

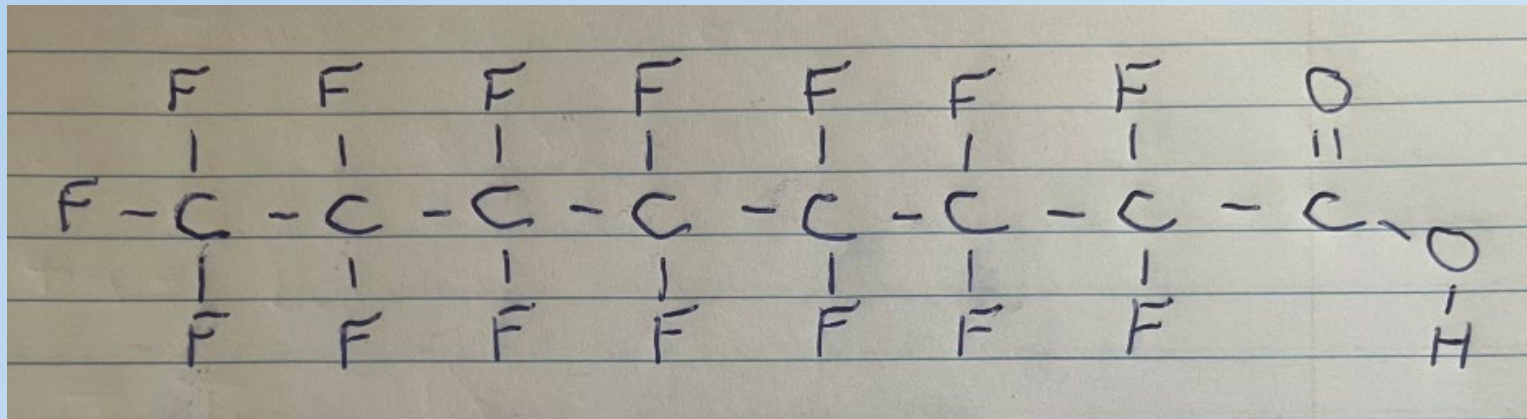


**West Virginia Department of Environmental Protection's
Experiences with PFAS
NATTS EtO Concentrations Across the Country**

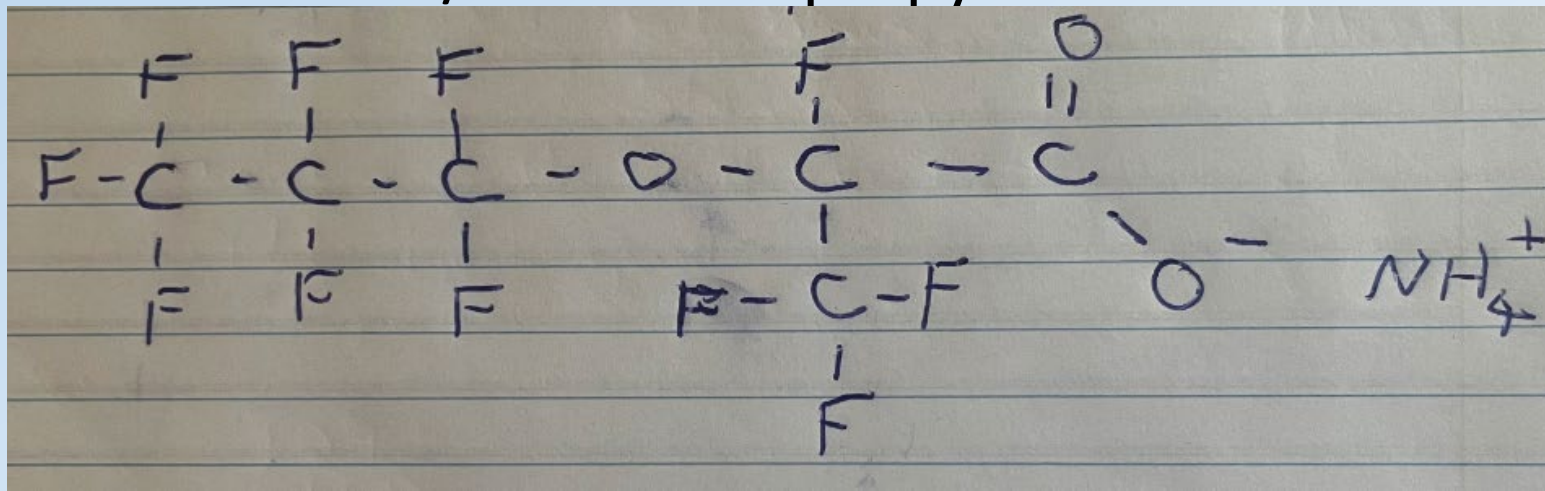
April 8, 2026

PFOA & GenX

- Ammonium Perfluorooctanoate (APFO)/C8/Perfluorooctanoic Acid PFOA

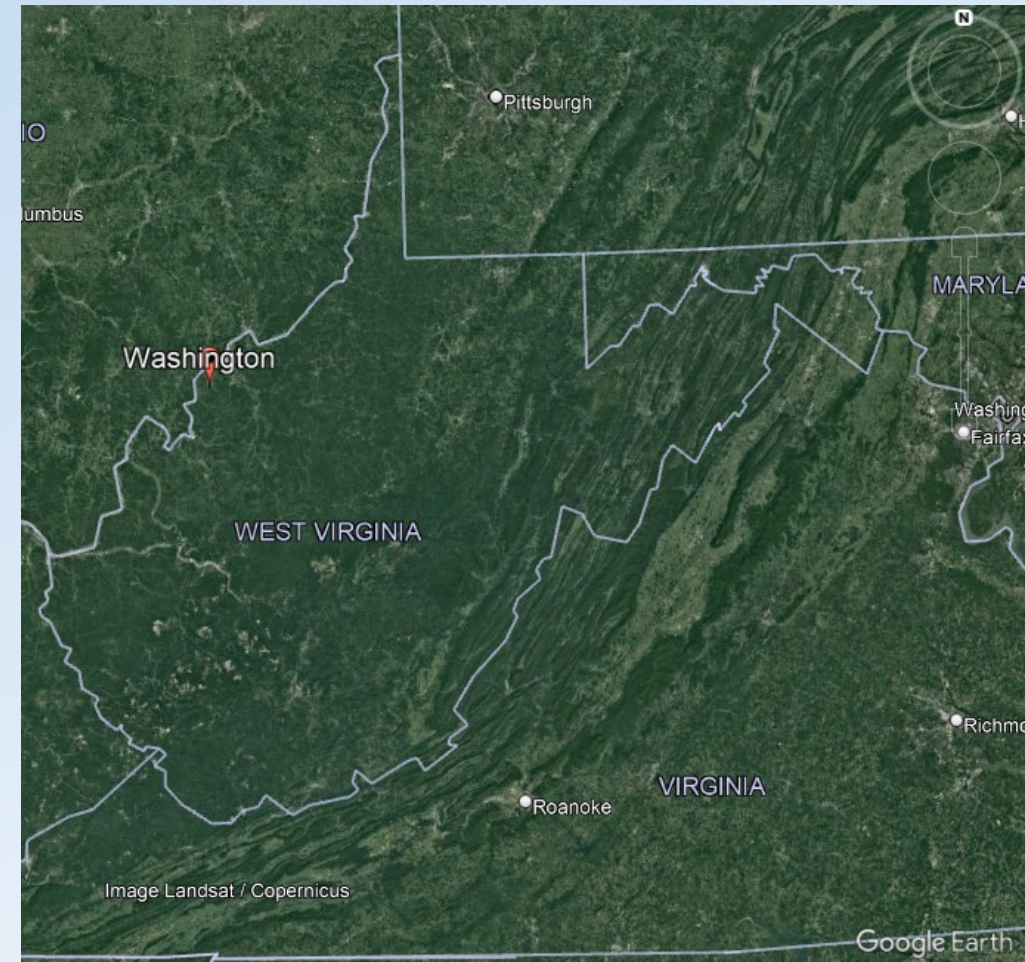


- GenX/C3-Dimer Acid/Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)

