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July 2026

An Issue Brief from CLEAN Waters

Chemical and nutrient pollution in water after the L.A. Fires

What We Did

Collected coastal seawater samples at 32 sites between January 2025 and May 2026, including during dry periods and after rainstorms.

Measured dissolved nutrient levels and human-made chemicals (reported in this brief) and metal levels (reported in our March 2026 Coastal Metals Brief).

Detected around 40,000 chemicals in collaboration with The Functional Metabolomics lab at UC Riverside. We were able to identify about 1,500 of the chemicals, including substances naturally found in the environment, as well as human-made chemicals from fire-related industrial and household sources.

Key Takeaways

- Seawater nutrient levels were immediately elevated after the fire in areas near the Palisades burn scar, but returned to baseline levels within 2-3 months.
- Approximately 200 chemicals were elevated after the LA fires. These included natural chemicals (e.g. from burned plants) and human-made chemicals. In general, these chemicals returned to baseline levels within months.
- Many other human-made chemicals were detected year-round and do not appear to be attributable to the LA fires. Continued monitoring and study of chemical pollution in LA area seawater is recommended.

Definitions:

- *Human-made chemical* — a foreign chemical that is not normally present in the environment. Sources include industrial chemicals, household chemicals, chemical components of the built environment (such as plastics), and pharmaceuticals.
- *Natural products* — a chemical that can be attributed to normal, non-human processes in an environment, like burned plants.
- *Nutrients* — chemicals (like nitrogen and phosphorus) dissolved in water that marine plants, algae, and other organisms use to survive. Very high nutrient levels can lead to algal growth, which can harm marine ecosystems.
- *Deep water upwelling* — A natural process in which cold, nutrient-rich water from deep in the ocean rises to the surface, increasing nutrient levels in coastal waters.
- *Dissolved organic matter (DOM) and total organic matter (TOM)* — TOM refers to all chemicals in a sample, which includes dissolved chemicals and chemicals attached to particles. DOM refers only to the dissolved chemicals that are left after the sample is filtered.

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Context

- Fires release nutrients from natural and human sources, which eventually make their way into the ocean. In addition, PhosChek fire retardant, which was used to fight both the Eaton and Palisades fires, contains concentrated phosphate and ammonium, which can also be washed into the ocean.
- Nutrients and chemicals are continuously entering the coastal ocean from natural processes, such as deep-water upwelling, and from the surrounding urban environment. As a result, it can be difficult to separate the effects of the LA fires from these other sources.
- Fires also transform and release chemicals from both natural sources (e.g., plants) and materials in homes/businesses. These include chemicals that are potentially harmful to humans and wildlife, including per- and poly- fluoroalkyl substances (PFAS), polycyclic aromatic hydrocarbons (PAHs), industrial chemicals, and plastic additives.
- Our approach is to compare pollution in the LA area to surrounding Southern California locations and to collect samples regularly over 1.5 years in 2025-2026.

Recommendations

- In general, the measured effects of the LA fires on chemical and nutrient pollution to the coastal ocean lasted only into Spring 2025.
- Continued study and monitoring of nutrient and chemical pollution in the LA area and throughout Southern California is needed to understand sources and impacts of pollution, including the potential for cumulative harm to humans or the environment.
- For many emerging contaminants of concern, there are no established thresholds for evaluating the risk they pose to human or ecosystem health. More research is needed to determine what levels of these contaminants are harmful to people and wildlife.

Methods

- Beach seawater samples were taken on 2/10/25, 6/1/25, 8/5/25, 8/6/25, 10/17/25, 11/18/25. In addition, 40 time-resolved samples were taken at the Santa Monica Pier between 1/25/25 and 5/1/26.
- Dissolved nutrient samples were filtered through a 0.2µm syringe filter and analyzed at the UC Santa Barbara Analytical Lab.
- Organic matter/chemical samples were collected on a solid phase extraction column, which captures chemicals in a resin. Dissolved samples were pre-filtered through a 0.2µm filter while total organic matter samples were not.
- Chemical samples were analyzed using non-targeted mass spectrometry methods at the UCR Functional Metabolomics Lab.

