

## PFAS: OKALOOSA COUNTY, FL

### ***What are PFAS?***

PFAS are per- and polyfluoroalkyl substances. PFAS is a class of chemicals found in various industrial and consumer goods. For instance, you may find them in food packaging, textiles, cosmetics, and frequently in aqueous film-forming foams (AFFFs) used to extinguish fires. PFAS chemicals are known for repelling grease, water, and stains, making them widely used in various applications. These chemicals are stable and persistent, earning them the nickname "forever chemicals" because they do not readily biodegrade, or break down easily in the environment.

Numerous researchers suggested PFAS are abundant in aquatic systems and toxic to a range of aquatic organisms, with additional concerns of bioaccumulation of PFAS. PFAS accumulate in sediments and aquatic organisms, which pose health risks to wildlife and humans through the food chain. Research suggests linkages of PFAS to disruption of endocrine function, reproduction, and development in aquatic organisms. Research suggests similar linkages of PFAS to humans, like increased cancer risk, immune system suppression, endocrine and reproductive disruption, and child developmental concerns.

The United States Geological Survey (USGS) estimated that at least 45% of the United States' tap water has one or more PFAS chemicals (Smalling et al. 2023). At least one PFAS was identified in 60% of public wells and 20% of domestic wells supplying drinking water in the eastern United States (McMahon et al. 2022).

### ***Have PFAS been found in Okaloosa County drinking water and surface waters?***

#### **Measured PFAS in Florida and Okaloosa County Drinking Waters**

A team of researchers completed a comprehensive statewide assessment of PFAS in Florida drinking water (Sinkway et al. 2024). The team collected 448 drinking water samples across all 67 Florida counties. The drinking water samples were analyzed for 31 PFAS, where 19 PFAS were found in at least one drinking water sample. The top five most frequently detected PFAS were 6:2 fluorotelomer sulfonate (6:2 FTS) (in 84% of the samples analyzed), Perfluorooctanoic acid (PFOA) (65%), linear perfluorooctane sulfonate (PFOS) (65%), branched PFOS (64%), and perfluorobutane sulfonic acid (PFBS).

A total of 107 taps had PFOA or PFOS concentrations above 4 ng/L (ppt), where the maximum total PFAS concentration in a tap was 219 ng/L. The maximum contaminant level for PFOA and PFOS is 4 ng/L, legally enforced by the United States Environmental

Protection Agency National Primary Drinking Water Regulation as of May 14, 2025 (USEPA, 2025). Overall, 8% of the drinking water samples analyzed exceeded 4 ng/L for PFOA and 16% for PFOS. The average total PFAS in city water was 15.6 ng/L, and in well water was 4.5 ng/L.

Okaloosa County had the 11<sup>th</sup> highest total PFAS (ng/L) concentration among the 67 Florida counties (Table 1). Among the eight drinking water samples collected, the maximum PFAS concentration measured was 140 ng/L, and the lowest was 18 ng/L. Okaloosa County had one drinking water sample that exceeded the 4 ng/L standard for PFOA. There were no drinking water samples that exceeded 4 ng/L for PFOS.

