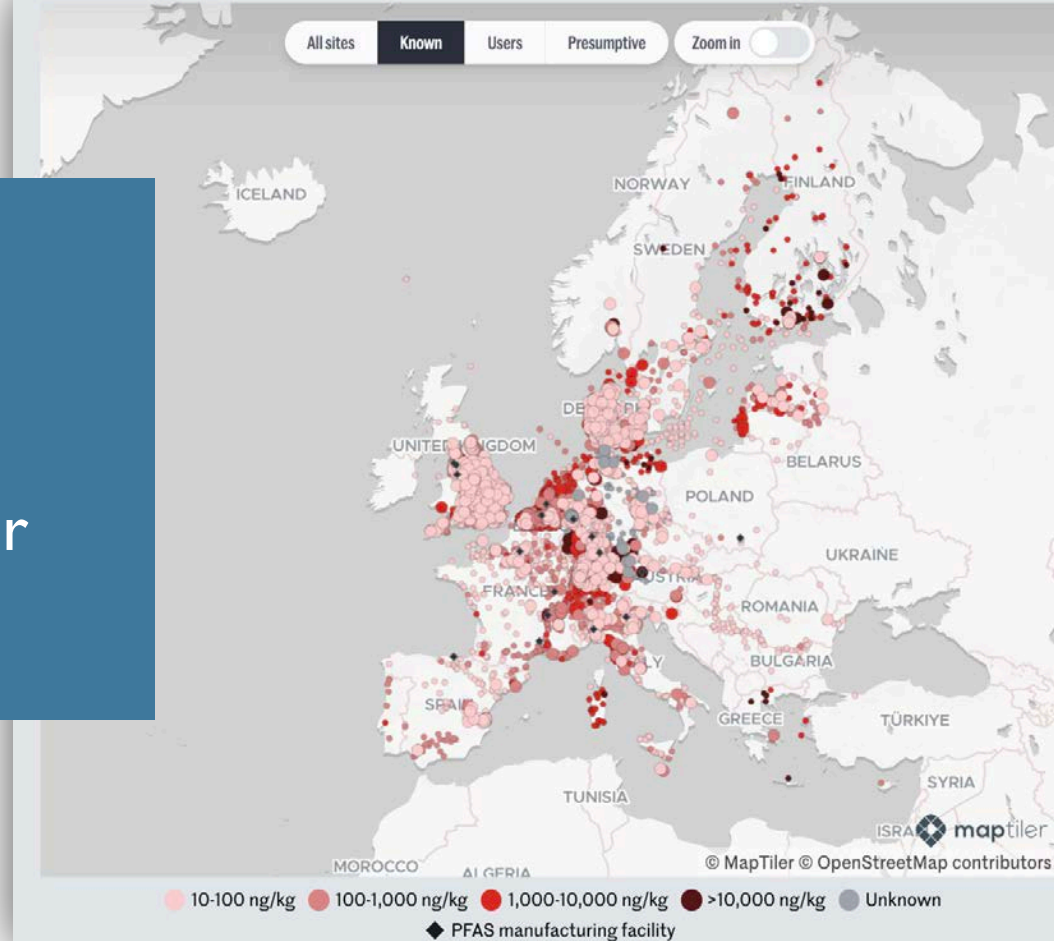
EU limit value

= 100 ng/l (20 PFAS)