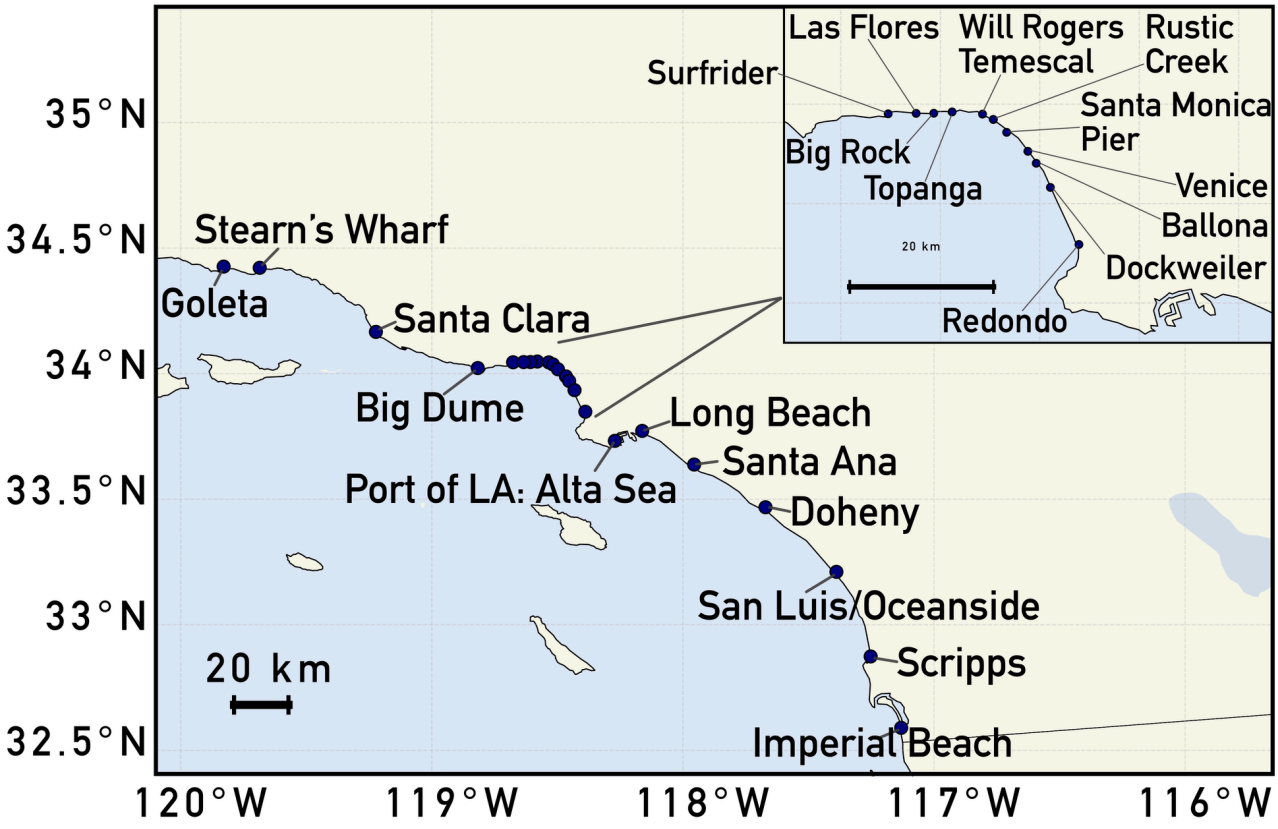

Figure 1. Map of sampling sites in Southern California.

Nutrient Data

Total nitrogen, phosphate, and ammonia levels at Santa Monica Pier in 2025-2026. **Nutrients were slightly elevated in Spring 2025 in the immediate aftermath of the LA fires.**

