March 2026

An Issue Brief from CLEAN Waters

Coastal metal concentrations after the LA Fires

What We Did

Collected coastal seawater samples across multiple dates in 2025, including both dry-season conditions and immediately after a major rain event, to compare baseline and storm-related impacts.

Preserved samples using trace-metal clean methods and analyzed them at USC using ICP-MS to measure total dissolvable metals, which includes both dissolved and particulate forms.

Collected beach sand along a 109-foot transect at multiple tide zones, air dried samples, and analyzed them using X-ray fluorescence (XRF) to quantify metal concentrations.

Key Takeaways

- Metals measured in coastal seawater and beach sand are not expected to harm marine life or human health, including following runoff associated with the 2025 Los Angeles megafires.
- At all locations and sampling times, metal concentrations in seawater and beach sand were well below U.S. EPA aquatic life thresholds and California drinking water standards.
- As expected, metal levels in seawater increased slightly after the first major rainfall following the fires, but still remained far below regulatory safety limits.
- Continued monitoring is recommended at the Rustic Creek and Topanga Creek outlets, which drain large portions of the Palisades burn area and show slightly higher metal levels than other regional sites, particularly after rain events.

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Context

- Wildfires that burn at very high temperatures can release metals from both natural materials and human-made sources by changing how these metals are stored and transported in the environment.
- Because there are limited data on metal concentrations in coastal sand and seawater prior to the L.A. fires, post-fire results were evaluated in the context of natural and human-influenced variability observed along the Southern California coastline, from Santa Barbara to San Diego.
- Exposure to elevated levels of certain metals, like lead, can be harmful to aquatic ecosystems and human health.
- Metals are naturally present in coastal sand and seawater, and additional inputs from human activities (such as stormwater runoff, agriculture, and legacy pollution from past gasoline use) existed before the fires. This makes it important to carefully interpret post-fire measurements.

Recommendations

- In general, fire-related metal contamination at the coast is not concerning for aquatic life or human health.
- Individuals with frequent exposure to sand or seawater or who may be more susceptible to exposure effects, including young children and pregnant individuals, can lower risk by avoiding consumption of sand and seawater, rinsing off after exposure to sand and seawater, and avoiding exposure during and immediately after rain events.
- Continued monitoring of acutely impacted sites (e.g. Will Rogers Beach and Rustic Creek and Topanga Creek outfalls) is recommended, since the data suggests there may be ongoing metal delivery after rain events.

Methods

Seawater analysis

- Coastal seawater samples were collected in acid washed HDPE bottles on 02/10/2025, 06/01/2025, 08/05/2025 and 08/06/2025 (dry season/pre rain) and 10/17/2025 (after a major rain event on 10/16/2025).
- Samples were acidified with trace metal grade hydrochloric acid and analyzed by ICP-MS at USC in December, 2025.
- Metal concentrations represent total dissolvable metals (dissolved and particulate metals).
- Metals quantified included Cadmium (Cd), Lead (Pb), Iron (Fe), Nickel (Ni), Copper (Cu), Zinc (Zn), Manganese (Mn), Cobalt (Co), Cerium (Ce), Lanthanum (La), Praseodymium (Pr), Neodymium (Nd) and Gadolinium (Gd).

Sand analysis

- Beach sand samples were collected on August 5 and 6, 2025 in Ziploc bags with a plastic scoop that was rinsed with seawater.
- Sand samples were collected at the sand/water interface, high tide interface, and on dry sand across a 109ft sampling transect for each location.
- Samples were air dried in plastic bags for two days. One tablespoon of sand was then decanted into a plastic XRF cup, air dried in the oven at 30C overnight, capped with mylar 3 micrometer film and analyzed by XRF (X-ray fluorescence).