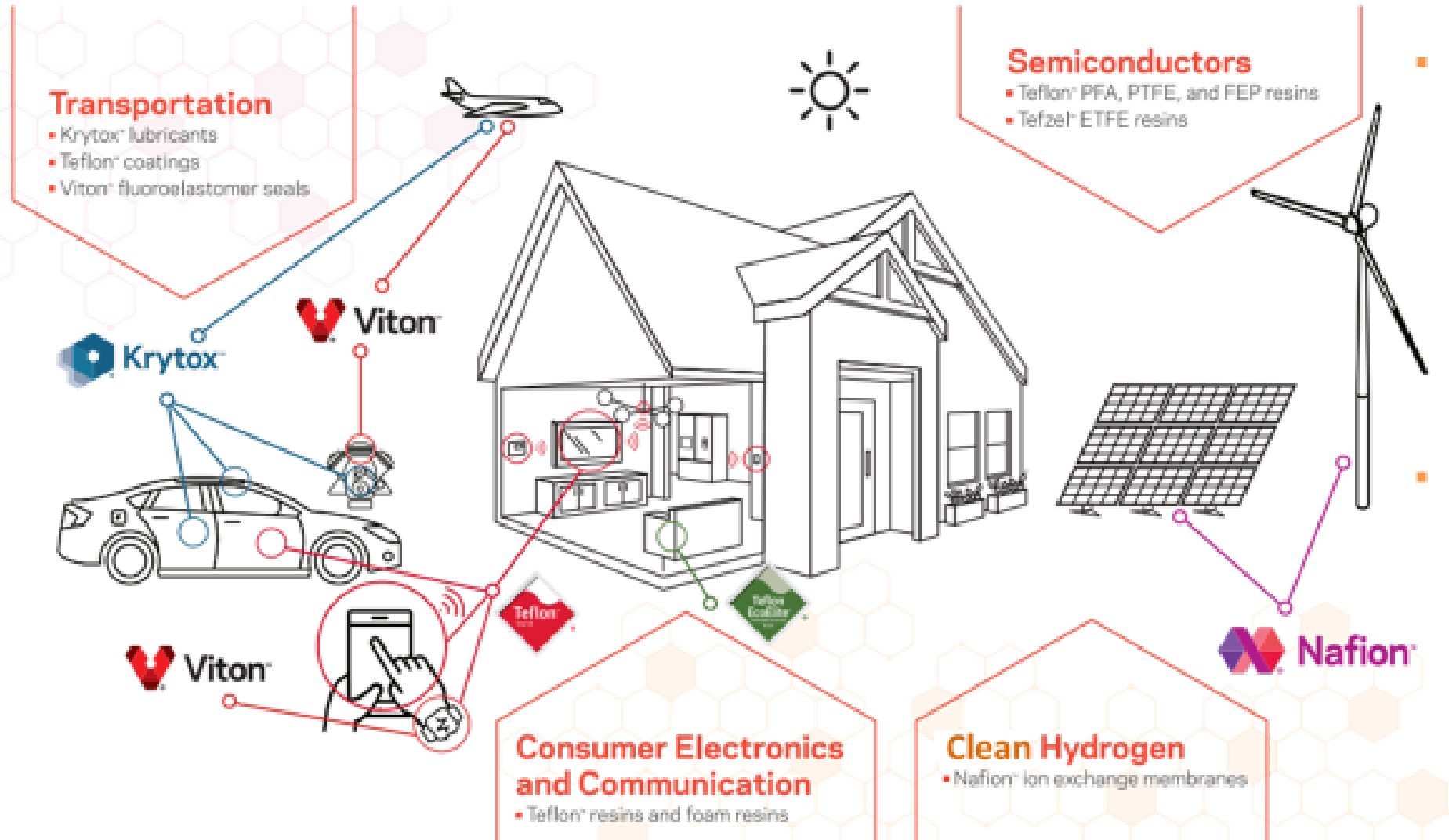


DuPont/Chemours Washington Works

- 1940's – Teflon production began
- 1950's – DuPont began using APFO/C8/PFOA
- 2013 – PFOA was phased out and replaced with C3-Dimer Acid/GenX
- 2015 – Part of DuPont was sold to Chemours
- 2015 – WVDAQ banned the use of PFOA
- 2018/2019 – Stack testing was performed with split samples sent to EPA ORD



Advanced Performance Materials (APM)



- Chemours' APM business is supported by two WV plants – **Belle and Washington Works** – that produce critical solutions and play an important role in many **emerging technologies** that are enabling a better future for all.
- Our fluoropolymers are essential building blocks to **advanced electronics, the hydrogen economy, semiconductors, and electric vehicles.**

Table 1
The Chemours Company - Washington Works
TC Scrubber Outlet
Parkersburg, West Virginia

Run Identification	Run 1	Run 2	Run 3	Average
Run Date	23Jul19	23Jul19	23Jul19	
Start/Stop Time	0948-1133	1250-1436	1536-1721	
<u>Exhaust Gas Conditions</u>				
Temperature (deg. F)	117	114	115	115
Moisture (volume %)	9.3	10.4	9.4	9.7
Oxygen (dry volume %)	4.5	4.1	4.1	4.2
Carbon Dioxide (dry volume %)	9.93	9.78	9.81	9.84
<u>Volumetric Flow Rate</u>				
acfm	1,981	1,895	2,068	1,981
dscfm	1,648	1,564	1,724	1,645
<u>C3 Dimer Acid Emissions</u>				
mg/dscm	6.78E-04	1.27E-03	3.01E-04	7.51E-04
lb/hr	4.19E-06	7.47E-06	1.94E-06	4.53E-06
<u>PFOA Emissions</u>				
mg/dscm	6.09E-04	2.01E-04	2.18E-04	3.43E-04
lb/hr	3.76E-06	1.18E-06	1.41E-06	2.11E-06
<u>E-1 Emissions</u>				
mg/dscm	<2.34	<1.67	<1.56	<1.86
lb/hr	<1.44E-02	<9.81E-03	<1.01E-02	<1.14E-02

<u>PFBA</u>	mg/dscm	6.35E-02	3.76E-02	5.02E-02	5.04E-02	1.10E-02	6.90E-03	7.22E-03	8.39E-03	78.0
	lb/hr	7.54E-05	4.86E-05	7.07E-05	6.49E-05	1.50E-05	1.37E-05	1.42E-05	1.43E-05	
<u>PFPeA</u>	mg/dscm	5.59E-01	4.97E-01	4.90E-01	5.16E-01	6.04E-02	3.38E-02	2.58E-01	1.18E-01	67.1
	lb/hr	6.64E-04	6.43E-04	6.90E-04	6.66E-04	8.21E-05	6.72E-05	5.08E-04	2.19E-04	
<u>PFHxA</u>	mg/dscm	8.99E-02	1.10E-01	9.63E-02	9.87E-02	5.64E-03	1.66E-03	2.16E-03	3.15E-03	96.0
	lb/hr	1.07E-04	1.42E-04	1.36E-04	1.28E-04	7.67E-06	3.31E-06	4.24E-06	5.07E-06	
<u>PFHpA</u>	mg/dscm	5.02E+00	5.73E+00	5.17E+00	5.31E+00	1.25E-02	1.45E-02	1.38E-02	1.36E-02	99.6
	lb/hr	5.96E-03	7.40E-03	7.28E-03	6.88E-03	1.70E-05	2.88E-05	2.72E-05	2.43E-05	
<u>PFOA</u>	mg/dscm	3.21E-01	4.24E-01	1.01E+00	5.83E-01	1.51E-03	1.35E-03	1.53E-03	1.46E-03	99.7
	lb/hr	3.81E-04	5.49E-04	1.42E-03	7.82E-04	2.05E-06	2.67E-06	3.01E-06	2.58E-06	
<u>PFNA</u>	mg/dscm	5.94E+00	7.43E+00	6.92E+00	6.76E+00	4.50E-03	2.56E-03	2.59E-03	3.22E-03	99.9
	lb/hr	7.05E-03	9.61E-03	9.74E-03	8.80E-03	6.12E-06	5.08E-06	5.08E-06	5.43E-06	
<u>PFDA</u>	mg/dscm	1.89E-01	2.29E-01	2.08E-01	2.09E-01	3.61E-03	1.15E-03	1.13E-03	1.96E-03	98.8
	lb/hr	2.24E-04	2.96E-04	2.93E-04	2.71E-04	4.91E-06	2.29E-06	2.21E-06	3.14E-06	
<u>PFUnA</u>	mg/dscm	4.03E+00	5.26E+00	4.92E+00	4.74E+00	5.37E-03	2.68E-03	2.54E-03	3.53E-03	99.9
	lb/hr	4.79E-03	6.80E-03	6.93E-03	6.17E-03	7.30E-06	5.33E-06	5.00E-06	5.87E-06	
<u>PFDoA</u>	mg/dscm	8.96E-02	1.17E-01	1.12E-01	1.06E-01	3.93E-04	2.13E-04	1.09E-04	2.38E-04	99.7
	lb/hr	1.06E-04	1.51E-04	1.58E-04	1.39E-04	5.34E-07	4.22E-07	2.14E-07	3.90E-07	
<u>PFTriA</u>	mg/dscm	3.27E+00	4.02E+00	4.11E+00	3.80E+00	3.08E-03	2.51E-03	1.53E-03	2.37E-03	99.9
	lb/hr	3.88E-03	5.20E-03	5.78E-03	4.96E-03	4.18E-06	5.00E-06	3.00E-06	4.06E-06	
<u>PFTeA</u>	mg/dscm	4.31E-02	4.60E-02	5.76E-02	4.89E-02	1.14E-04	9.40E-05	5.31E-07	6.94E-05	99.8
	lb/hr	5.12E-05	5.94E-05	8.12E-05	6.39E-05	1.54E-07	1.87E-07	1.04E-09	1.14E-07	
<u>HFPO-DA</u>	mg/dscm	3.75E+02	3.01E+02	4.77E+02	3.84E+02	2.16E+00	2.69E+00	2.21E+01	8.99E+00	96.6
	lb/hr	4.45E-01	3.89E-01	6.72E-01	5.02E-01	2.94E-03	5.35E-03	4.35E-02	1.72E-02	

How are PFAS Air Emissions Regulated?