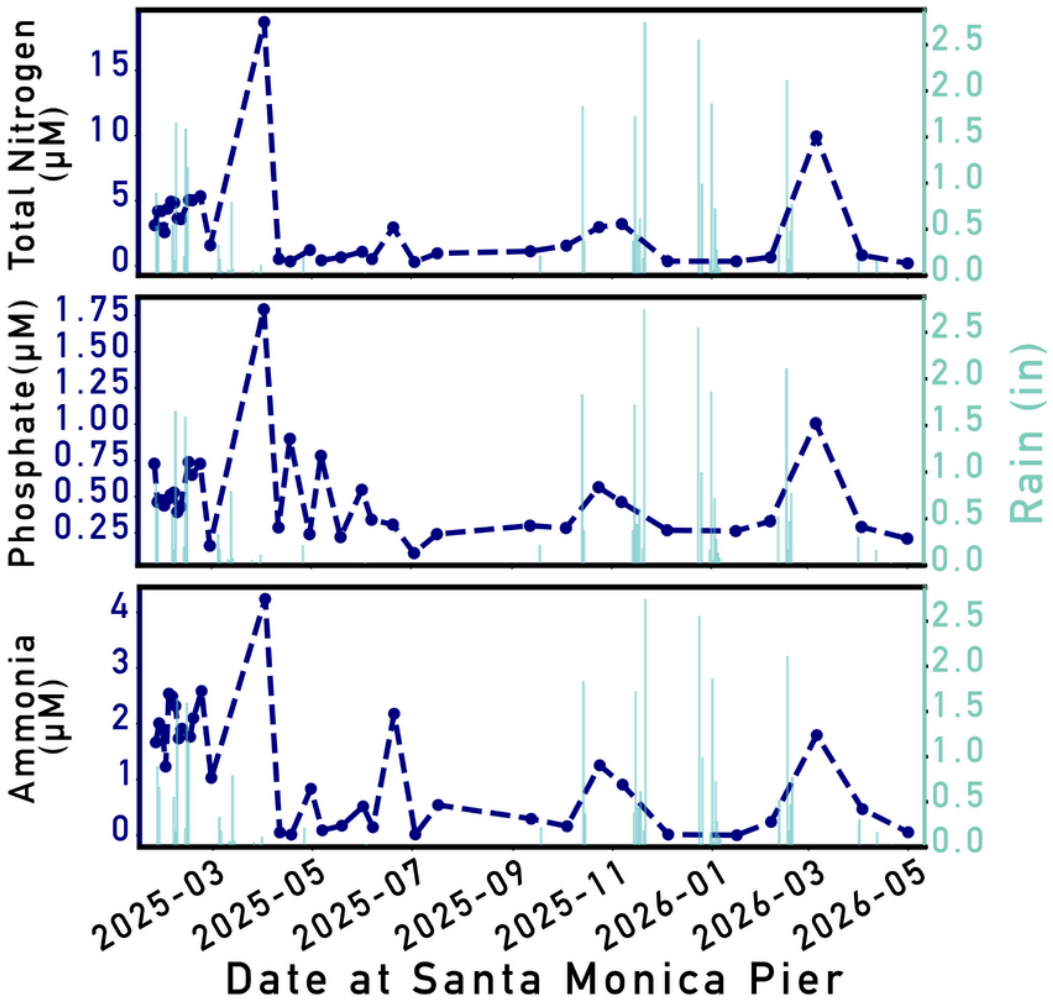

Figure 2. Total nitrogen, phosphate, and ammonia levels from Jan 25, 2025 to May 1, 2026 at the Santa Monica Pier. Rain data taken from NOAA rain averages at the GW3385 UCLA sensor.

Nutrient Data

Near the Palisades burn scar, **nutrient levels were generally highest on February 10, 2025, the first date Malibu beaches were sampled after the January 2025 LA fires.**

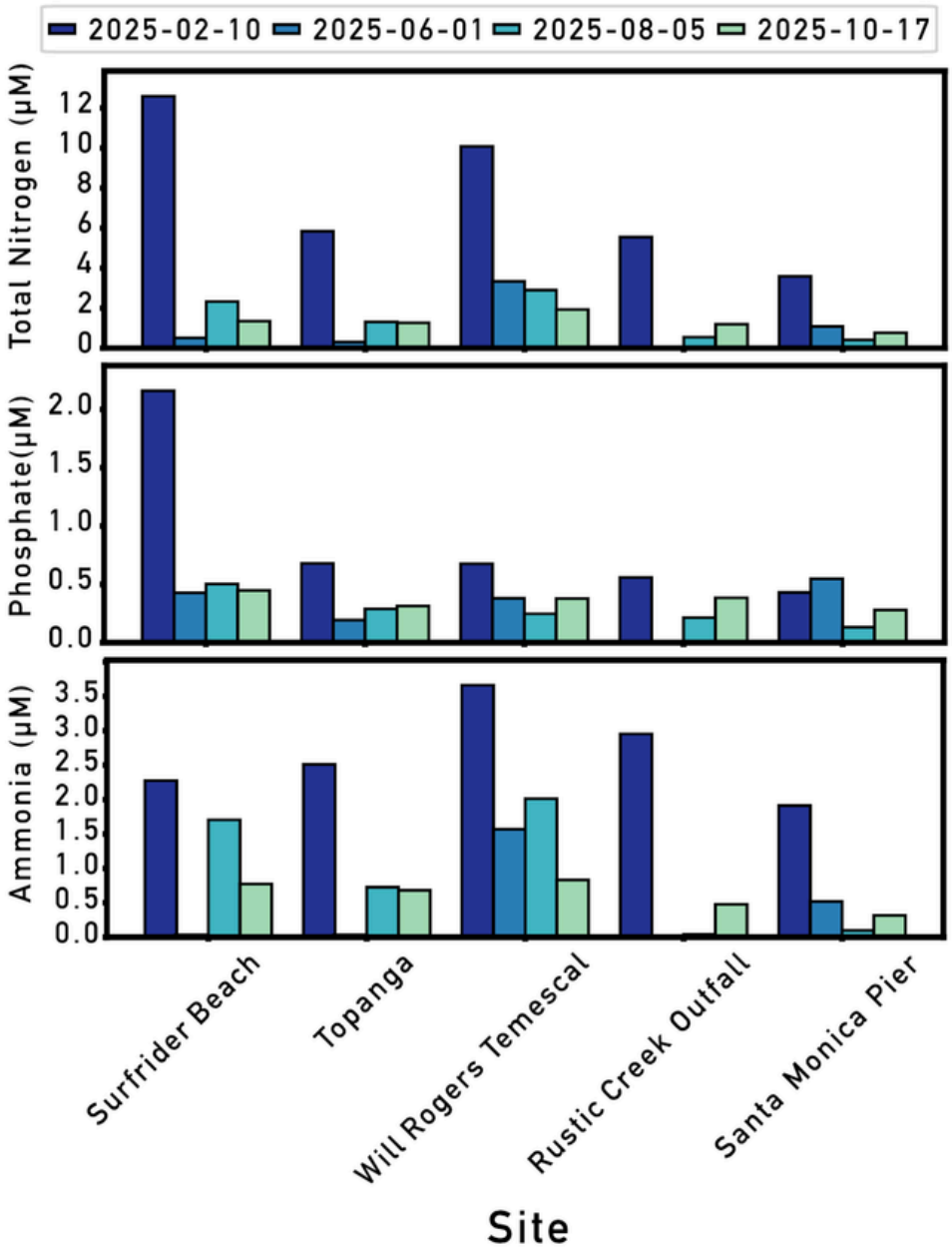

Figure 3. Total nitrogen, phosphate, and ammonia levels at Malibu and Santa Monica area beach sites on four sampling days throughout 2025.

