



Backwards and Forwards

A Review of the Regulation of Background Contaminants

Tomorrow's Rules of the Road/Florida Brownfields Association Conference

September 17, 2026



| Outline

1. Old Favorites in Florida
2. PFAS
3. Other States
4. Thoughts on Guidance and Regulation

Contaminated Soils Forum Agenda 2013

- Regional anthropogenic and natural background are de facto the same (e.g., chloride in agricultural areas, grappling with PAHs).
- Database of existing background studies for soil and groundwater.
- Consideration of alternative statistical options for characterizing background.
- Establishment of consensus statewide or regional definitions of what constitutes background, including for urban sites. This has been an ongoing discussion for years, but it becomes increasingly important as ubiquitous substances like arsenic are singled out for extraordinarily restrictive consideration by EPA (2025 toxicity assessment for arsenic under the IRIS program, for example).

1 | Old Favorites in Florida

Arsenic

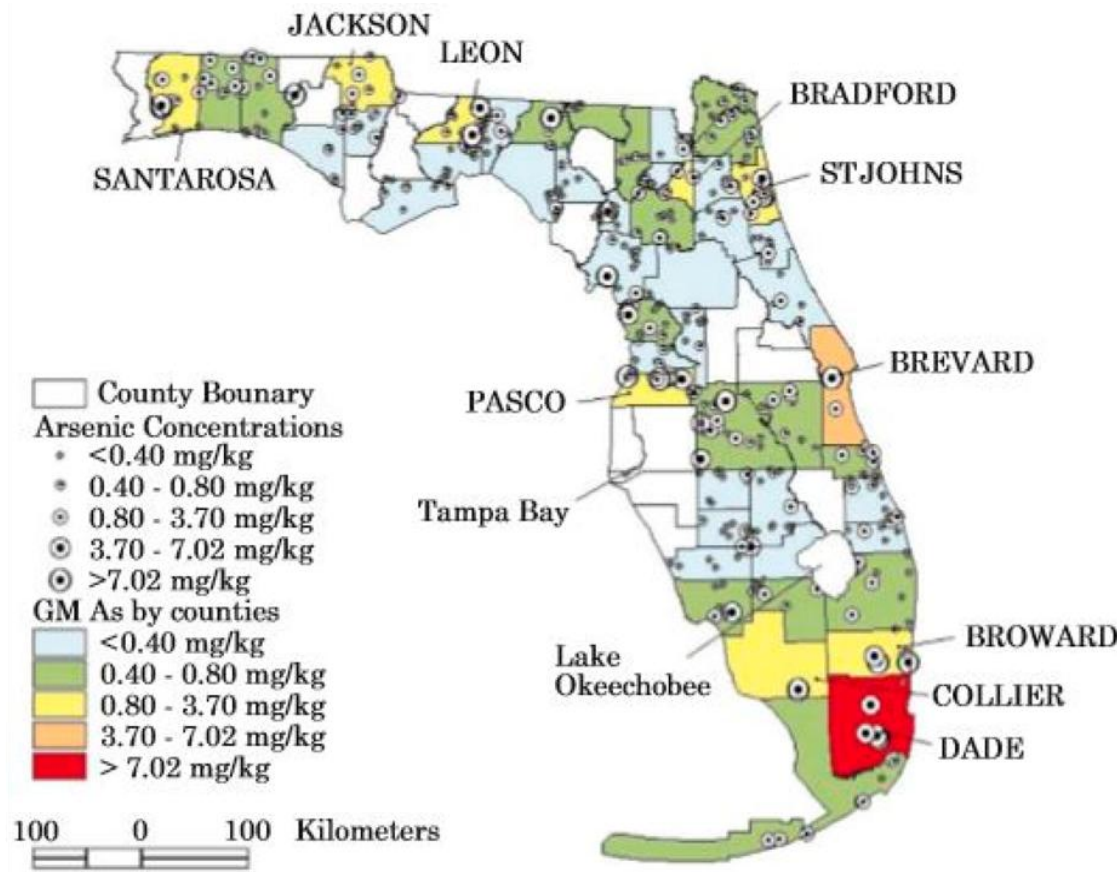


Figure 1: Map showing arsenic concentrations in soils of Florida (from Chen et al. [70]). **Source:** *Int. J. Environ. Res. Public Health* **2018**, 15(10), 2278; <https://doi.org/10.3390/ijerph15102278>