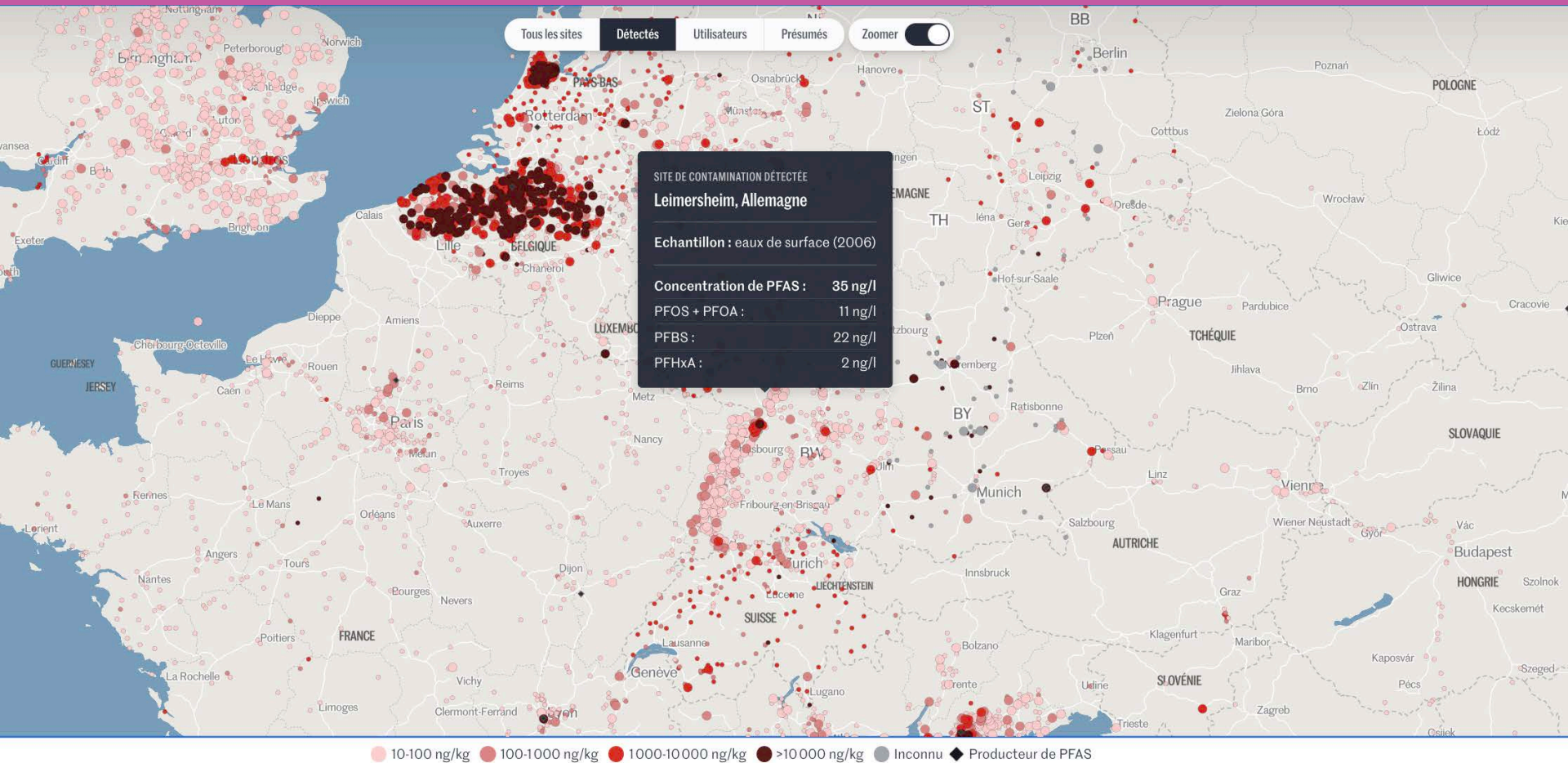
= 500 ng/l (sum PFAS)

Hotspot according to Forever
Pollution Project's Experts

= **100 ng/l**



XRJ | PFAS concentrations display



Journalism meets Academia (and vice versa)



pubs.acs.org/est

Article

PFAS Contamination in Europe: Generating Knowledge and Mapping Known and Likely Contamination with “Expert-Reviewed” Journalism

Alissa Cordner, Phil Brown, Ian T. Cousins, Martin Scheringer, Luc Martinon, Gary Dagorn, Raphaëlle Aubert, Leana Hosea, Rachel Salvidge, Catharina Felke, Nadja Tausche, Daniel Drepper, Gianluca Liva, Ana Tudela, Antonio Delgado, Derrick Salvatore, Sarah Pilz, and Stéphane Horel*



Cite This: <https://doi.org/10.1021/acs.est.3c09746>



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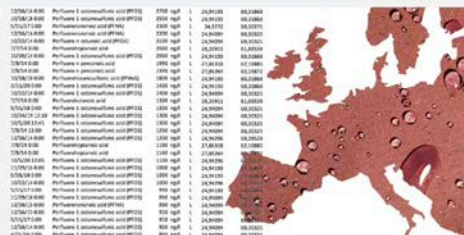
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Metrics & More

Article Recommendations

Supporting Information

ABSTRACT: While the extent of environmental contamination by per- and polyfluoroalkyl substances (PFAS) has mobilized considerable efforts around the globe in recent years, publicly available data on PFAS in Europe were very limited. In an unprecedented experiment of “expert-reviewed journalism” involving 29 journalists and seven scientific advisers, a cross-border collaborative project, the “Forever Pollution Project” (FPP), drew on both scientific methods and investigative journalism techniques such as open-source intelligence (OSINT) and freedom of information (FOI) requests to map contamination across Europe, making public data that previously had existed as “unseen science”. The FPP identified 22,934 known contamination sites, including 20 PFAS manufacturing facilities, and 21,426 “presumptive contamination sites”, including 13,745 sites presumably contaminated with fluorinated aqueous film-forming foam (AFFF) discharge, 2911 industrial facilities, and 4752 sites related to PFAS-containing waste. Additionally, the FPP identified 231 “known PFAS users”, a new category for sites with an intermediate level of evidence of PFAS use and considered likely to be contamination sources. However, the true extent of contamination in Europe remains