Nutrient Data

Nutrient data at 20 sites along the Southern California coastline in summer 2025 (dry season) and fall 2025 (after a major rain). **Sites directly within the Palisades Fire burn scar are highlighted in light blue and did not have elevated nutrient levels compared to the rest of the region by late 2025.**

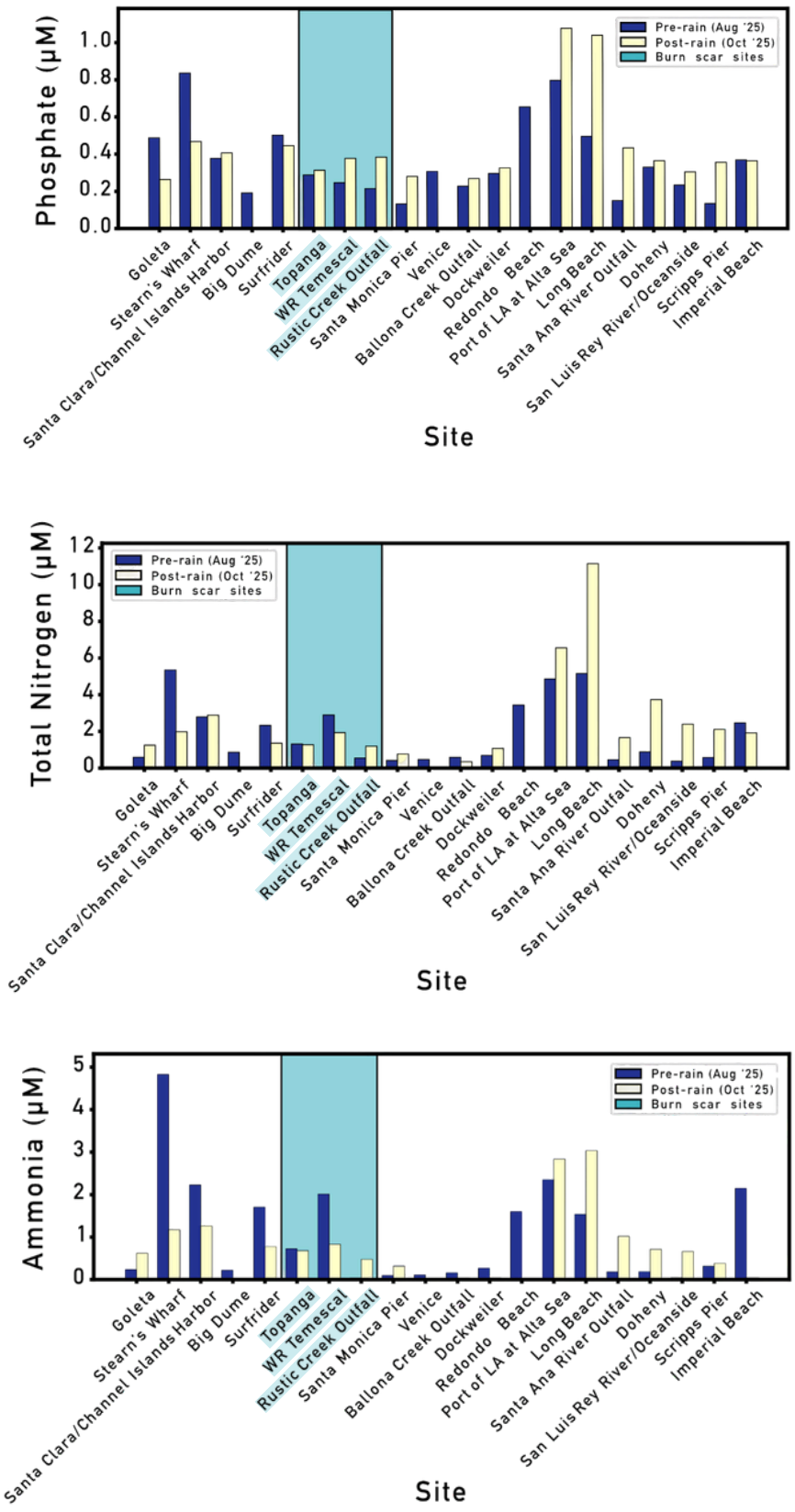

Figure 4. Nutrient levels at Southern California beach sites during the dry season in August 2025 ("pre-rain") and the wet season in October 2025 ("post-rain"). Big Dume, Venice, and Redondo Beach do not have wet season measurements.

Chemical Data

Interpreting Peak Area

Chemical data are reported in peak area, which is a relative unit. For a given chemical, a larger peak area indicates more of the chemical is present, and a smaller peak area indicates less of the chemical is present. However, peak areas cannot be directly compared across chemicals.