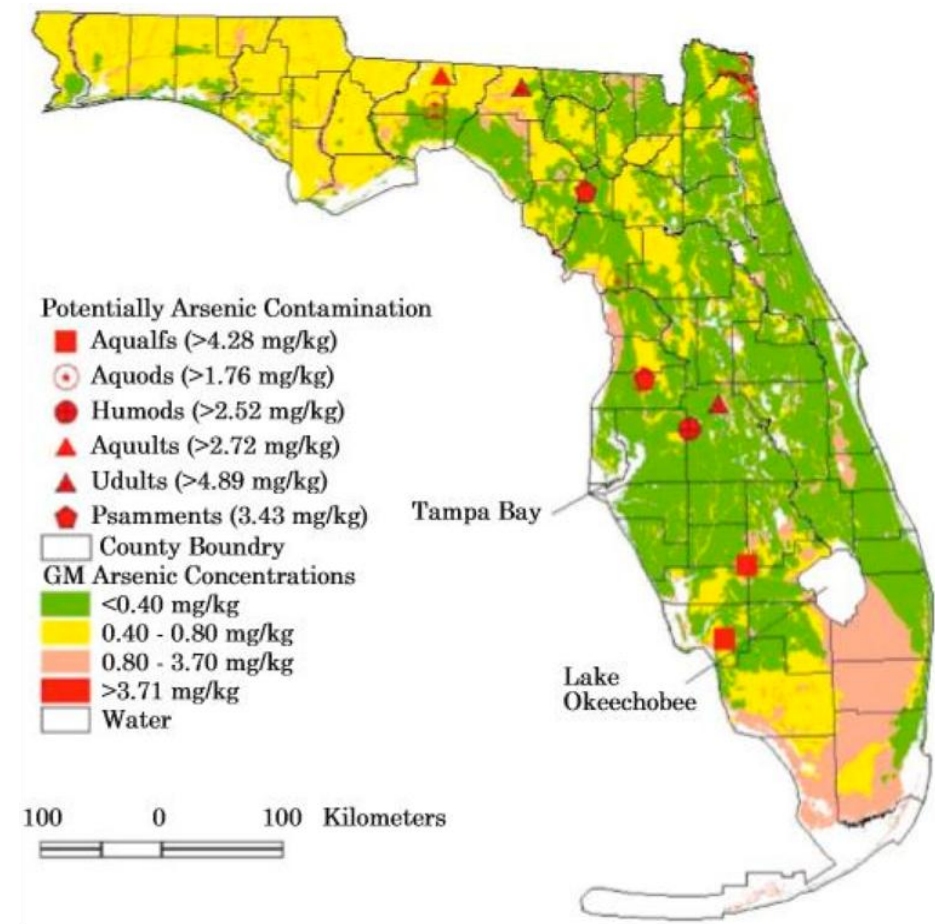


Figure 2: Map showing arsenic concentrations in soils of Florida (from Chen et al [70]). **Source:** *Int. J. Environ. Res. Public Health* **2018**, 15(10), 2278; <https://doi.org/10.3390/ijerph15102278>

Benzo(a)Pyrene and PAHs

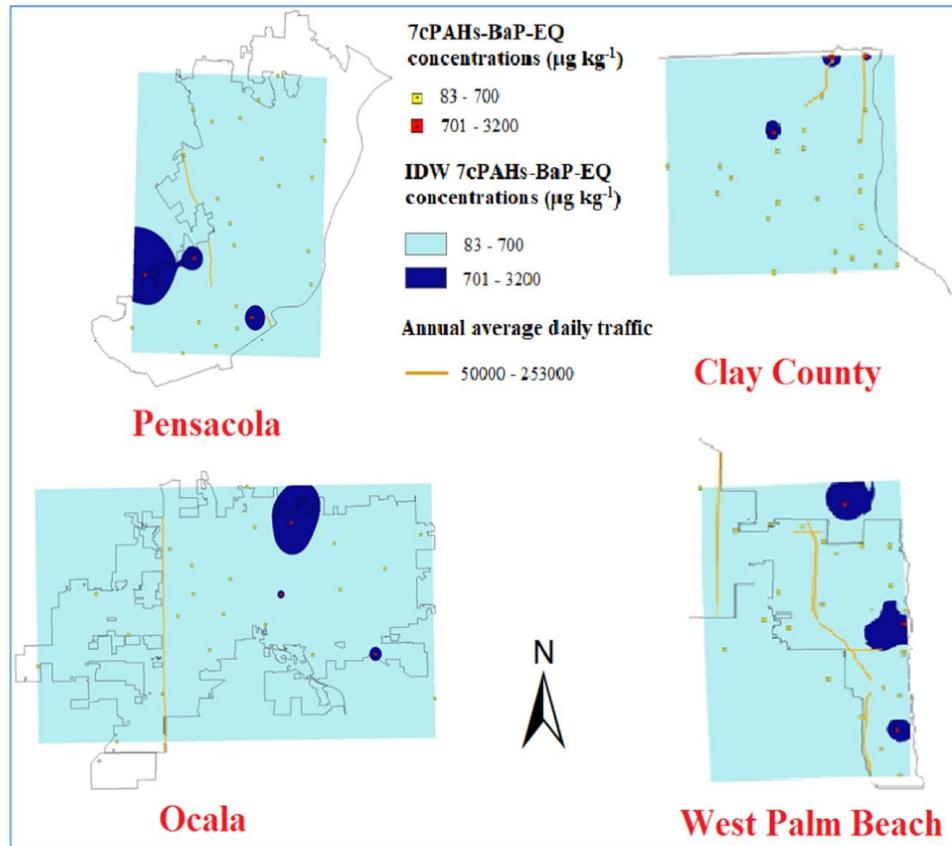


Figure 3: Depiction of BaP and PAHs in four counties. **Source:** *Science of the Total Environment* 685:463-470
References 7,10