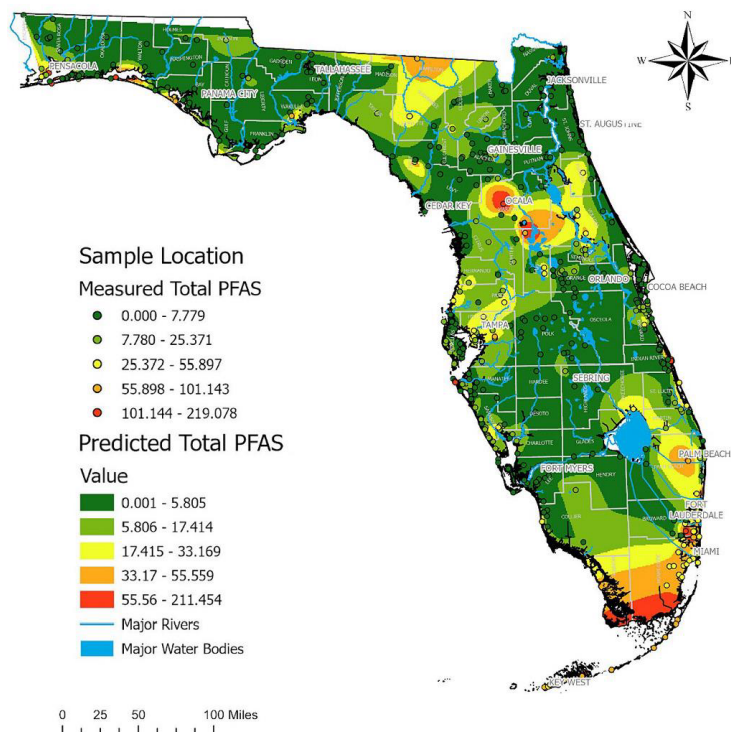


Figure 1. Map with measured total PFAS samples across a gradient of low concentrations (green dots) to medium concentrations (yellow dots) to higher concentrations (red dots). Shaded map colors are the predicted total PFAS using estimated values of PFAS concentrations from low (green) to high (red). Data, figure, and result interpolation from Sinkway et al. 2024.

Table 1. The 12 Florida counties with highest and lowest total PFAS ( $\Sigma$  PFAS) maximum and average concentrations (ng/L). Data, figure, and result interpolation from Sinkway et al. 2024.

Florida counties (with at least 5 drinking water samples) that represented the top-12 highest and lowest mean  $\Sigma$ PFAS (in ng/L).

Counties with high $\Sigma$ PFAS	No. of samples (n)	Max (ng/L)	Mean (ng/L)	Counties with low $\Sigma$ PFAS	No. of samples (n)	Max (ng/L)	Mean (ng/L)
Monroe	13	101.1	79.4	Duval	5	0.0	0.0
Escambia	12	219.1	49.0	Franklin	10	0.3	0.0
Miami-Dade	17	90.0	43.5	Leon	8	5.8	1.4
Broward	13	115.1	36.4	Levy	6	5.0	1.9
Indian River	15	162.1	34.2	Polk	14	6.6	2.0
Lake	6	95.9	26.6	Lee	15	6.4	2.1
Hillsborough	12	59.8	25.2	Alachua	20	20.8	2.8
Marion	7	115.6	21.4	Orange	16	17.2	4.1
Pasco	6	38.7	21.4	Pinellas	20	12.2	4.4
Volusia	5	37.9	19.0	St. John's	8	32.5	4.4
Okaloosa	8	140.4	18.1	Santa Rosa	25	15.0	4.8
Manatee	11	119.7	16.1	Brevard	27	33.0	6.2

### Measured PFAS in Florida and Okaloosa County Surface Waters

A team of researchers completed a comprehensive statewide assessment of PFAS in Florida surface waters (Camacho et al. 2024). A network of citizen scientists collected 2,323 surface water samples across the 67 Florida counties. These surface water samples were analyzed for 50 PFAS, with 33 PFAS being detected in at least one surface water sample. The top five most frequently detected PFAS were perfluorooctanoic acid (PFOA) (94% of the samples), perfluorobutane sulfonic acid (PFBS) (65%), perfluorohexanoic acid (PFHxA) (61%), perfluorononanoic acid (PFNA) (54%), and perfluorooctane sulfonate (PFOS) (53%) (Table 2).

There were 915 surface water samples (39%) with PFOA concentrations above 4 ng/L and 920 samples (40%) with PFOS above 4 ng/L. All counties had at least one sample with PFOA, 96% had PFNA, 93% had PFBS, 91% had PFOS, and 82% of counties had PFHxA. The average PFAS detected among counties ranged from 2 ng/L of PFNA to 10 ng/L of PFOS. The maximum PFAS detected among counties ranged from 81 ng/L of PFOA to 1135 ng/L of PFOS.

A total of 49 surface water samples were collected in Okaloosa County. Okaloosa County ranked 28<sup>th</sup> among Florida counties due to 10 (10 of the 49 total samples or 20%) surface water samples with PFOA above 4 ng/L. Okaloosa County ranked 8<sup>th</sup> for the number of samples (80% of the samples) above 4 ng/L for PFOS. The average total PFAS concentration detected in a surface water sample was 31 ng/L, while the maximum total PFAS concentration detected in a sample was 185 ng/L.