Is it a VOC? Is it an ODC? CISWI? WV State Rule?

8.1.1. Emissions released to the atmosphere shall be limited to the pollutants and associated maximum emission rates set forth in the following Table 8.1.1:

Table 8.1.1.

Emission Point ID	Source ID (Description)	Control Device	Pollutant	Emission Limit	
				pph	tpy
T5HTE	T5HT (#1 Tank)	None	ODC	0.2	0.01
			VOC	27.4	0.06
T5HUE	T5HU (#2 Tank)	None	ODC	0.2	0.01
			VOC	27.4	0.06
T5HVE	T5HV (#3 Tank)	None	ODC	0.2	0.01
			VOC	27.4	0.06
T5HWE	T5HW (#4 Tank)	None	ODC	0.2	0.01
			VOC	27.4	0.06
T5HXE	T5HX (#5 Tank)	None	ODC	0.2	0.01
			VOC	27.4	0.06
T5HN (Area Emissions)	T5HN (Raw Material System)	None	VOC	2.2	0.01
T5HC & T5HD (Area Emissions)	T5HC (#4 Polykettle)	None	ODC	0.1	0.02
	T5HD (#5 Polykettle)		VOC	1.7	7.14
T5HCE	T5HC (#4 Polykettle)	None	ODC	0.8	0.15
	T5HN (Raw Material System)				
	T5HW (#4 Tank)		VOC	17.10	3.30
T5HCE2	T5HP (Raw Material Tank)	None	ODC	0.7	0.01
			VOC	152.0	1.33
T5HDE	T5HD (#5 Polykettle)	None			
	T5HX (#5 Tank)		ODC	0.78	0.15
	T5HT(#1 Tank)				
	T5HU (#2 Tank)		VOC	32.30	3.30
	T5HV (#3 Tank)				
T5HDE2	T5HP (Raw Material Tank)				
T5HDE2	T5HD (#5 Polykettle)	None	ODC	0.7	0.01
			VOC	152.0	1.33

7.1.5. All control devices shall be maintained and operated in accordance with the information submitted in Permit Application R13-1823A through R13-1823M. The operating conditions which shall be adhered to include the following:



Thermal Converter - Combustion (T7IMC)	Value	Units
Minimum Combustion Chamber Temperature	1,800	°F
Maximum Waste Gas Feed Rate	1,910	pph
Maximum Charge Rate (HFC-23 from tank car unloading for CISWI)	As required under CISWI monitoring requirements in Condition 7.2.2.	
Thermal Converter - Scrubber (T7IMC)	Value	Units
Maximum Gas Stream Flow	As required under the 40 C.F.R. 63, Subpart FFFF monitoring requirements in Condition 7.2.7.	
Minimum Pressure Drop Across the Wet Scrubber	As required under the CISWI monitoring requirements in Condition 7.2.2.	
Minimum Re-circulated Liquor Flow (1st Stage)	40	gpm
Minimum Re-circulation Pump Current (1st Stage)	1.0	Amps
Note: If minimum re-circulation liquor flow indication above is less than 40 gpm (i.e. flow meter malfunction), then the recirculation pump amp load must be maintained above 1.0 amp load as a back-up indication to flow.		
4th (Final Scrubbing) Stage Requirements:		
Minimum Scrubber Liquor Flow (4th Stage) (Dilute Na ₂ SO ₃ , pH adjusted)	The most stringent of the CISWI monitoring requirements in Condition 7.2.2, the 40 C.F.R. 63, Subpart FFFF monitoring requirements in Condition 7.2.7, or the 40 C.F.R. 63, Subpart NNNNN monitoring requirements in Condition 7.2.4.	
Liquor Oxidation/Reduction Potential (4th Stage)	≤ +400	millivolts vs. Ag/AgCl ref. electrode
Minimum Scrubber Liquor pH (4th Stage)	The most stringent of the CISWI monitoring requirements in Condition 7.2.2, the 40 C.F.R. 63, Subpart FFFF monitoring requirements in Condition 7.2.7, or the 40 C.F.R. 63, Subpart NNNNN monitoring requirements in Condition 7.2.4.	
Maximum Scrubber Effluent pH (4th Stage)	As required under the 40 C.F.R. 63, Subpart NNNNN monitoring requirements in Condition 7.2.4.	

TRI & GHG Emissions Reported from the Facility

Speciated list of what “could” be considered PFAS reported

Reported to TRI – 9 compounds

Reported solely as Greenhouse Gas Emissions – 56 compounds

EPA proposed in September 2025 to remove Greenhouse Gas reporting for most sectors

A final rule expected in 2026

From Report	Chemical	Point source emissions (lb/yr)
TRI	HCFC-123	5.0
TRI / GHG	Perfluorohexanoic Acid	0.1
TRI / GHG	HCFC-22	16651.0
TRI / GHG	CFC-114	1.0
TRI / GHG	HFPO-DA	725.0
TRI / GHG	CFC-12	0.1
TRI / GHG	HCFC-124	0.2
TRI	Perfluorooxyl iodide	61.0
TRI	Tetrafluoroethylene	68669.0
GHG	Hexafluoropropylene	36351.4
GHG	1,1,1,2,2,3,3-Heptafluoro-3-(1,2,2,2-tetrafluoroethoxy)-propane (E1)	11595.2
GHG	1-chloro-1,1,2,2,3,3 hexafluoropropane [K226CB]	0.1
GHG	1-chloro-1,1,2,2,3,3,4,4 Octofluorobutane [K328LCC]	1.9E-02

GHG	1H,10H-Perfluorodecane	679.0
GHG	1H,12H-Perfluorododecane	102.1
GHG	1H,4H-Perfluorobutane	2796.4
GHG	1H,6H-Perfluorohexane	2191.5
GHG	1H,8H-Perfluorooctane	1284.0
GHG	Chloropentafluoroethane	385.3
GHG	Chlorotrifluoroethylene [K1113]	9.4
GHG	Chlorotrifluoromethane	196.2
GHG	Heptadecafluoro-1-iodooctane	60.8
GHG	Hexafluoro-2-butyne	19.9
GHG	HFC-125	937.7
GHG	HFC-134a	0.6
GHG	HFC-23	32252.0
GHG	HFC-32	4.1
GHG	HFC-43-10mee	2333.3
GHG	HFO-1123	1.5
GHG	Octofluoro-2-butene [K1318]	46.4
GHG	Pentafluoropropene	3.0
GHG	Perfluorobut-1-ene	158.2
GHG	Perfluorobutonic Acid (PFBA)	817.2
GHG	Perfluorobutylethylene	19.1