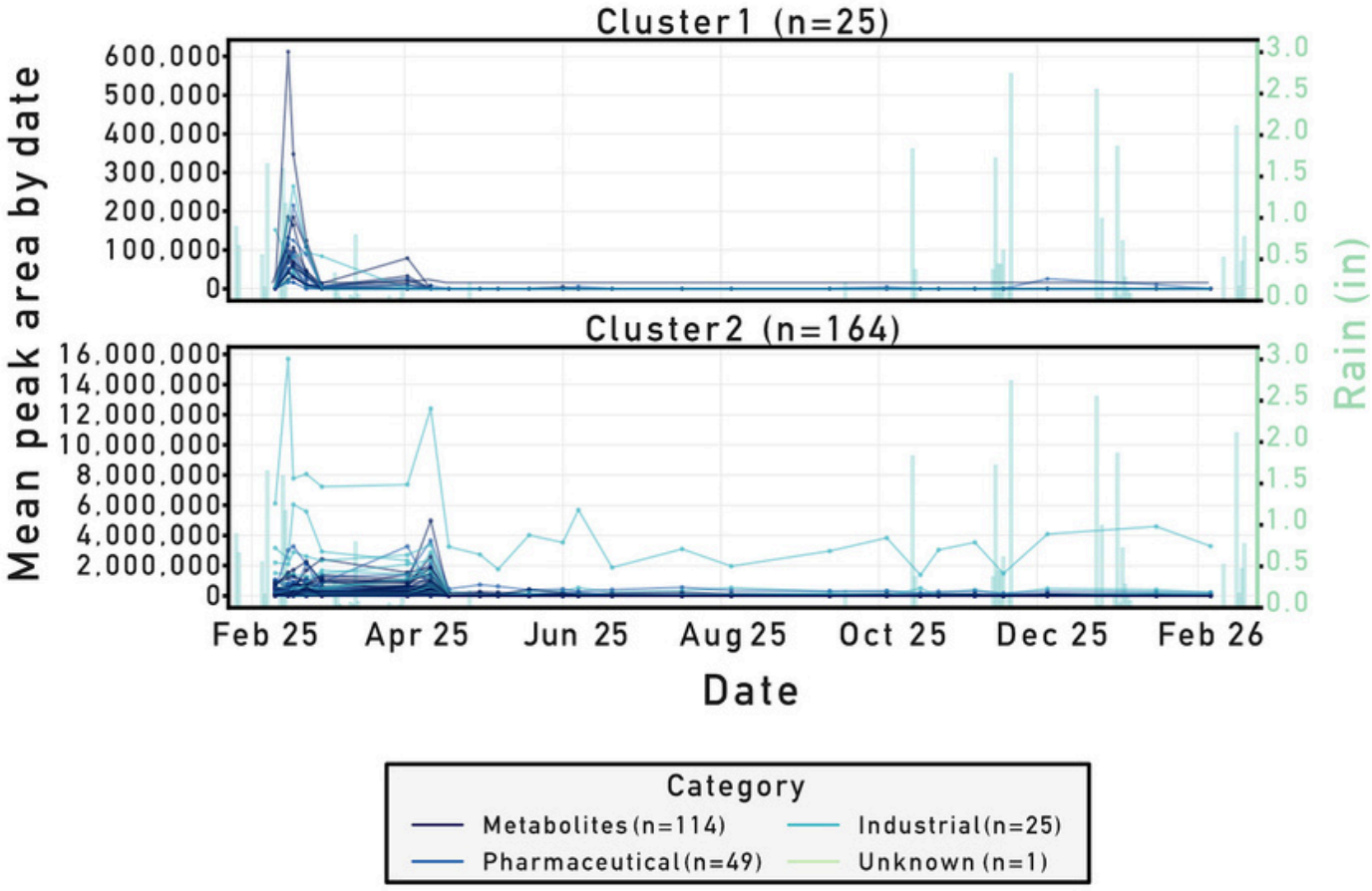

Figure 5. We identified 189 human-made chemicals in coastal seawater at the Santa Monica Pier that were significantly elevated in early 2025 and returned to baseline levels later in the year. **Our interpretation is that these chemicals are attributable to the LA fires.**

Chemical Data

The majority of fire-related chemicals we detected were "metabolites" which come from natural sources like burned plants. Pharmaceutical chemicals were also detected. Industrial chemicals include human-made plasticizers, PFAS, phthalates, and other chemicals.

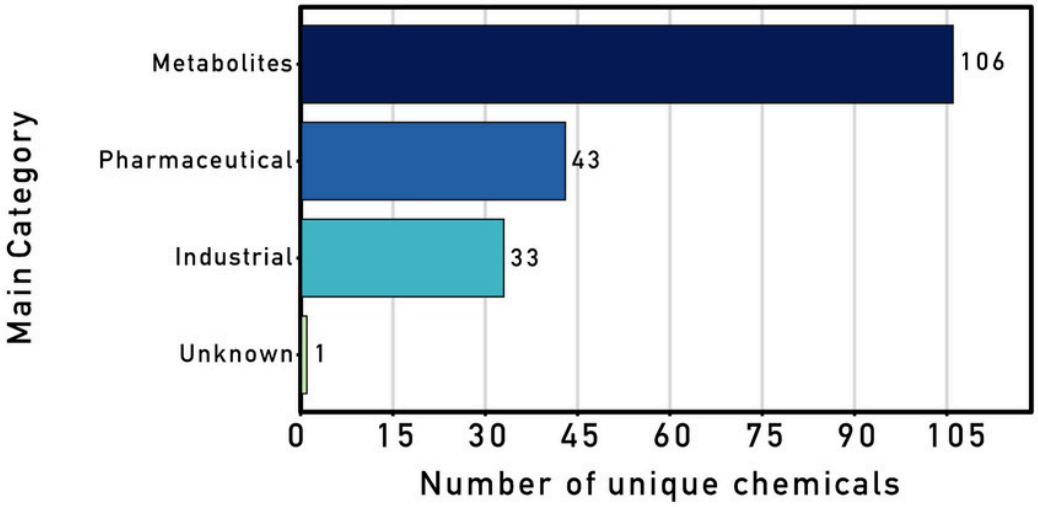

Figure 6. Main category distribution for chemicals that peaked in February following the LA fires.