Map of sampling sites

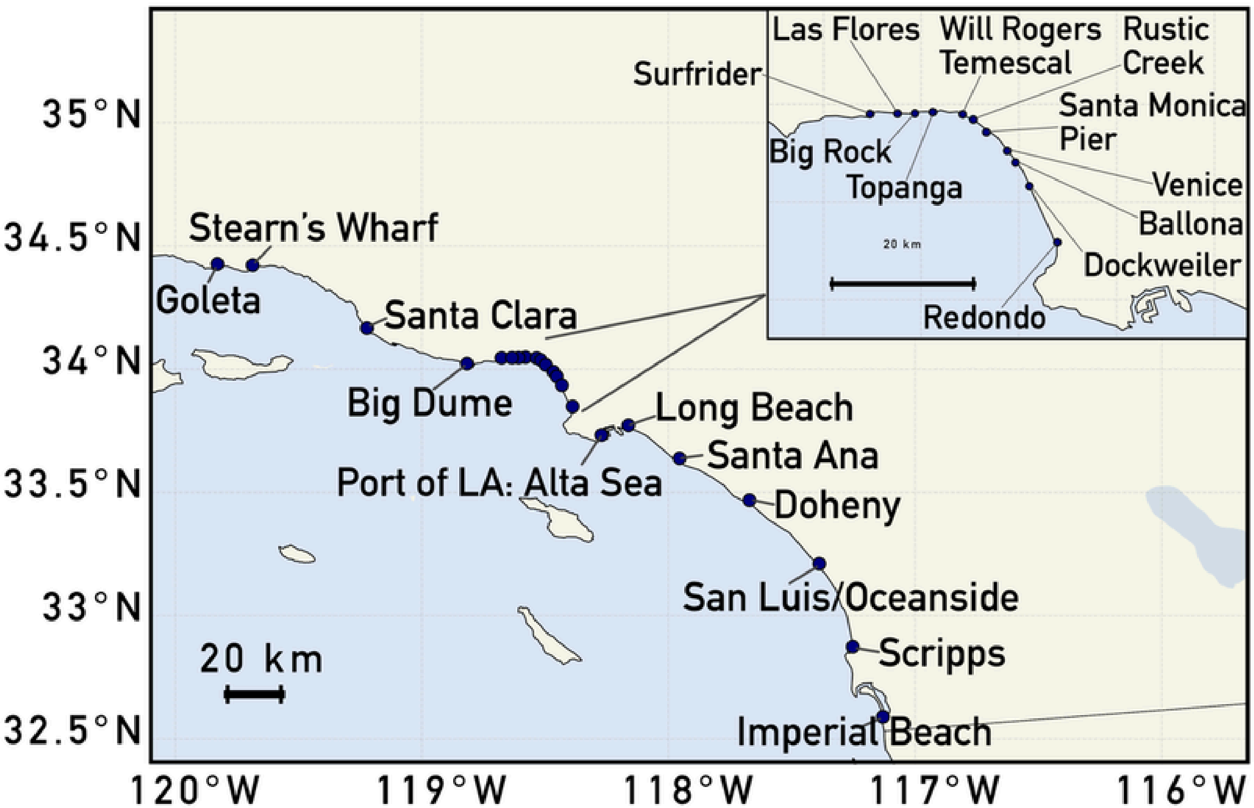

Figure 1. Map of sampling sites

Selected data – Lead

Summary

Lead concentrations in seawater were 8x less than the EPA aquatic life standards (for chronic exposure) and 15x less than the current California drinking water standard. Lead levels were elevated at Will Rogers beach at Temescal canyon after a “first flush” rain event in October 2025. Seawater lead levels in one directly affected area increased slightly in recent months, likely due to delayed delivery and increased severity of rain events. Lead levels in sand were always well below the CalEPA soil standard (80ppm).

Lead Concentrations in Ocean Water Relative to EPA Aquatic Life Standard, Before and After Rainfall