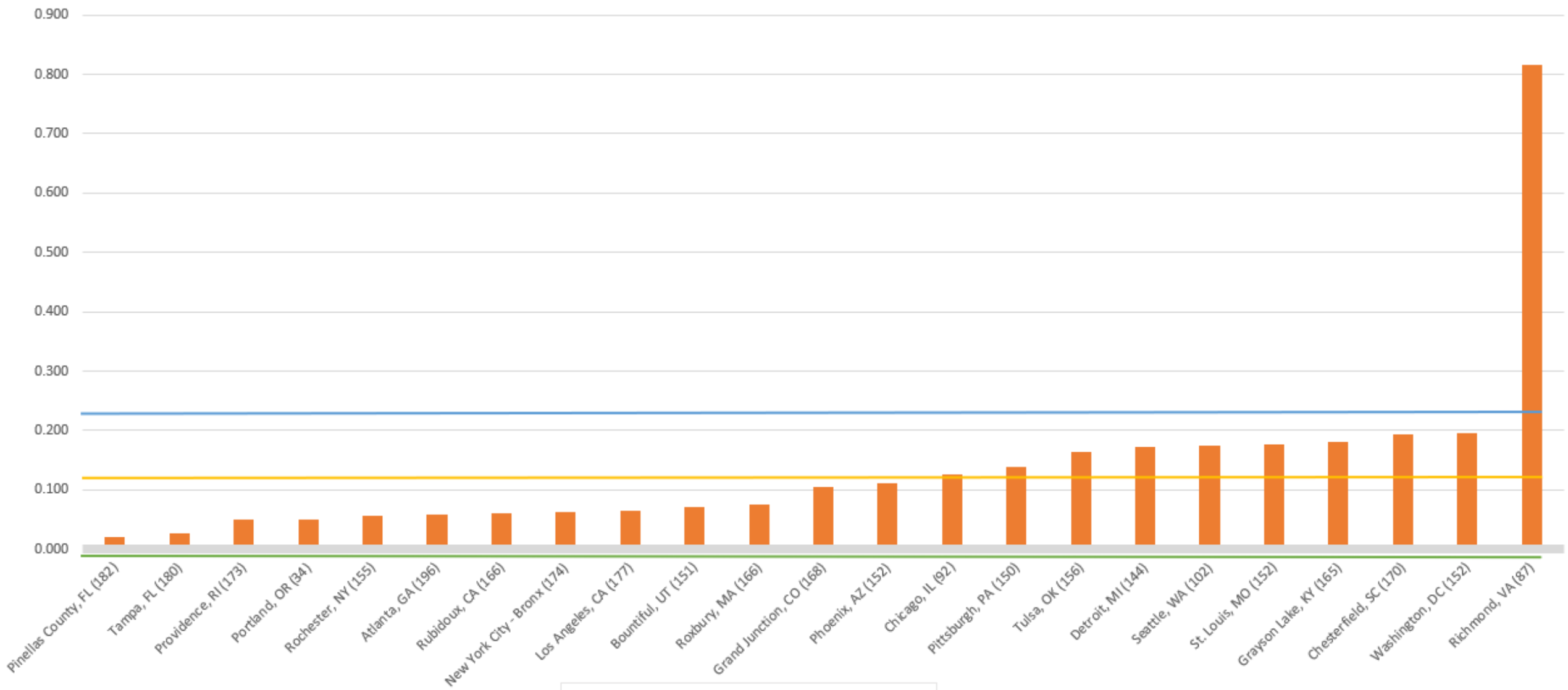
GHG	Perfluorobutyl iodide	1287.2
GHG	Perfluorocyclobutane	60049.4
GHG	Perfluorodecane	0.6
GHG	Perfluorodecanoic acid (PFDA)	3.3E-02
GHG	Perfluorododecane	1.4E-05
GHG	Perfluorododecanoic acid (PFDoA)	4.4E-02
GHG	Perfluoroethyl vinyl ether	10782.5
GHG	Perfluoroheptanoic acid (PFHpA)	0.3
GHG	Perfluorohexadecane	3.7E-05
GHG	Perfluorohexyl iodide	181.2
GHG	Perfluoroisobutylene	1760.6
GHG	Perfluorononane	8.8E-04
GHG	Perfluorononanoic acid (PFNA)	0.3
GHG	Perfluorooctanoic acid (PFOA)	18.5
GHG	Perfluoropentadecane	2.4E-05
GHG	Perfluoropentanoic Acid (PFPeA)	0.2
GHG	Perfluoropropyl vinyl ether	15165.9
GHG	Perfluorotetradecane	3.5E-05
GHG	Perfluorotetradecanoic acid (PFTeA)	1.1E-02
GHG	Perfluorotridecane	2.1E-05
GHG	Perfluorotridecanoic acid (PFTriA)	0.2
GHG	Perfluoroundecane	7.9E-06
GHG	Perfluoroundecanoic acid (PFUnA)	0.3
GHG	PFC-116 (Perfluoroethane)	996.4
GHG	PFC-218 (Perfluoropropane)	3230.6
GHG	PFC-3-1-10 (Perfluorobutane)	0.4
GHG	PFC-4-1-12 (Perfluoropentane)	131.9
GHG	PFC-5-1-14 (Perfluorohexane, FC 72)	57.8
GHG	PFC-6-1-12	8.8E-04
GHG	PFC-7-1-18	0.8
GHG	PMVE; HFE-216	5.9

NATTS EtO Concentrations Across the Country

- Looked at EtO concentrations at only National Air Toxics Trends Stations (NATTS)
 - Only looked at sites that are still measuring data and not reporting technical issues
 - Only used 2022-2024 data
 - Examined flagged LK's – (detected, value may be biased high)
 - With three years of data, the risks shown cannot be used to determine lifetime risk
 - WVDEP was told by EPA that they will not be using Method 327 for NATTS



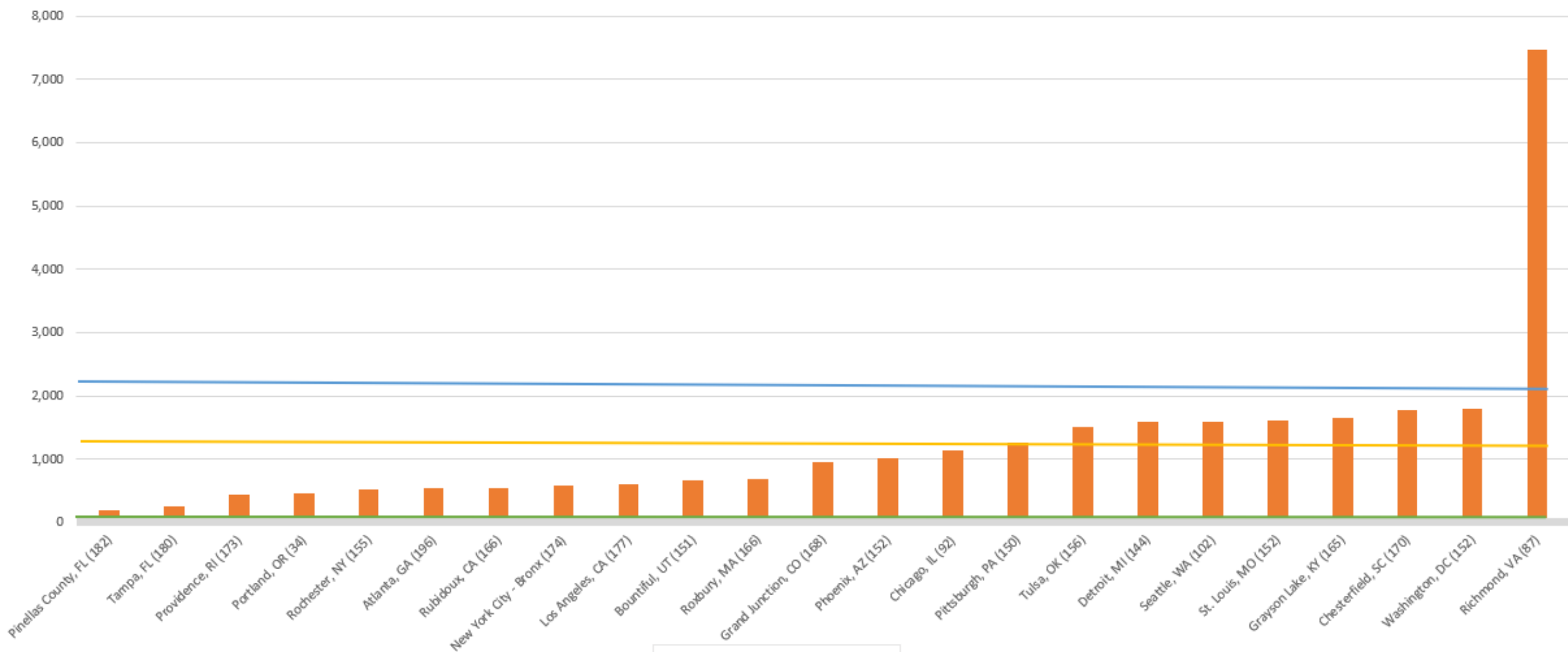
National Air Toxics Trends Stations (NATTS) EtO Average Concentration (ppbv)



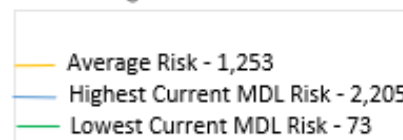
() - Number of samples for each site (2022-2024)
Chemists may report below MDL as zero

— Average Concentration - 0.137 ppbv
— Highest Current MDL Concentration - 0.241 ppbv
— Lowest Current MDL Concentration - 0.008 ppbv

National Air Toxics Trends Stations (NATTS) EtO Site Average Risk (in a million)