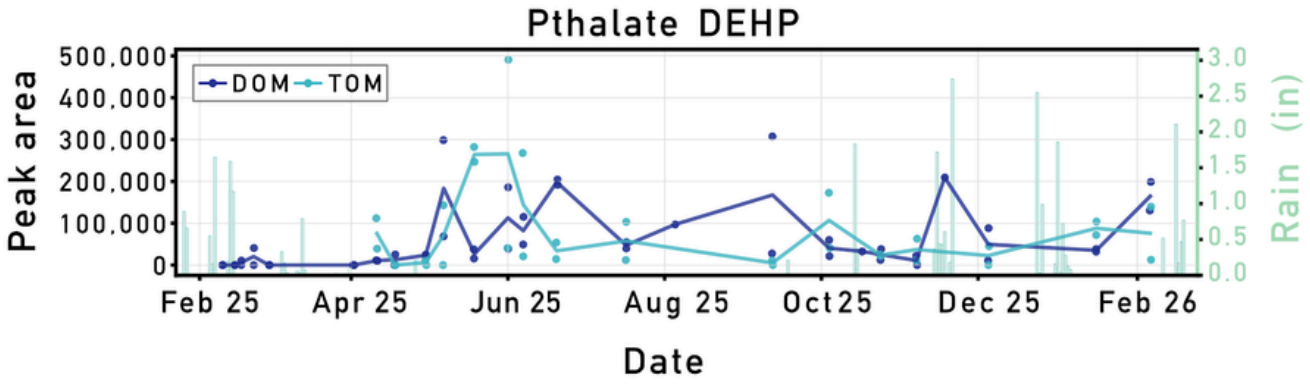

Figure 7. An example of a chemical (Phthalate DEHP (Di(2-ethylhexyl)phthalate), **a regulated harmful plasticizer**) that is **elevated throughout the year at Santa Monica Pier**, suggesting that additional study into chemical pollution of seawater is needed.

Chemical Data

PFOS (Perfluorooctane sulfonate), a **man-made "forever chemical",** formerly used in stain repellents and firefighting foams, **was highly elevated in the immediate aftermath of the LA fires, but declined overall by May 2025 and has remained low or undetectable ever since.**

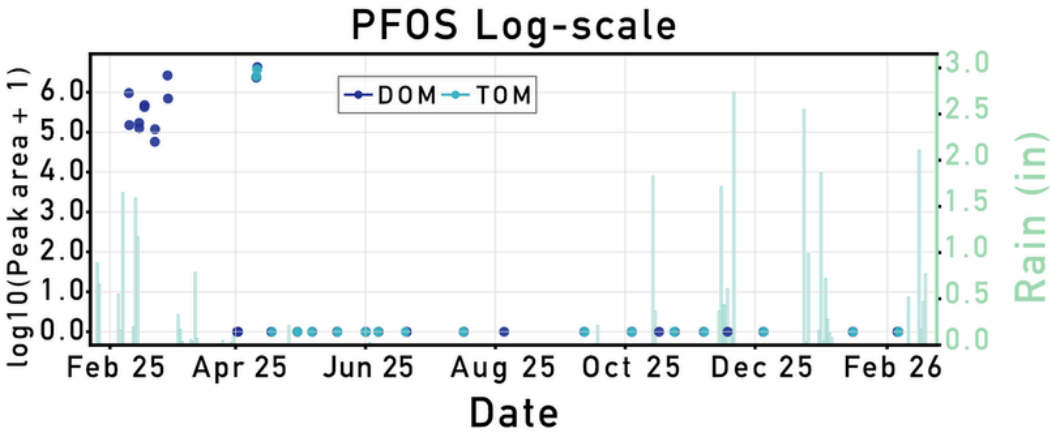

Figure 8. PFOS at Santa Monica Pier, from Feb 10, 2025 to Feb 6, 2026. Note that data is plotted on a logarithmic scale.