PFAS DATA HUB

cnrs

<https://pdh.cnrs.fr>



Making visible the invisible | Part 2 Politics Forever Lobbying Project (2025)

Coordination *Le Monde*

46 journalists

16 countries

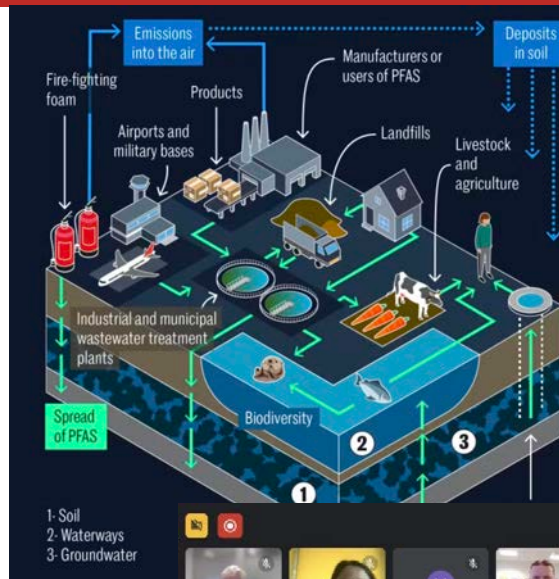
29 medias

18 experts

11 cats

140 articles

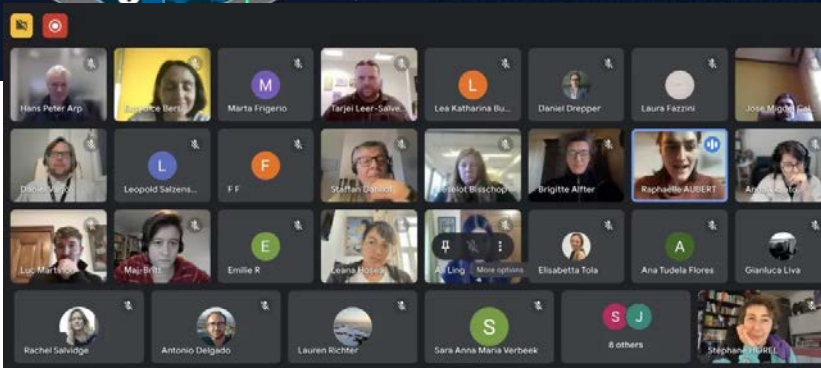
14,000 PFAS documents



PFAS | THE COST OF INACTION

EPIISODES

€100 billion a year.



navigare
necesse est,
vivere non est
necesse





Denik Referendum



Investigative
Reporting
Denmark



investico
onderzoeksjournalisten

DE GROENE
AMSTERDAMMER



KLASSEKAMPEN

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Czech Republic

Denmark

Finland

The Netherlands

The Netherlands

The Netherlands

Norway

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MIT Technology Review



oštro

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Germany

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Sweden

WDR

SZ

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L'Espresso

DAGENS ETC

SRF

THE BLACK SEA
DYING UCLP INTO STORIES

WATERSHED

Germany

Germany

Greece

Italy

Sweden

Switzerland

Turkey

United Kingdom



Italy



Italy

[FACTA.EU]

Italy

lavialibera
pensieri nuovi, parole diverse

Italy

The
Guardian

United Kingdom



foreverpollution.eu/lobbying

XRJ reloaded



Rob Bilott

Attorney, Taft Stettinius & Hollister LLP /
United States

Bio



Ian Cousins

Stockholm University / Sweden

Bio



Joost Dalmijn

Stockholm University / Sweden

Bio



Martin Scheringer

ETH Zürich / Switzerland

Bio



Jamie De Witt

Oregon State University / United States

Bio



Romain Figuière

Stockholm University / Sweden

Bio



Gretta Goldenman

Global PFAS Science Panel / Belgium

Bio



Philippe Grandjean

University of Southern Denmark /



Dorte Herzke

Norwegian Institute for Air Research /



Marcel Riegel

German Water Center / Germany

Historical documents



Lauren Richter

University of Toronto / Canada

Bio



Lieslot Bisschop

Erasmus University of Rotterdam / The
Netherlands

Bio



Sammie Verbeek

Vrije Universiteit in Amsterdam / The
Netherlands

Bio

AI analysis



Hugo Subtil

University of Zürich / Switzerland



Juliette Jahan de Lestang

École des Mines de Paris / France

XRJ | The Cost



Ali Ling

University of St. Thomas School of
Engineering / United States



Hans Peter Arp

Norwegian University of Science and
Technology and Norwegian
Geotechnical Institute / Norway



Raphaëlle Aubert
Le Monde



Eurydice Bersi

**REPORTERS
UNITED**



HIGH ESTIMATE

SCENARIO:
PFAS emissions into the environment continue. More contaminated sites need to be equipped and treated.