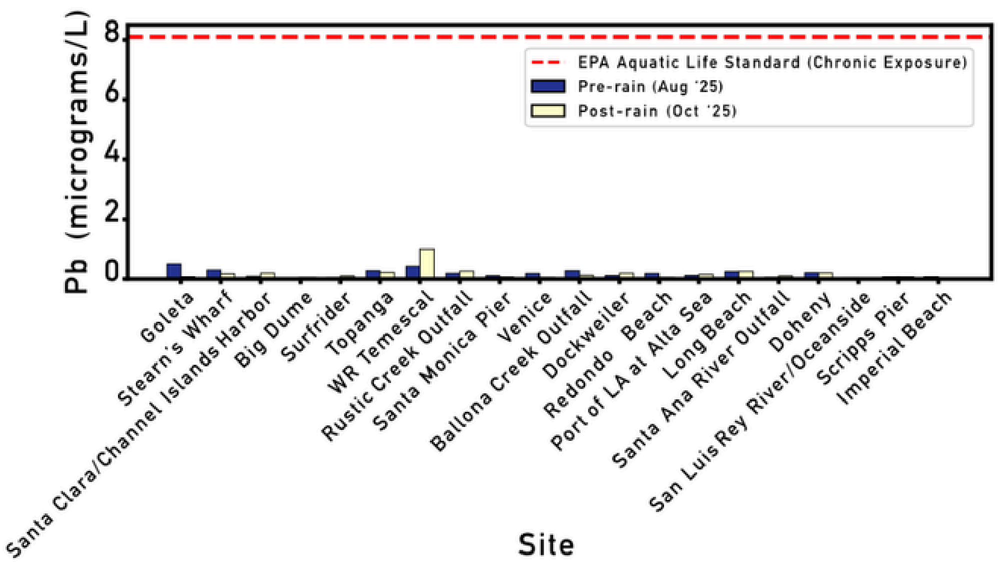

Figure 2. Total dissolvable lead concentration in seawater at locations (ordered North to South). Red highlighted sites are located directly in the burn scar (Palisades fire) or are draining burn scar areas (Eaton fire). Lead concentrations are always well below the EPA aquatic life standard (8.1 ug/L, blue dashed line).

Lead Concentrations in Ocean Water Before and After Rainfall

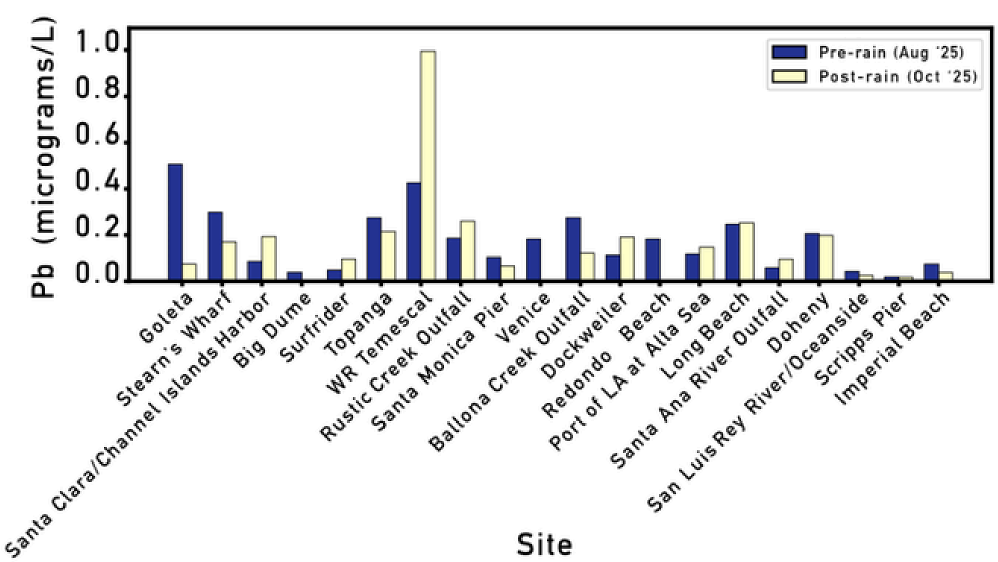

Figure 3. Total dissolvable lead concentration in seawater at locations (ordered North to South), zoomed in on the y axis. Red highlighted sites are located directly in the burn scar (Palisades fire) or are draining burn scar areas (Eaton fire). Lead concentrations are always well below the EPA aquatic life standard (8.1 ug/L).