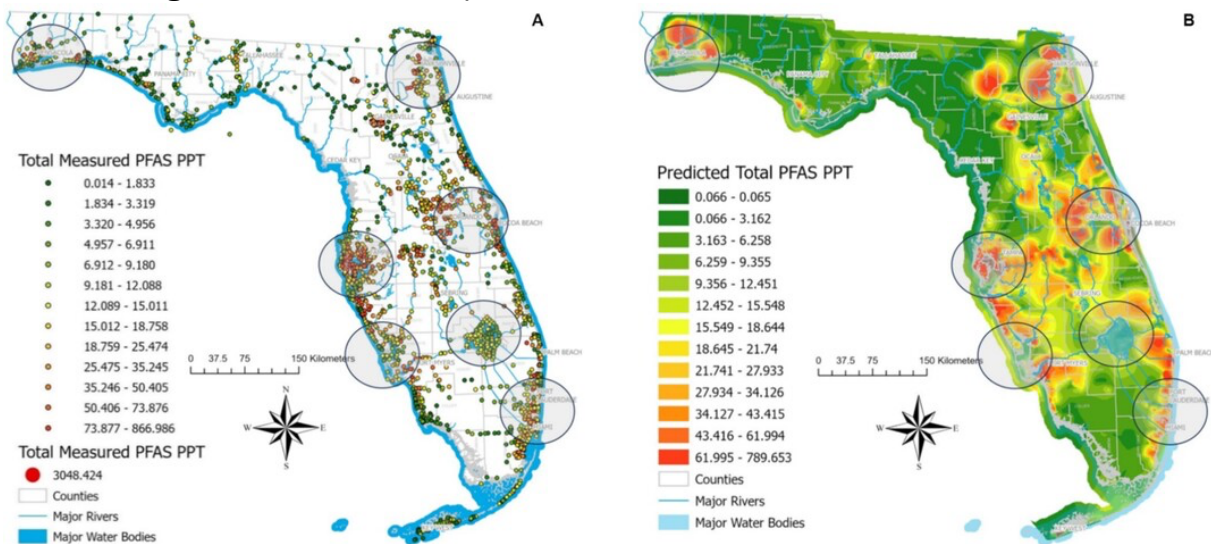
Dr. Bowden, with the University of Florida's College of Veterinary Medicine and Chemistry Department, led the PFAS research shared here. Dr. Bowden has extensive information on the Bowden Lab website (<https://www.bowdenlaboratory.com/dr-bowden.html>), including an interactive map of all the PFAS surface water samples

collected in Florida. Select Okaloosa County under the filter section to see the surface water samples and learn more about the PFAS information for each sample collected in Okaloosa County (<https://www.bowdenlaboratory.com/florida-surface-water.html>).

### ***What does this mean for Okaloosa County?***

PFAS were detected in drinking water and surface waters in Okaloosa County. Although not the highest concentrations or most frequent identified in Florida, there were drinking and surface water samples above USEPA's 4 ng/L contaminant level standard. Understanding what PFAS are and joining in educational conversations about PFAS helps our community. Efforts that support continued sampling and extended monitoring also increase our understanding of PFAS concentrations in Okaloosa County's drinking and surface waters. If you want to learn more about PFAS or join community scientists' efforts to expand PFAS water monitoring, please contact Dana Stephens, Florida Sea Grant Extension Agent with the UF/IFAS Okaloosa County Extension Office.

Figure 2. Map A contains all surface water sites sampled with detected PFAS, where the dots' color represents the total PFAS concentration measured. Map B shows predicted PFAS levels based on measured total PFAS concentrations in surface water samples. Note that these values do not represent predicted PFAS concentrations on land. Data, figure, and result interpolation from Camacho et al. 2024.



### ***References***

Camacho, C.G., et al. 2024. Statewide surveillance and mapping of PFAS in Florida surface waters. *American Chemical Society*, 4: 434-4355.  
<https://doi.org/10.1021/acsestwater>.

United States Environmental Protection Agency (USEPA). 2025. Per- and polyfluoroalkyl substances (PFAS) final PFAS national primary drinking water regulation. <https://www.epa.gov/sdwa/and-polyfluoroalkyl-substances-pfas>.

McMahon, P.B., Tokranov, A.K., and Bexfield, L.M. 2022. Perfluoroalkyl and polyfluoroalkyl substances in groundwater used as a source of drinking water in the Eastern United States. Environmental Science and Technology 56(4): 2279-2288. <https://doi.org/10.1021/acs.est.1c04795>

Skinkway, T.D., et al. 2024. Crowdsourcing citizens for statewide mapping of per- and polyfluoroalkyl substances (PFAS) in Florida drinking water. Science of the Total Environment, 926: 1-9. <https://doi.org/10.1016/j.scitotenv.2024.171932>.

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