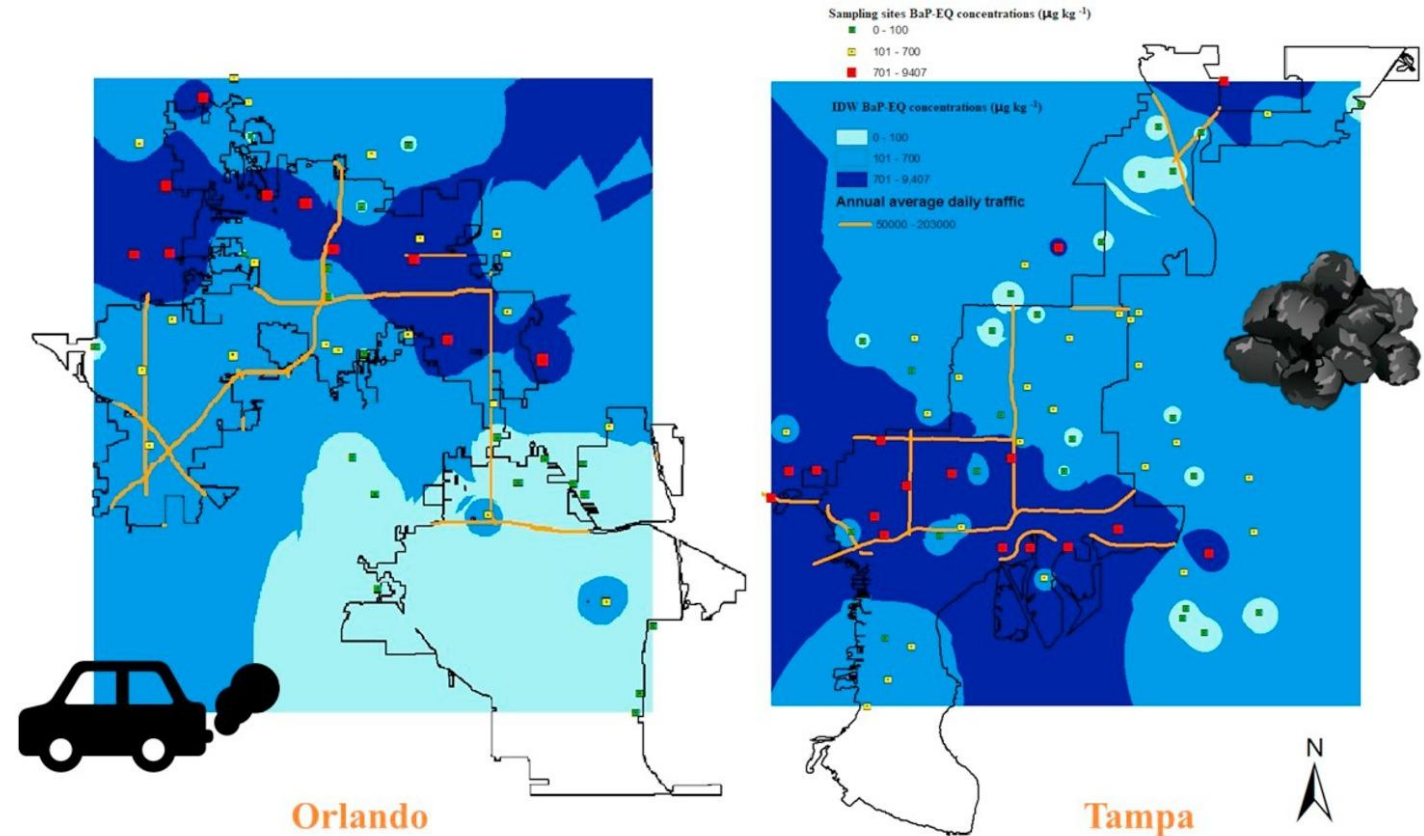


Figure 4: Depiction of BaP EQ concentrations in two cities. **Source:** *Chemosphere* 214:220-227

Iron

- Biscayne Aquifer: Iron concentrations commonly >secondary drinking-water standard of 300/ug/L
- Sand and Gravel Aquifer (Panhandle): Iron concentrations >secondary drinking-water standard in 10% of analyzed samples
- Surficial and intermediate aquifers (east coast and south-central): Iron concentrations >secondary drinking-water standard in more than half of analyzed samples
- Floridan: Iron may be >secondary drinking-water standard but in not more than 10% of the samples