Lead Concentrations in Ocean Water at Selected Locations Over Time

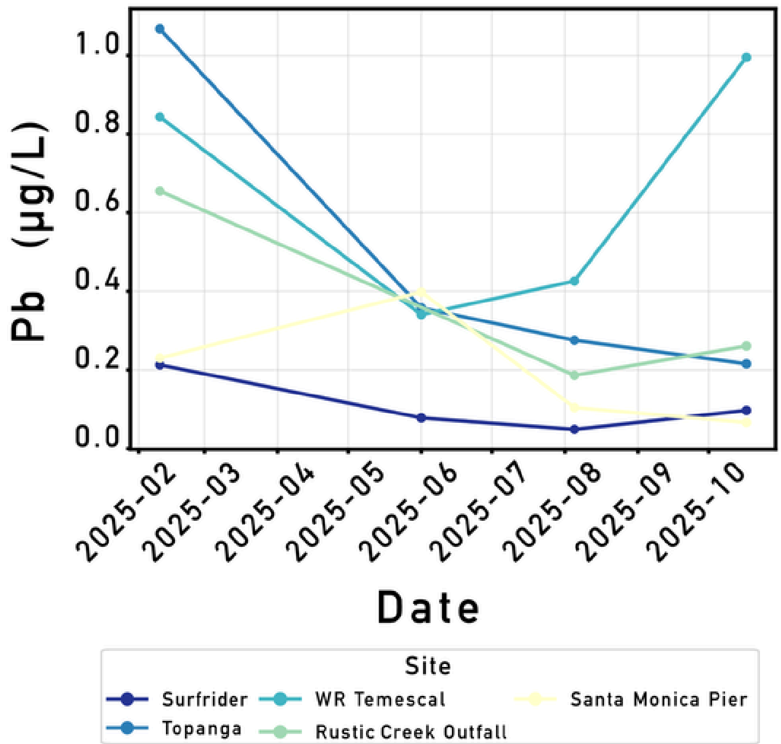

Figure 4 Total lead concentration in seawater at selected locations. Lead concentrations are always well below the EPA aquatic life standard (8.1 ug/L).

Total Lead Concentrations in Beach Sand on August 5-6, 2025

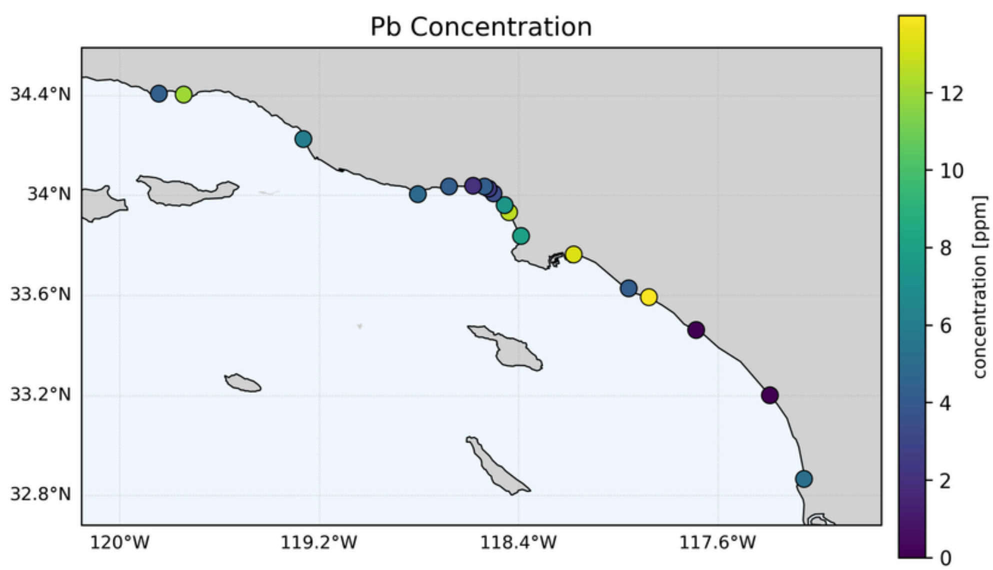

Figure 5. Total lead concentration in sand (dots are colored by the measured concentration). Lead concentrations were variable but always well below the California residential soil standard (80ppm). Burn scar areas did not experience higher lead levels than other locations.

Selected data – Cadmium

Summary

Cadmium concentrations were 87x less than the EPA aquatic life standard (chronic exposure) and 55x less than the California drinking water standard. There is no evidence of increased seawater Cadmium related to the LA fires.