Near the Palisades burn scar, **PFOS levels were highest on February 10, 2025,** the sampling date closest to the January 2025 LA fires, and **then declined sharply.**

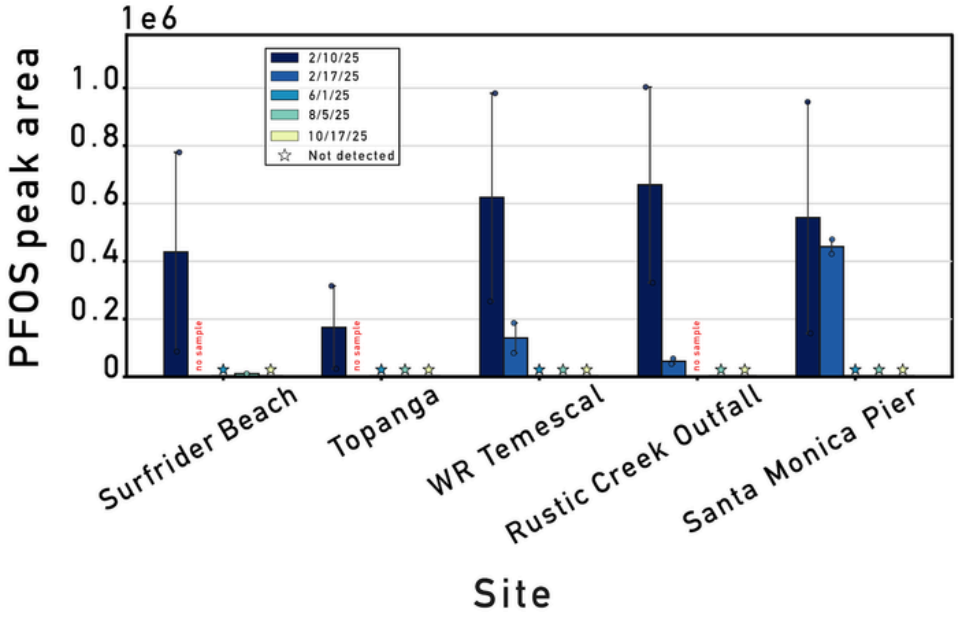

Figure 9. PFOS at Malibu area locations on select dates throughout 2025.

Chemical Data

The following show examples of a range of chemicals that we interpret as being attributable to the LA Fires. At Santa Monica Pier, all of these chemicals spiked in the days after the fire and then declined sharply in the spring of 2025 and has remained very low or undetectable through February 2026. Levels measured at the Pier did not appear to change in the wake of rain events.

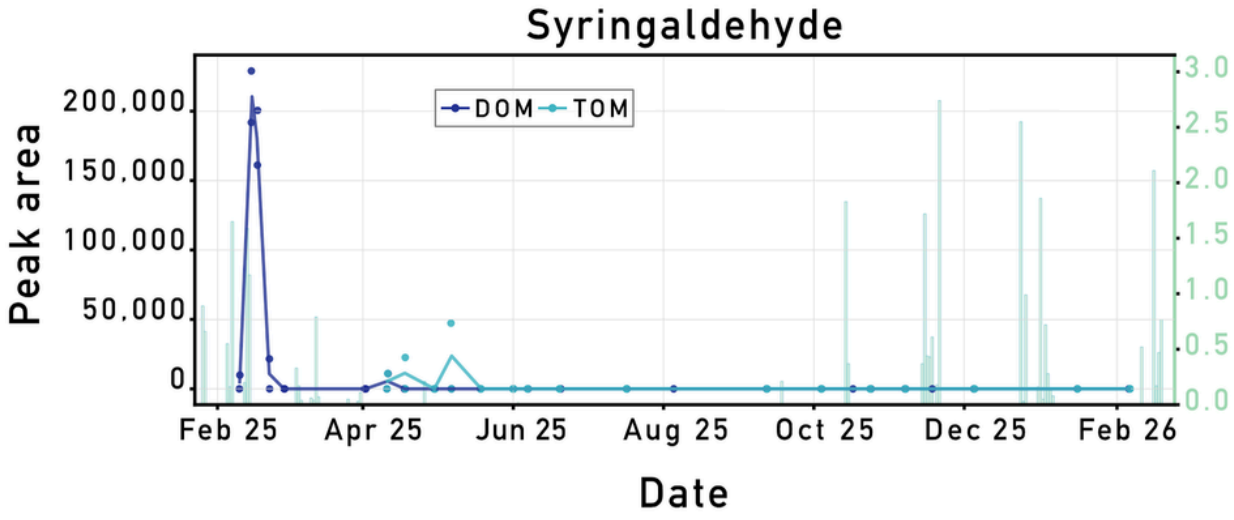

Figure 10. Syringaldehyde at Santa Monica Pier Feb 10, 2025 to Feb 6, 2026. The chemical syringaldehyde is produced during the burning of vegetation and other organic matter.