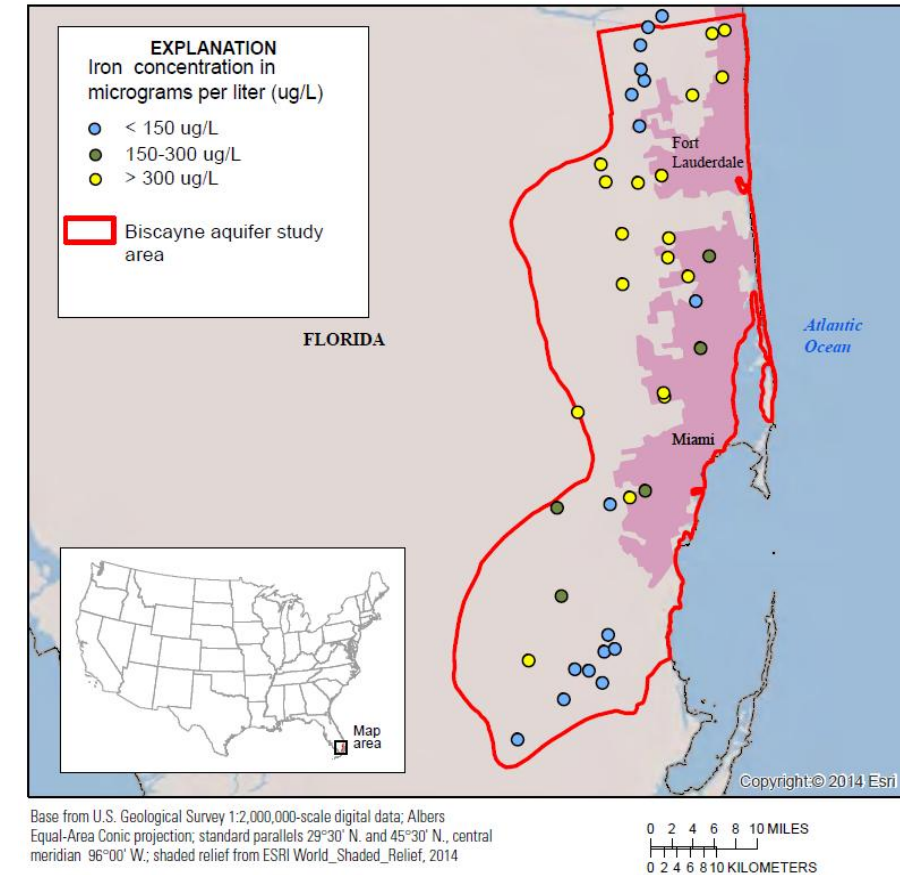


Figure 5: Iron concentrations in public supply wells, Biscayne Aquifer. **Source:** USGS FS 2019-3056
Reference: 9

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PFAS

(Per- and Polyfluoroalkyl Substances)

Development of PFAS Background

FDEP Dynamic Plan:

- UF study on surface water quality
- UF study on flooding/extreme weather influences on the distribution and transport of PFAS
- UF development of a comprehensive PFAS data set.

FDEP GIS layer for PFAS ERIC sites:

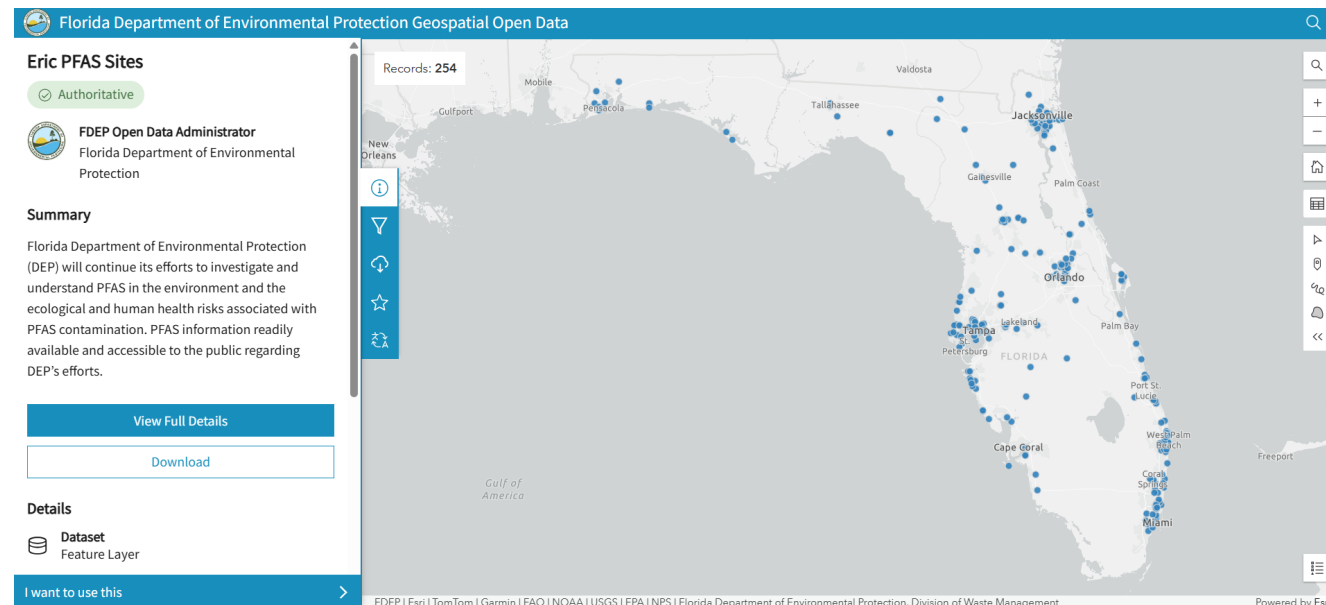


Figure 6: FDEP GIS layer for PFAS ERIC sites. **Source:** <https://geodata.dep.state.fl.us/datasets/FDEP::eric-pfas-sites-1/explore?location=28.033287%2C-84.057665%2C6>.