Cadmium Concentrations in Ocean Water Before and After Rainfall

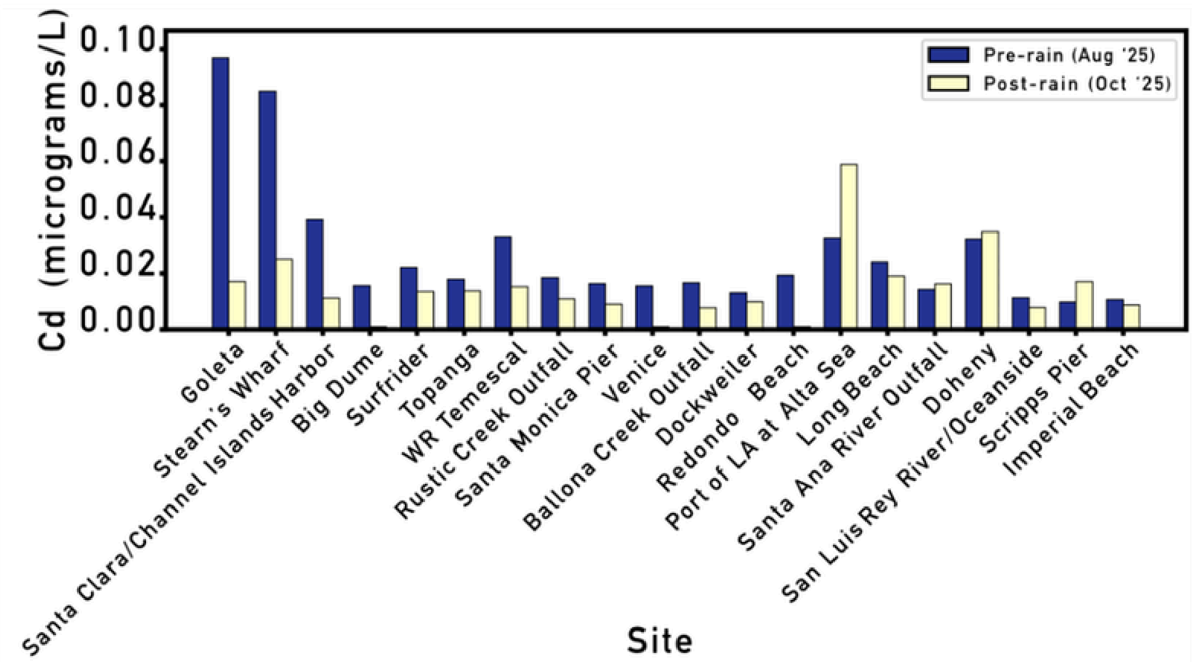

Figure 6. Total dissolvable cadmium concentration in seawater at locations (ordered North to South). Red highlighted sites are located directly in the burn scar (Palisades fire) or are draining burn scar areas (Eaton fire). Cadmium concentrations are always well below the EPA aquatic life standard (7.9 ug/L).

Selected data – Iron

Summary

Iron is an important macronutrient for marine life. In certain locations, iron concentrations exceeded the California drinking water standard (300ug/L). There is no EPA aquatic life standard for iron. Iron levels may be elevated near the Palisades burn scar compared to surrounding LA areas, but pose no risk to human health or aquatic life..