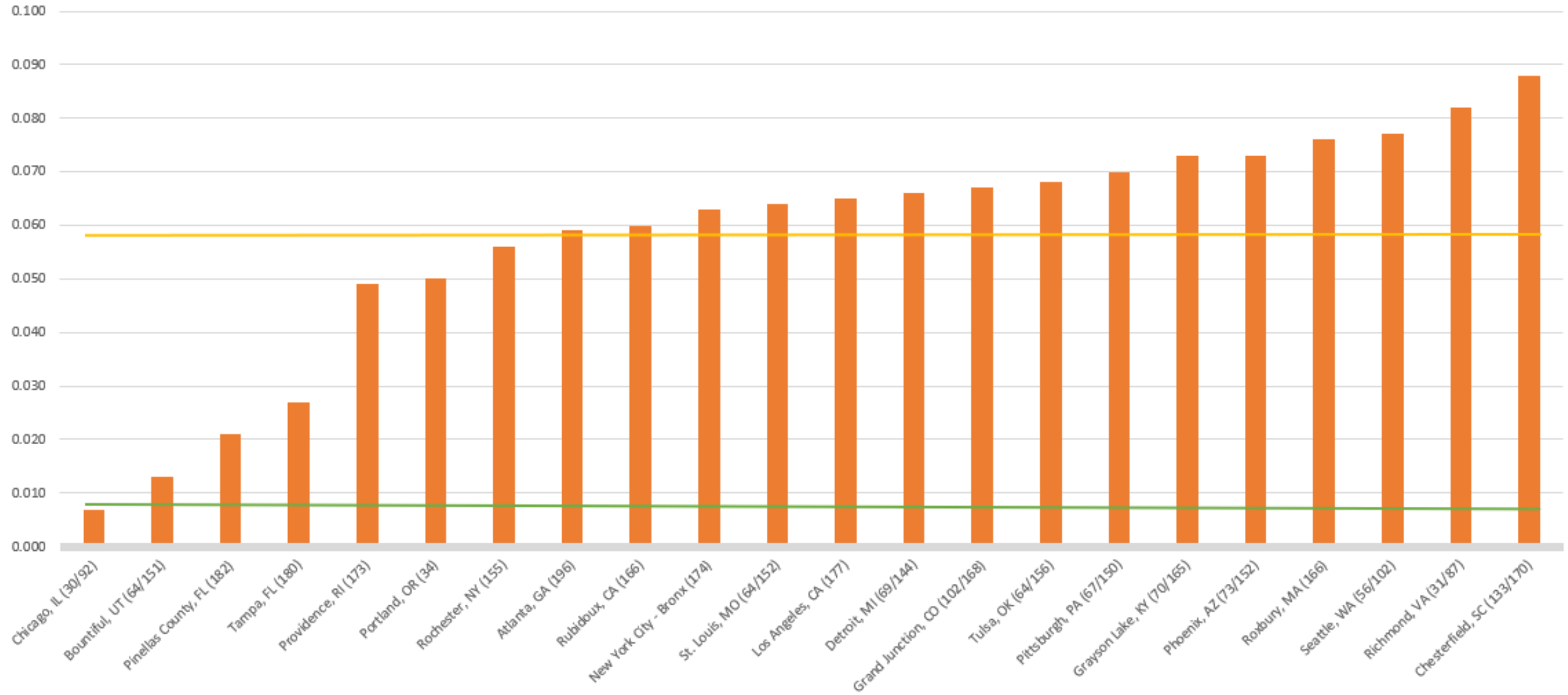


() - Number of samples for each site (2022-2024)
Chemists may report below MDL as zero



May 29, 2025

National Air Toxics Trends Stations (NATTS)
EtO Average Concentration (ppbv)
LK Removed



() - Number of samples for each site (2022-2024)

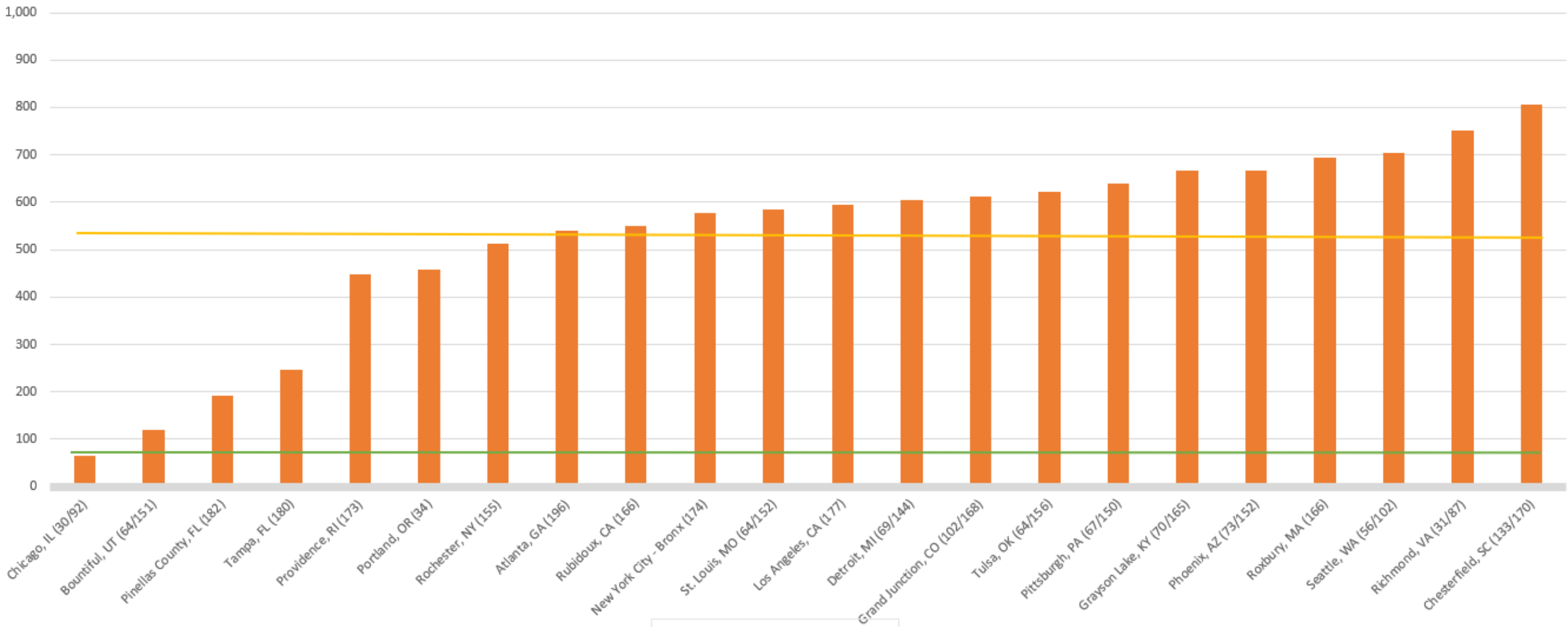
Chemists may report below MDL as zero

LK - Reported value may be biased high

Washington NATTS removed

Average Concentration - 0.058 ppbv
Highest Current MDL Concentration - 0.241 ppbv
Lowest Current MDL Concentration - 0.008 ppbv