PFAS

FDEP GIS layer for PFAS ERIC sites:

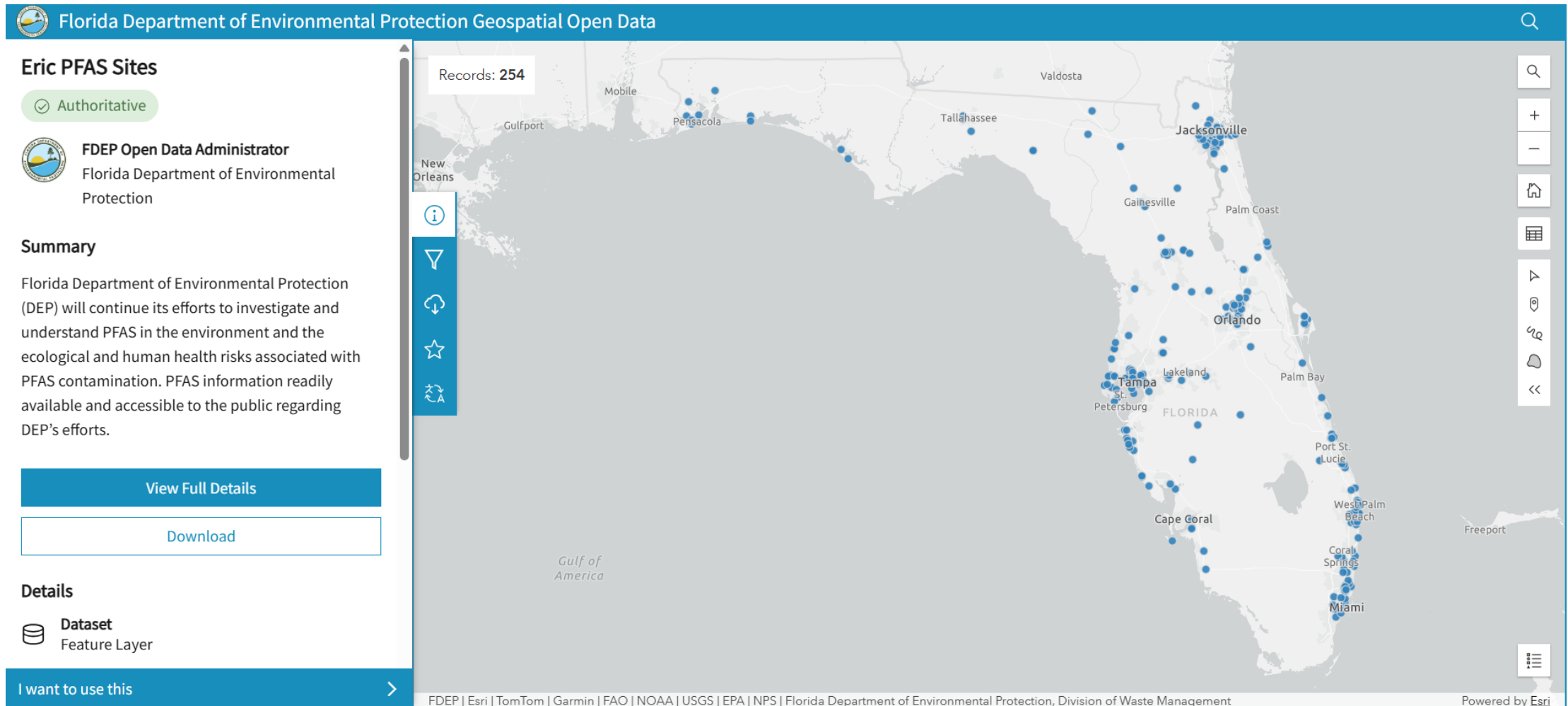


Figure 6: FDEP GIS layer for PFAS ERIC sites. **Source:** <https://geodata.dep.state.fl.us/datasets/FDEP::eric-pfas-sites-1/explore?location=28.033287%2C-84.057665%2C6>.