Iron Concentrations in Ocean Water Before and After Rainfall

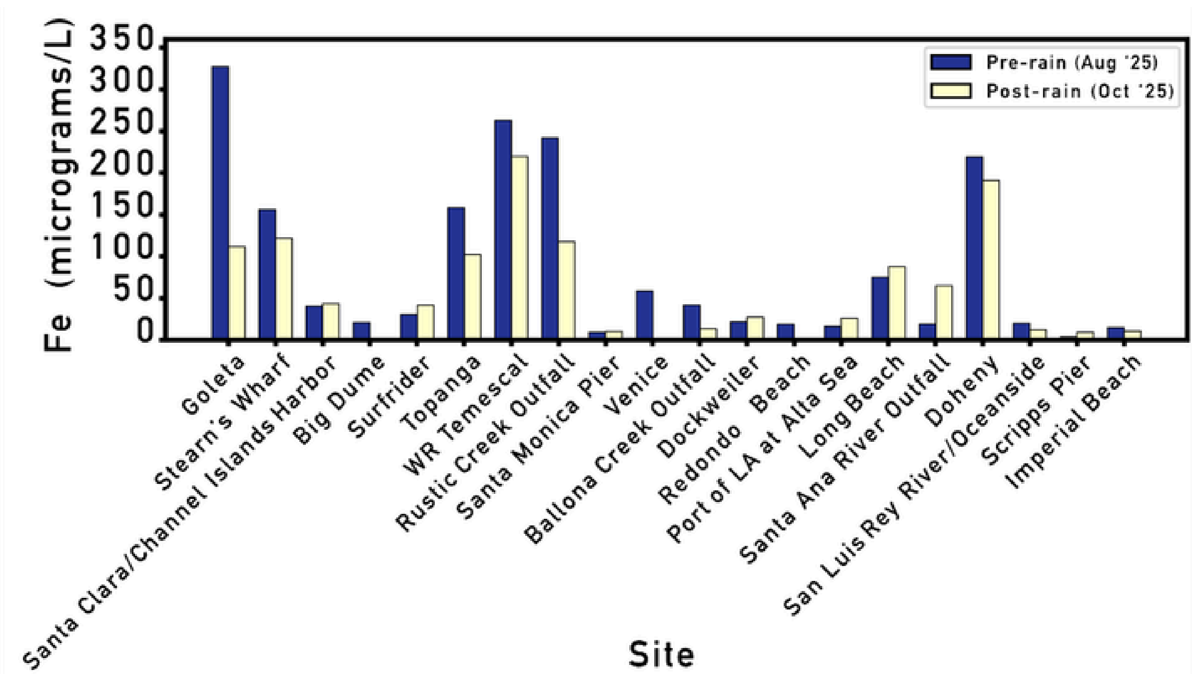

Figure 7. Total dissolvable iron concentration in seawater at locations (ordered North to South). Red highlighted sites are located directly in the burn scar (Palisades fire) or are draining burn scar areas (Eaton fire). There is no EPA aquatic life standard for iron.

Selected data – Manganese and Cobalt

Summary

Manganese and cobalt have similar natural sources as iron. Like iron, these metals may be elevated in the direct vicinity of the Palisades burn scar or outfalls that drain the Eaton burn scar,, corroborating the iron data. These metals do not pose harm to aquatic life or human health.

Manganese Concentrations in Ocean Water Before and After Rainfall

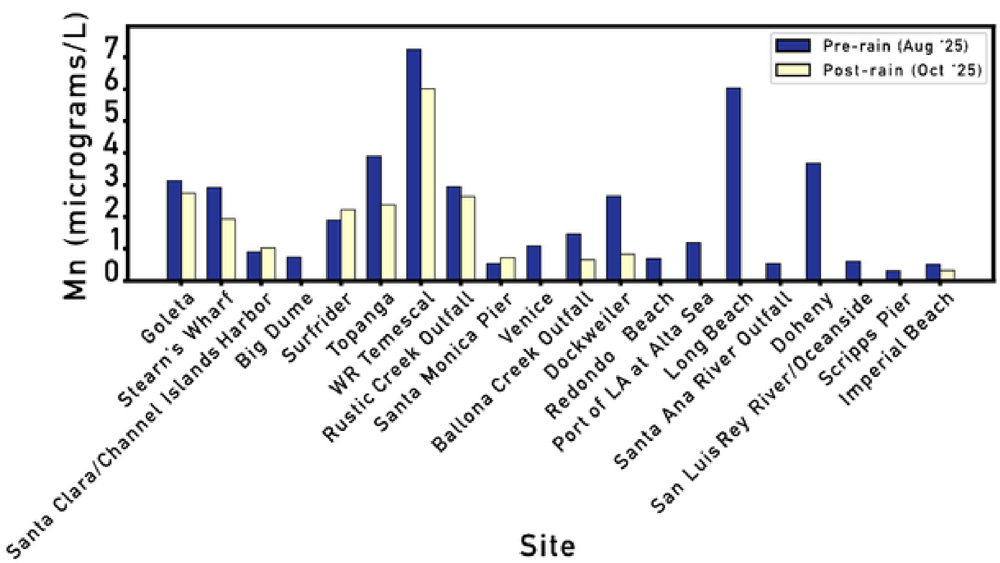

Figure 8. Total dissolvable manganese concentration in seawater at locations (ordered North to South). Red highlighted sites are located directly in the burn scar (Palisades fire) or are draining burn scar areas (Eaton fire). There is no EPA aquatic life standard for manganese.