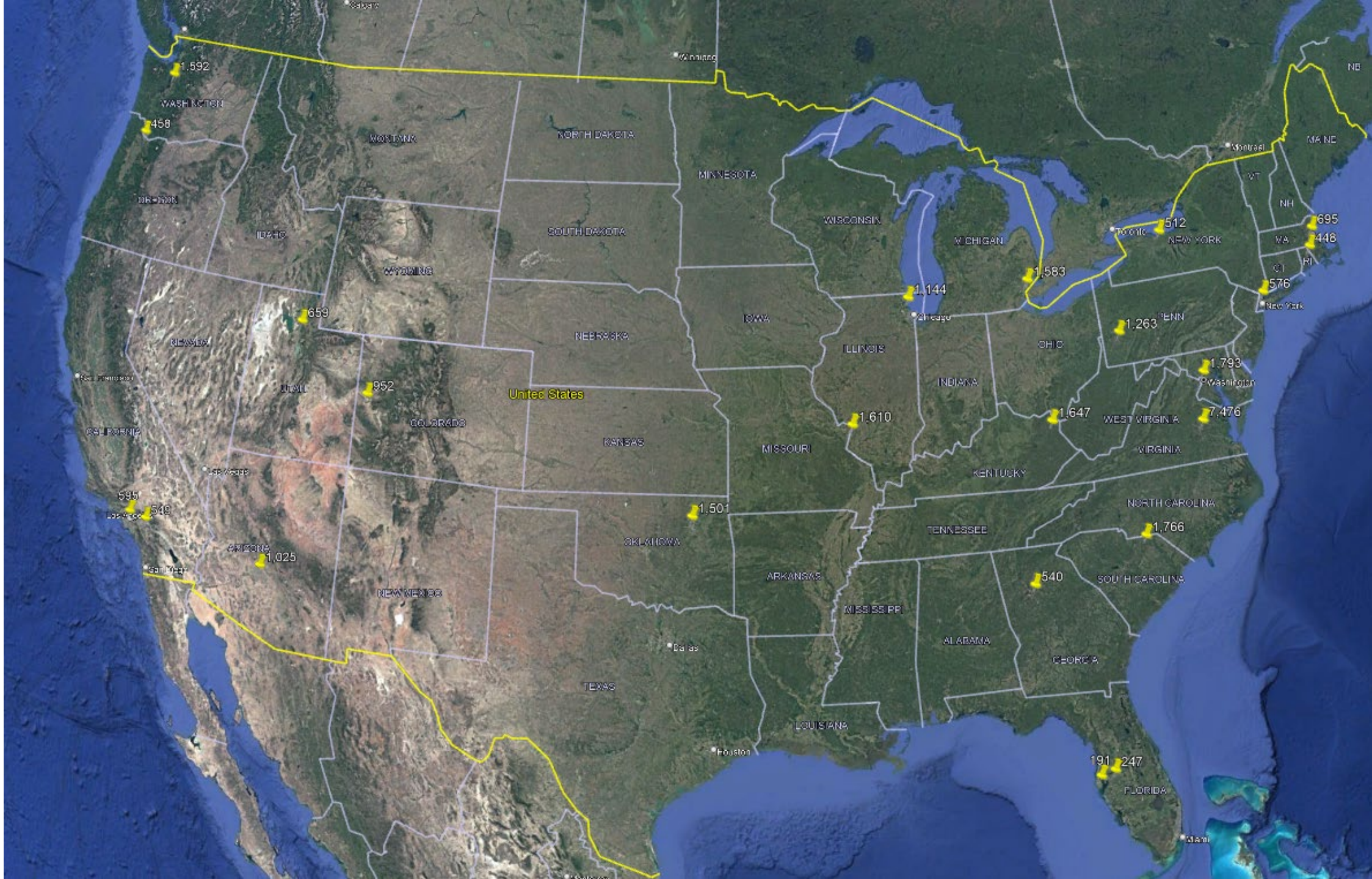
National Air Toxics Trends Stations (NATTS)
EtO Site Average Risk (in a million)
LK Removed



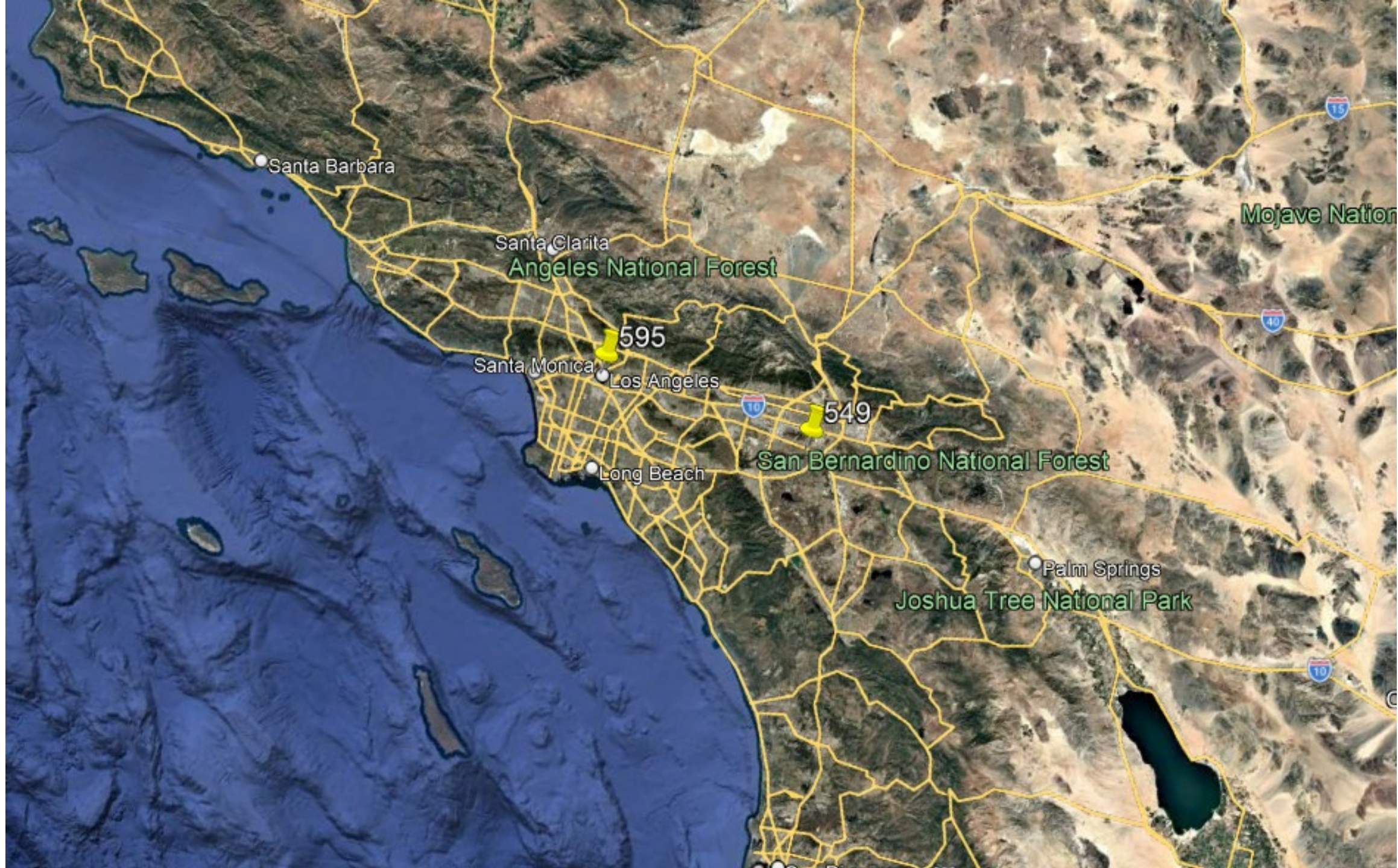
() - Number of samples for each site (2022-2024)
Chemists may report below MDL as zero
Washington NATTS removed

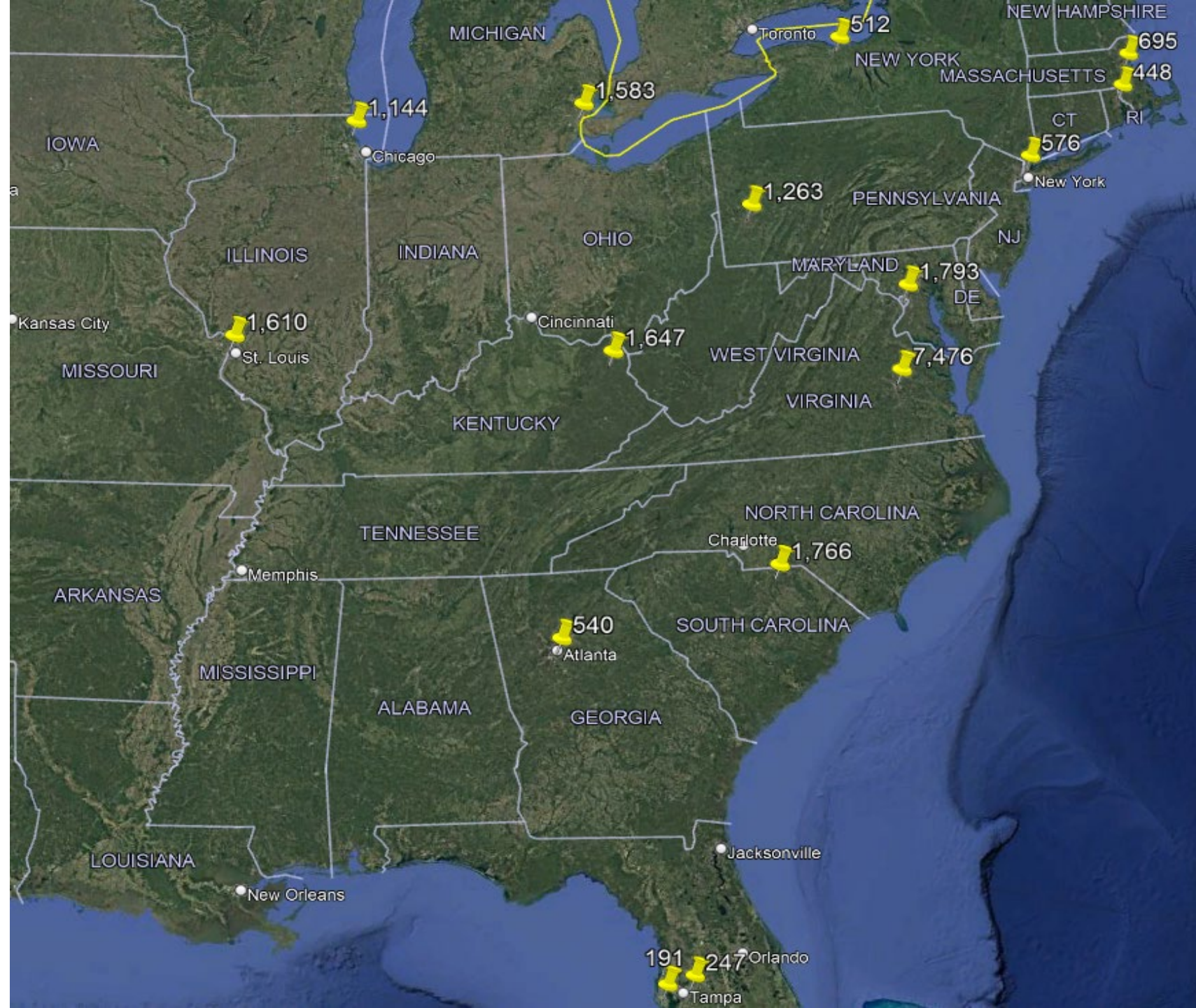
Average Risk - 533
Highest Current MDL Risk - 2,205
Lowest Current MDL Risk - 73