PFAS Data Set for Surface Water Quality

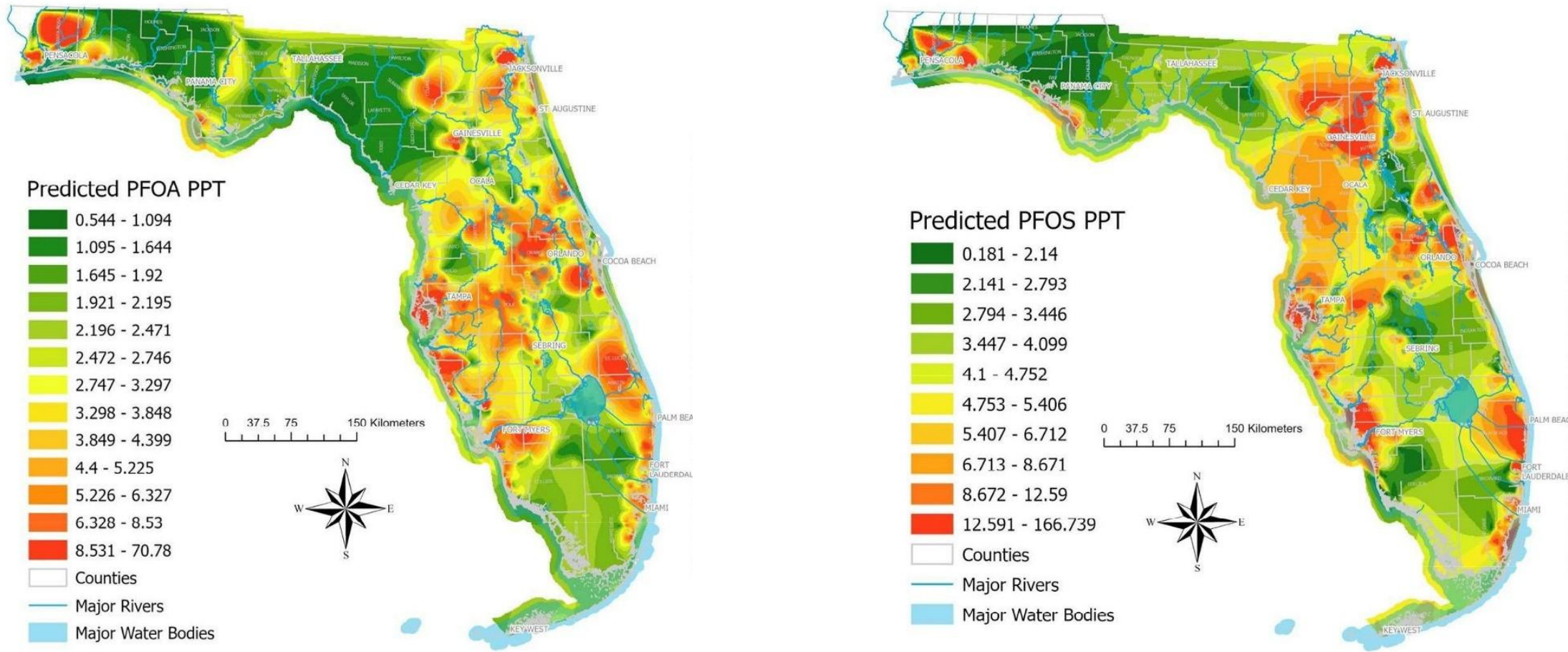


Figure 7: Predicted PFOA and PFOS concentrations in surface water.
Reference: 1

Development of PFAS Background Data

Drinking Water, Military and Other Known Sites

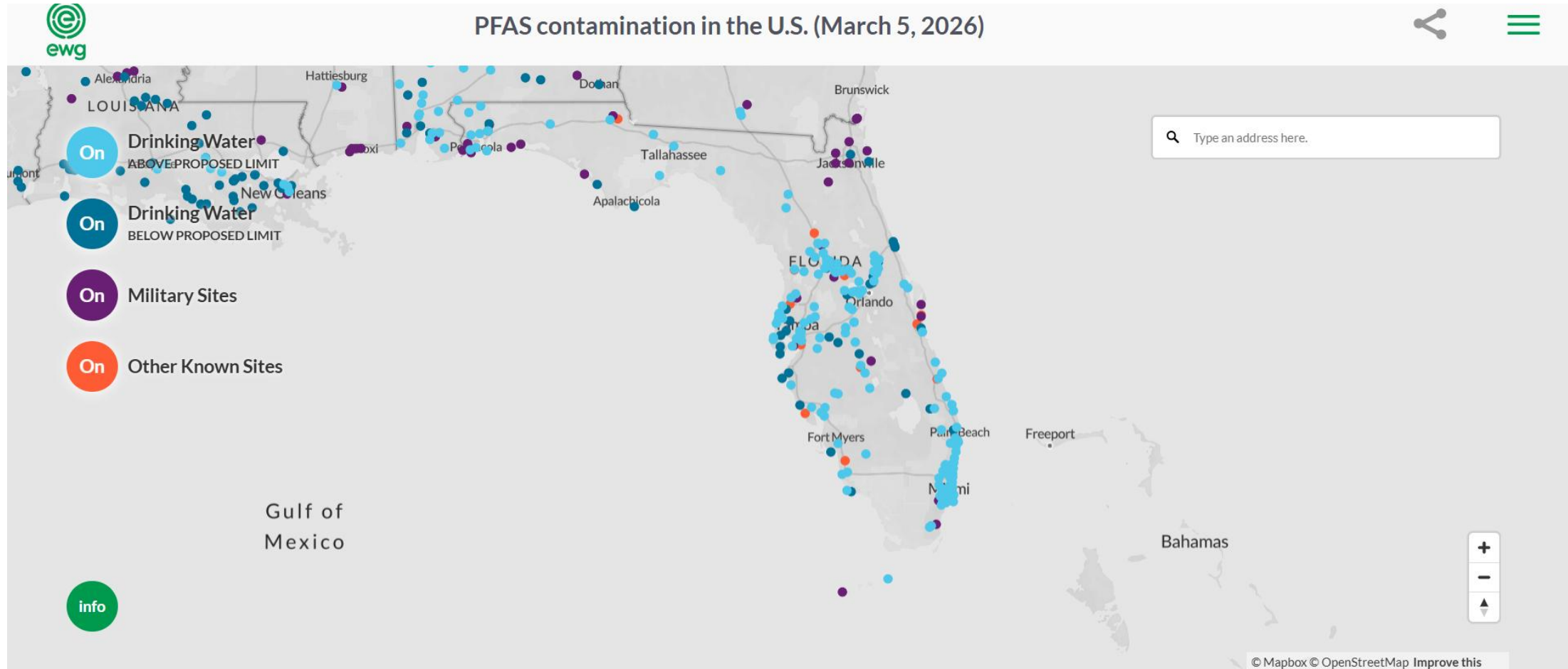
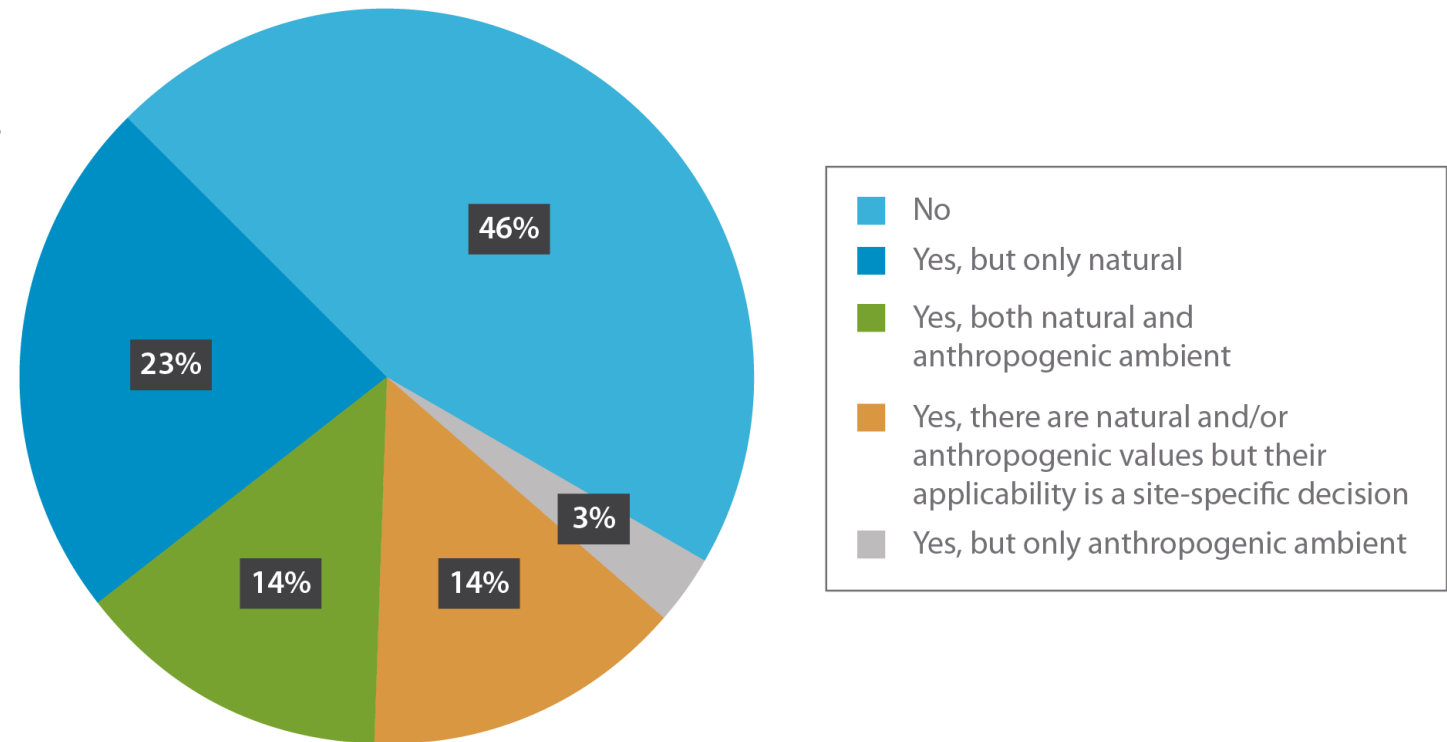


Figure 8: PFAS drinking water, military and other known sites. **Source:** https://www.ewg.org/interactive-maps/pfas_contamination/.

3 | Other States

ITRC Soil Background and Risk Assessment

- Study from 2021
- More than half the state survey responses indicated that the states have established statewide or regional soil background values.
- UF development of a comprehensive PFAS data set.
- Some states will consider soil background surveys prepared by the USGS, with or without state involvement, to be valid for use in risk assessments



Some examples from other states:

- **Vermont:** As a result of VTDEC's background study, a statewide arsenic background value was established to be used as the new state soil standard. For PAHs, the background level in urban areas was found to be significantly higher than what was identified in non-urban areas, so the urban background concentration was adopted as the soil standard for urban areas as defined on the state's GIS layer.
- **Georgia:** State Superfund Program allows the use of regional background values but GA EPD reserves the right to approve the use of such values. Our voluntary remediation program cites documents published by USGS "*Chemical Analysis of Soils and Other Surficial Materials of the Continental United States*" (Boerngen and Shacklette, 1981), *Open Report 81-197*.
- **Oregon:** "From a geologic point of view, in natural systems, there aren't really outliers and all the data should be used to determine background; there is no dropping out of data points. This can arguably be hard to distinguish source versus background in some instances." Also, "With PAHs, there are a wider range of approaches to assess ambient (petrogenic vs pyrogenic) concentrations, ratio tests and so forth." ⁴
- **Pennsylvania:** "The complicated geology of PA makes the development of statewide natural background levels virtually impossible. Any guidance on how to work through this problem would be very helpful." ⁴

