

Final Recommended Aquatic Life Criteria and Benchmarks for Select PFAS

(Information taken from the referenced fact sheet)

As part of the U.S. Environmental Protection Agency's commitment to safeguard the environment from per- and polyfluoroalkyl substances (PFAS), the agency has published final national recommended water quality criteria and benchmarks to help states protect aquatic ecosystems from several PFAS. For perfluorooctanoic acid (PFOA) and perfluorooctane sulfonic acid (PFOS), the EPA published final recommended freshwater criteria for short-term (acute) and long-term (chronic) exposure.

The EPA's national recommended water quality criteria and benchmarks reflect the latest scientific knowledge regarding the effects of these PFAS on aquatic organisms, such as fish and aquatic insects. Concentrations of these individual PFAS in water bodies above the relevant criteria or benchmark level may harm the growth and reproduction of aquatic organisms or kill them. The EPA's recommended criteria and benchmarks are for individual PFAS and do not account for potential mixture effects (e.g., dose additivity). States can adopt the EPA's recommended criteria and benchmarks into their water quality standards or adopt other scientifically defensible values, including values based on local or site-specific conditions.

What are aquatic life water quality criteria and benchmarks?

The EPA's recommended water quality criteria and benchmarks for the protection of aquatic life represent the highest concentrations of pollutants in surface water that would allow fish and other aquatic species to live, grow, and reproduce.

PFAS have been manufactured and used by a broad range of industries since the 1940s and there are estimated to be thousands of PFAS present in the global marketplace. PFAS are used in many applications because of their unique physical properties such as resistance to high and low temperatures, resistance to degradation, and nonstick characteristics. PFAS can enter the aquatic environment during the manufacturing, use, and disposal of industrial and consumer products. Examples of sources include municipal and industrial wastewater treatment plant discharges, landfill leachate, runoff from areas where some firefighting foams have been used, and atmospheric deposition. PFOA and PFOS are two of the most widely used and studied PFAS.

How do PFAS affect aquatic life?

PFAS are not naturally occurring and have no biologically important functions or beneficial properties to aquatic life. At certain concentrations, PFAS can negatively affect the survival, growth, and reproduction of aquatic organisms like fish and aquatic insects. Aquatic plants seem to be more tolerant to PFAS and are less likely to be harmed than fish and other aquatic life.

What are the EPA's final recommended criteria for PFOA and PFOS to support aquatic life in freshwater?

The EPA's final recommended aquatic life criteria documents provide a critical review of PFOA and PFOS toxicity data and provide separate PFOA and PFOS criteria to help protect aquatic life from the effects of these chemicals. **Table 1** provides a summary of the criteria components.

Parts per million (ppm) and **parts per trillion (ppt)** are both ways of expressing extremely small concentrations, but they differ in scale:

- **1 ppm** = 1 part of a substance per 1,000,000 parts of the whole. *This is equivalent to 1 drop in 50 liters (13 gallons) of water.*
- **1 ppt** = 1 part of a substance per 1,000,000,000,000 parts of the whole. *This is equivalent to 1 drop in 20 Olympic-sized swimming pools.*

Table 1. Final Recommended Freshwater Aquatic Life Water Quality Criteria for PFOA and PFOS in ppm and ppt.

Criteria Component	Acute Water Column (CMC) ¹	Chronic Water Column (CCC) ²	Invertebrate Whole-Body (mg/kg ww ³)	Fish Whole-Body (mg/kg ww ³)	Fish Muscle (mg/kg ww ³)
PFOA Magnitude	3.1 ppm	0.10 ppm	1.18 (mg/kg ww ³)	6.49 (mg/kg ww ³)	0.133 (mg/kg ww ³)
	OR 3,100,000 ppt	OR 100,000 ppt	OR 1,180,000 (ng/kg ww ³)	OR 6,490,000 (ng/kg ww ³)	OR 133,000 (ng/kg ww ³)
PFOS Magnitude	0.071 ppm	0.00025 ppm	0.028 ppm	0.201 ppm	0.087 ppm
	OR 71,000 ppt	OR 250 ppt	OR 28,000 (ng/kg ww ³)	OR 201,000 (ng/kg ww ³)	OR 87,000 (ng/kg ww ³)

¹ Criterion Maximum Concentration.

² Criterion Continuous Concentration.

³ Wet Weight.

What do these columns mean?

The definitions are:

Acute criteria protect aquatic species from short-term exposures to high pollutant concentrations. Short time period (hours, days, or months) exposure to high levels.

Chronic criteria protect aquatic species from long-term and repeated pollutant exposures. (Long time period (years to lifetime of species) exposure to low levels.

Invertebrate: Species, other than fish, living in surface waters. The results are based upon the whole body used to generate PFOS level.

Fish whole-body: This refers to the entire fish, including skin, bones, and organs. being used to generate the concentration.

Fish Muscle: Only the filets of the fish are used to generate the concentrations. Filets are the part of fish consumed by humans.

What levels are present in airport and residential well sample results?

Drinking water maximum contaminant levels (MCLs) for PFOA and PFOS are 4 ppt (parts per trillion) each. The highest groundwater concentration of PFOS and PFOA reported on airport were 382 ppt and 11.5 ppt, respectively, in 2020; the current highest level from the November 2024 on airport sampling event was 92.7 ppt PFOS and trace levels of PFOA. **The highest detected airport well PFOS levels are, respectively, 1,290 and 4.5 times lower than the corresponding acute and chronic aquatic criteria PFOS levels.** JAC continues to monitor and test the groundwater off airport. To date, PFOS concentrations near the southwestern end of the Eligibility Boundary are less than 20 ppt and PFOA levels are non-detect.

Where can I find additional information?

Further information can be found at:

[Fact Sheet: Final Recommended Aquatic Life Criteria and Benchmarks for Select PFAS](#)

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