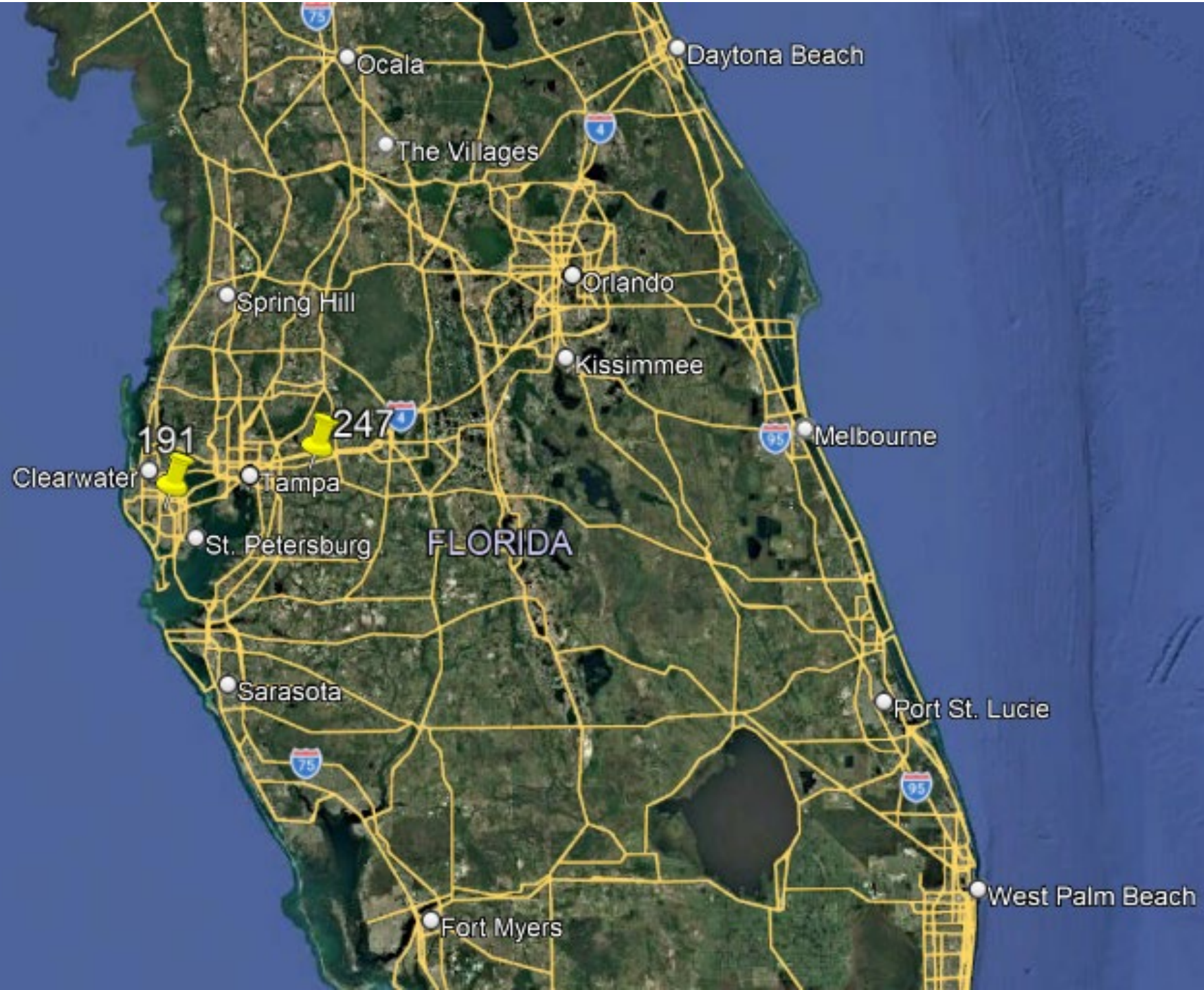
April 3, 2026



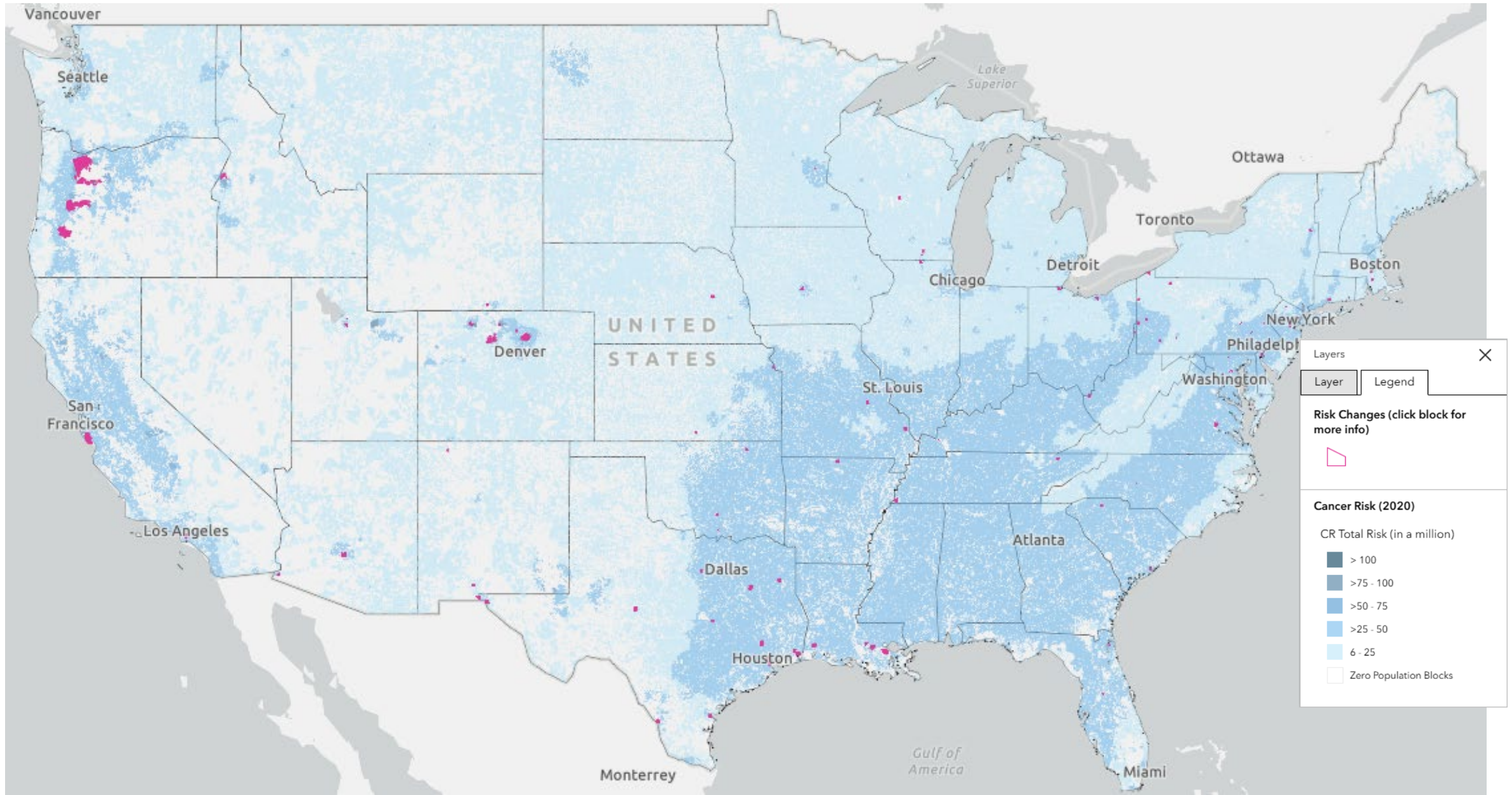




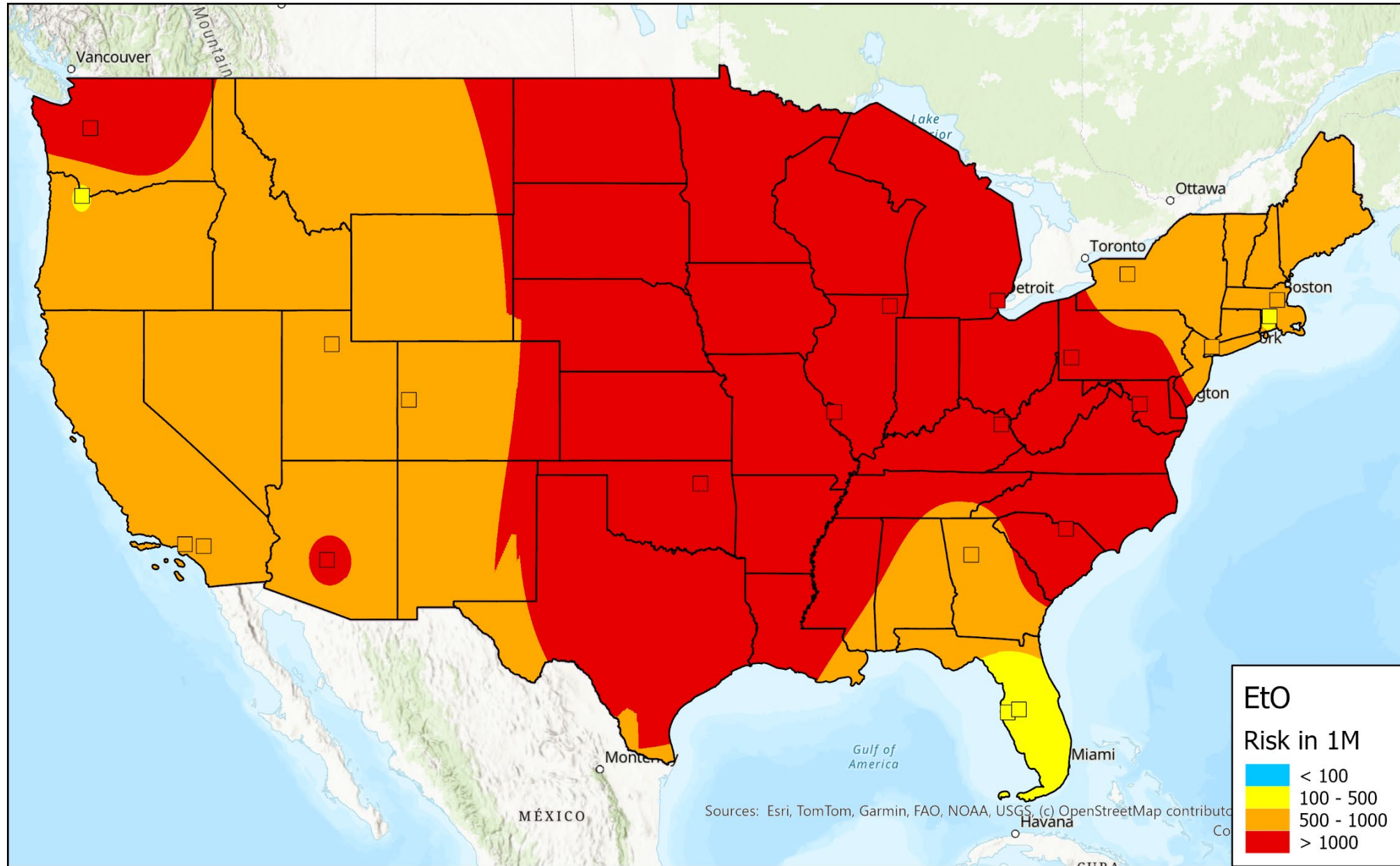




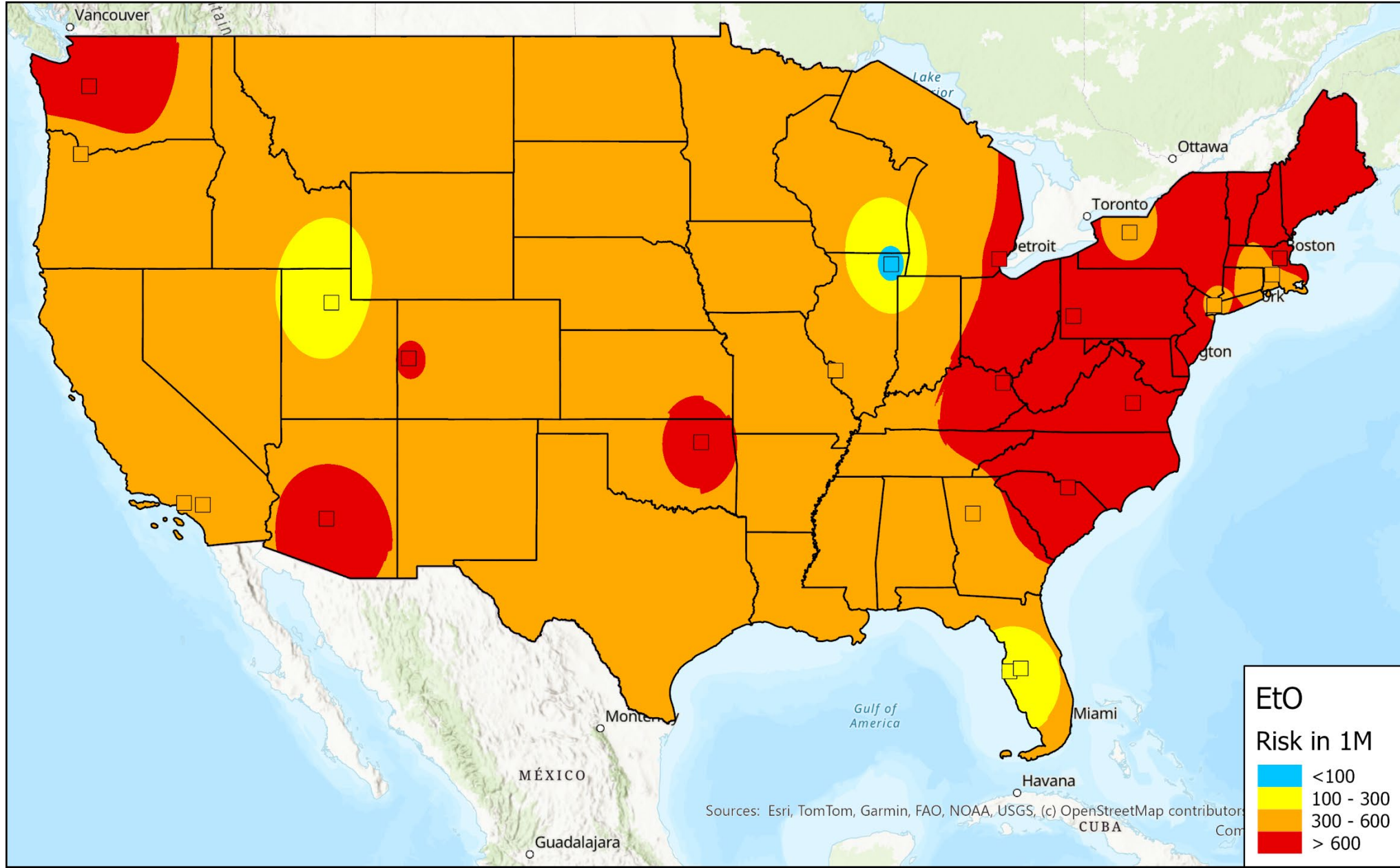
2020 AirToxScreen Map



2022-2024 EtO Risk (without Richmond)



2022-2024 EtO Risk (without LK's or D.C.)



Summary

- Incomplete combustion can cause pieces of chains of PFAS to reform
- GenX does not work as well as PFOA
- PFAS may in some states may only be regulated if they are VOC's
- If GHG reporting is removed, some states may lose the ability to track individual PFAS
- Concerns if GenX is banned, another PFAS with unknown health effects may be used
- Almost all NATTS across the country show concentrations that if converted to risk, would be above 100 in a million
- Are LK's values real or not? If so, to what degree?
- Do most or at least the majority of the entire continental U.S. have background concentrations at these concentrations?



Mike Egnor, PE

Air Toxics Coordinator

WV Department of Environmental Protection

Division of Air Quality

michael.egnor@wv.gov

304-414-1255