4 | Thoughts on Guidance and Regulation

Background Levels in Florida

- Arsenic, BaP/PAHs and Iron have anthropogenic signatures/effects or are naturally occurring in concentrations > CTLs throughout the state
- Precedent in Miami-Dade County for county or sub-county regional background levels
- Precedent in other states for state or regional background levels
- Precedent in Florida for Delineated Areas

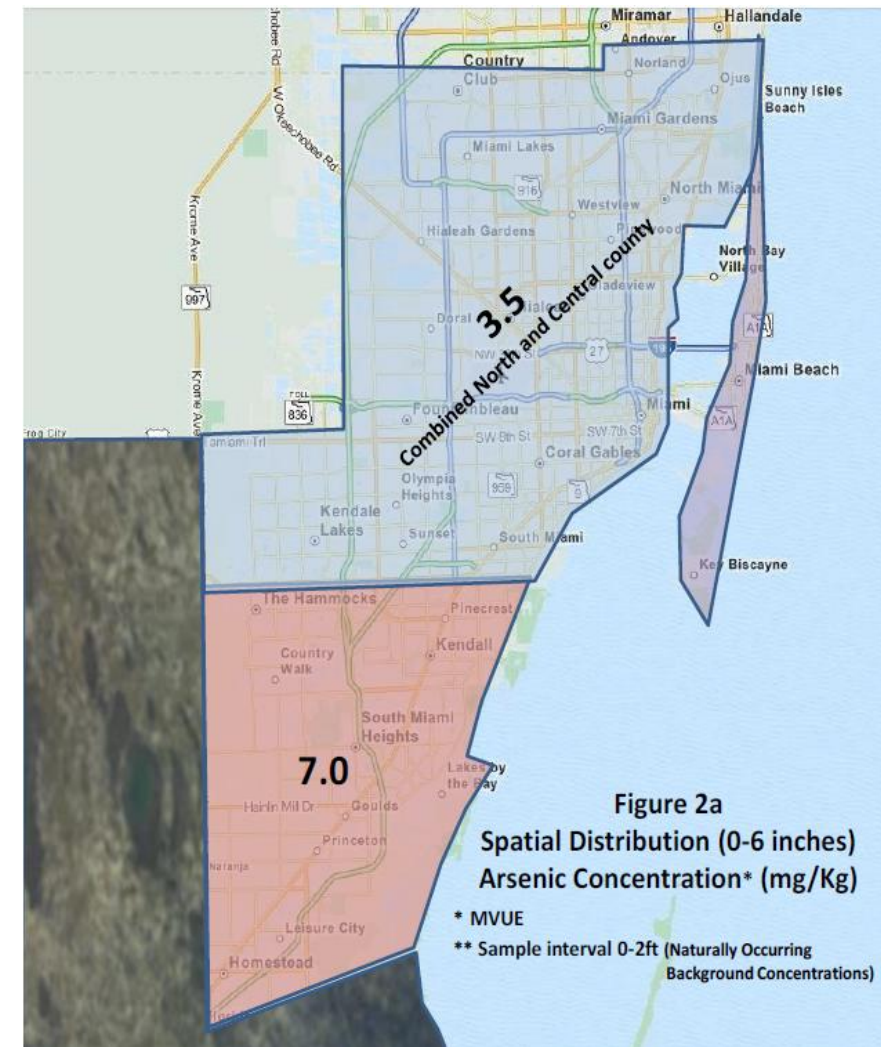


Figure 9: Spatial Distribution of Arsenic. **Source:** Miami-Dade County Anthropogenic Background Study, April 3, 2014

For Immediate Consideration:

- Revisions/updates to FDEP soil and groundwater background guidance documents
 - Inclusion of areas affected by non-point source stormwater runoff
 - Consideration of alternative statistical (especially) approaches
 - Use of existing FDEP geospatial open data (Waste Cleanup Background Study Sites)
- Revisions to Delineated Areas Rule (Chapter 62-524)



For Future Consideration:

- Establish state regional background numbers for arsenic in soils
- Establish state urban BaP/PAH background levels for soils
- Establish state iron background levels in groundwater based on the specific aquifer



5 | References

References

1. Camacho, C.G. et al, 2024, Statewide Surveillance and Mapping of PFAS in Florida Surface Water. ACS EST Water 4(10): 4343-4355
2. Chen, M., Ma, L.Q., Harris, W., 1998, Background Concentrations of Trace Metals in Florida Surface Soils: Comparison of Four EPA Digestion Methods and Baseline Concentration of 15 Metals: Annual Progress Report; Soil and Water Science Department, University of Florida
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10. Peng G.; Xu, M.; Liu, Y.; da Silva, E.B.; Xiang, P.; Ma, L., 2019, Emerging and Legacy PAHs in Urban Soils of Four Small Cities: Concentrations, Distribution and Sources. Science of the Total Environment 685:463-470

| Thank You!