PFAS TREATED:
All types of PFAS, including TFA



XRJ | Stress-test of the lobbying arguments



Gary Fooks

University of Bristol / United Kingdom



Stéphane Horel
Le Monde



Jose Miguel Calatayud
Freelancer



Daniel Värjö
sverigesradio



Sarah Pilz
Freelancer



XRJ | Stress-test of the lobbying arguments

Health

#1 'Not all PFAS' [are the same] | **MISLEADING**

#2 [Fluoropolymers are] 'Not toxic' | **MISLEADING**

#3 [because Fluoropolymers are] 'Polymers of Low Concern (PLCs) according to criteria established by the Organisation for Economic Co-operation and Development' | **POTENTIALLY DISHONEST**

→ [All 3 leading to the lobbying request of] 'No grouping'

#4 'Persistence is not enough' | **FALSE**

Environment

#5 'Emissions are/can be managed' | **FALSE**

#6 'Non-fluorinated polymerisation aids' [allows clean manufacture of fluoropolymers] | **FALSE**

→ [leading to the lobbying request of] 'Self-regulation'

#7 'Waste can be managed' | **FALSE**

→ [leading to the lobbying request of] 'Existing regulation/s are enough'

**Most arguments are straight from
the corporate disinformation playbook**



XRJ | The stress-test methodology

Organisation	Argument exact quote	Sub-argument	Context	Country	Argument topic	DocumentCloud Link	Category
Arkema	Arkema has developed an innovative patented technology to produce PVDF fluoropolymers without the use of PFAS polymerization aids		Echa consultation	France	Non-fluorinated polymerisation aids		Science
Arkema	Arkema considers that fluoropolymers produced without PFAS polymerization aids deserve an exemption.		Echa consultation	France	Non-fluorinated polymerisation aids		Science
Arkema	Potential impact of the restriction is quite huge in term of cost per kilo of emission saved which might question the proportionality of the restriction.		Echa consultation	France	Economic impact		Economy
Arkema	It is their specific combinations of properties that are not matched by any of the alternatives. [...] Fluoropolymers are unique materials due to their high-performance properties: non-wetting, high dielectric, non-stick, fire resistant, temperature resistant, weather resistant and with near universal resistance to chemicals.		Echa consultation	France	There is no alternative		TINA
Arkema	The scope of the restriction should be more granular and based on the presence / absence of the "unacceptable risk" in the meaning of REACH, [...] that is, it should consider the risk profile of the substance itself and the		Echa consultation	France	Not toxic		Science
					Persistence is not enough	https://www.chemicals.echa.europa.eu/en/infrastructure/infrastructure-1	
					Not toxic	https://www.chemicals.echa.europa.eu/en/infrastructure/infrastructure-1	
Arkema	"dangerous substances" under the CLP regulation, a classification that justifies a restriction		FOI	France	Existing regulation/s are enough	https://www.chemicals.echa.europa.eu/en/infrastructure/infrastructure-1	
Arkema	The dossier often refers to the dangers of PFOS and PFOA, which are already regulated at European level (REACH, POPs); adding a restriction applicable to all PFAS to this framework could lead to a superfluous double ban;		FOI	France	Existing regulation/s are enough	https://www.chemicals.echa.europa.eu/en/infrastructure/infrastructure-1	

**Methodology to investigate lobbying live
(and not post-mortem)
> To be improved!**



XRJ | 14.000 documents

- Archives US EPA
- 3M litigation
- Freedom of information requests



Industry Documents Library

Toxic Docs

From: [REDACTED]
Sent: Tuesday, July 14, 2023 11:34 AM
To: [REDACTED] (GROW) [REDACTED]
Cc: [REDACTED] (GROW) [REDACTED]
(ENV) [REDACTED]@ec.europa.eu>
Subject: RE: Meeting with [REDACTED] on PFAS



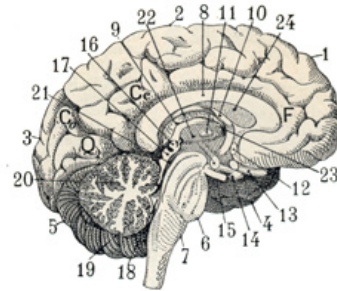
A XRI: a subjective recipe

win *for journalists*

- Methodology
- Rigour
- Quality
- Credibility

win *for experts*

- Data
- Impact
- Scientific literacy in the public
- Intellectual challenge



Thank you!