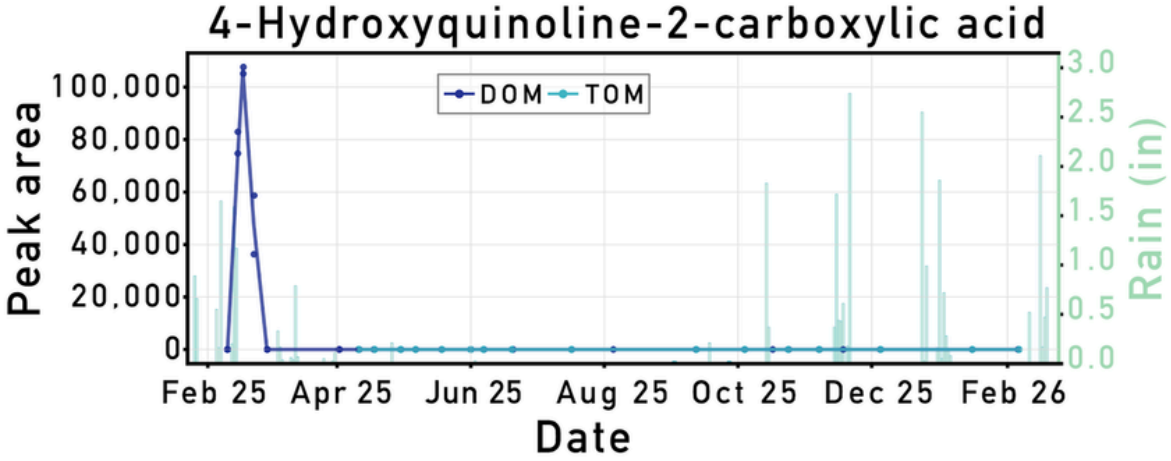

Figure 11. 4-Hydroxyquinoline-2-carboxylic acid at Santa Monica Pier, from Feb 10, 2025 to Feb 6, 2026. The chemical 4-Hydroxyquinoline-2-carboxylic acid is a quinoline derivative often attributed to fires (both from burned plant material and household materials).

Chemical Data

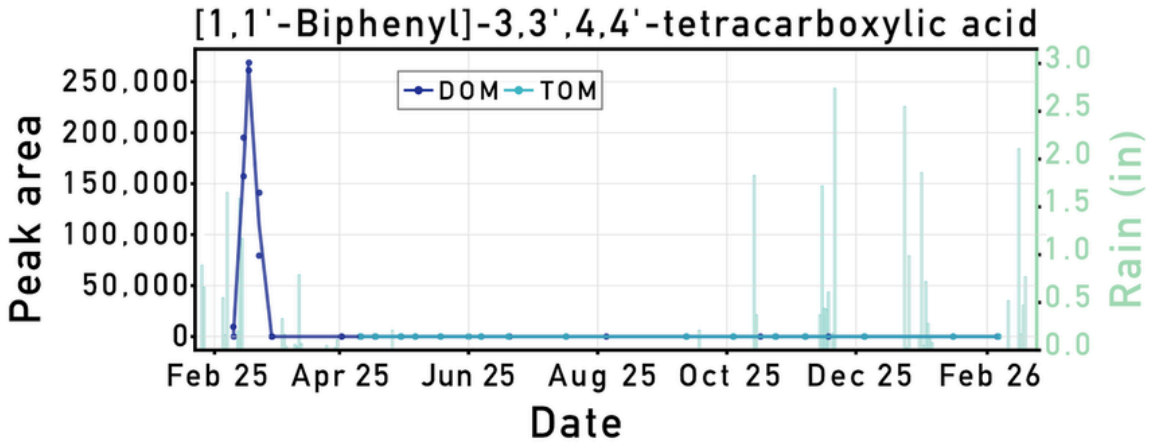

Figure 12. [1,1'-Biphenyl]-3,3',4,4'-tetracarboxylic acid at Santa Monica Pier, from Feb 10, 2025 to Feb 6, 2026. The chemical [1,1'-Biphenyl]-3,3',4,4'-tetracarboxylic acid is an industrial chemical used in household insulation.

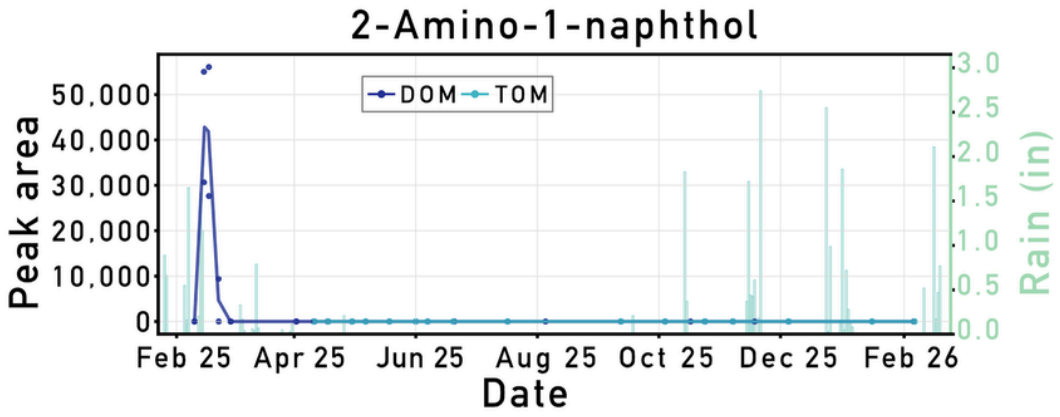

Figure 13. 2-Amino-1-naphthol at Santa Monica Pier, from Feb 10, 2025 to Feb 6, 2026. The chemical 2-Amino-1-naphthol is an industrial chemical and carcinogen.

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Special thanks

Heal the Bay for providing assistance in accessing Santa Monica Pier for sampling from February 2025 to May 2026. SurfriderLA for assisting with ongoing sampling of Will Rogers, Malibu, and Santa Monica area beaches.

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