Cobalt Concentrations in Ocean Water Before and After Rainfall

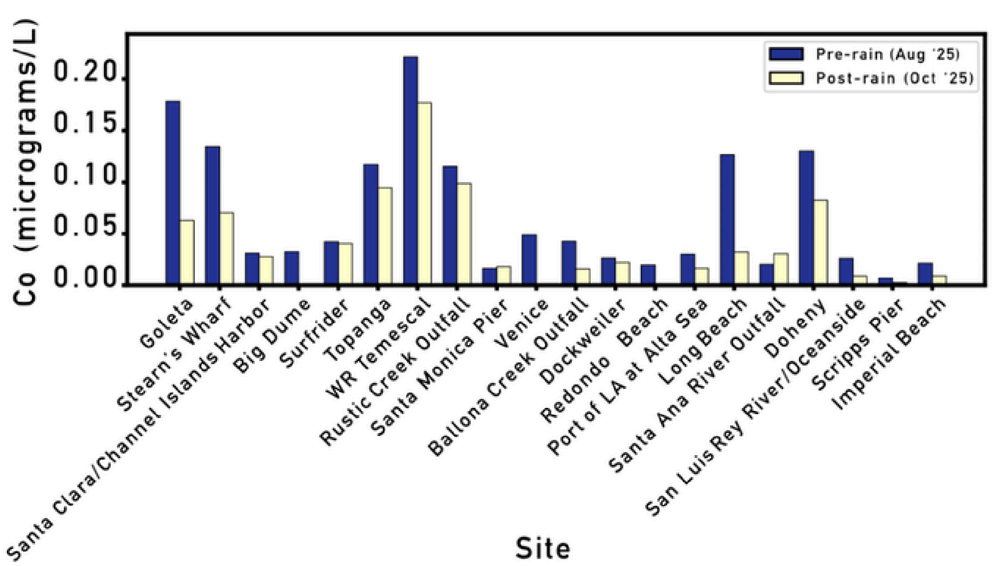

Figure 9. Total dissolvable cobalt concentration in seawater at locations (ordered North to South). Red highlighted sites are located directly in the burn scar (Palisades fire) or are draining burn scar areas (Eaton fire). There is no EPA aquatic life standard for cobalt.

Selected data – Lanthanum and Neodynium

Summary

Lanthanum is used in hybrid car batteries and specialized electrical equipment (like fiber optics). Neodymium is also used in things like electronics and motors. Both metals are also naturally occurring. There are no aquatic life or drinking water standards for these metals. Lanathum and Neodymium may be elevated in areas adjacent to the Palisades burn scar, but are most concentrated at other, non-fire affected locations along the Southern California coast.

Lanthanum Concentrations in Ocean Water Before and After Rainfall

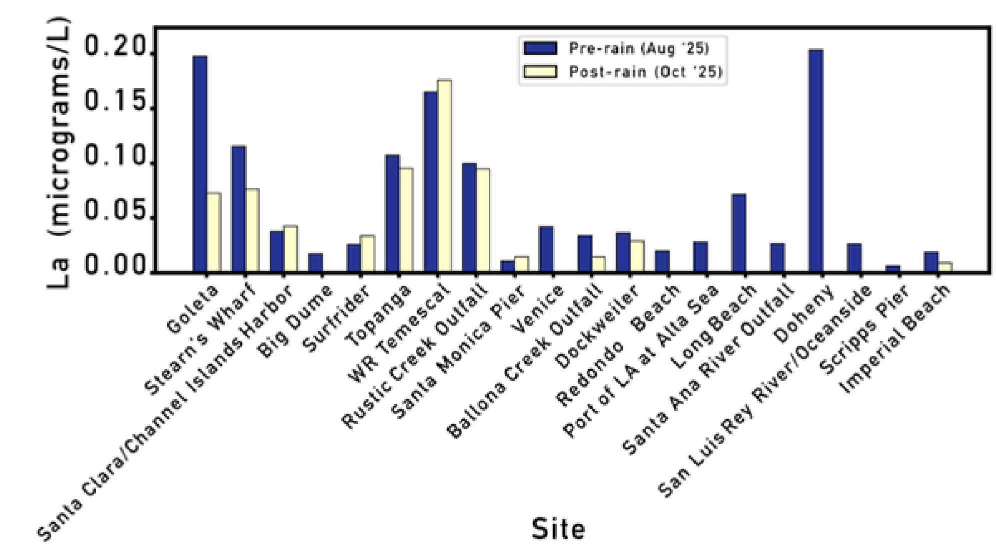

Figure 10. Total dissolvable lanthanum concentration in seawater at locations (ordered North to South). Red highlighted sites are located directly in the burn scar (Palisades fire) or are draining burn scar areas (Eaton fire). There is no EPA aquatic life standard for lanthanum.

Neodynium Concentrations in Ocean Water Before and After Rainfall

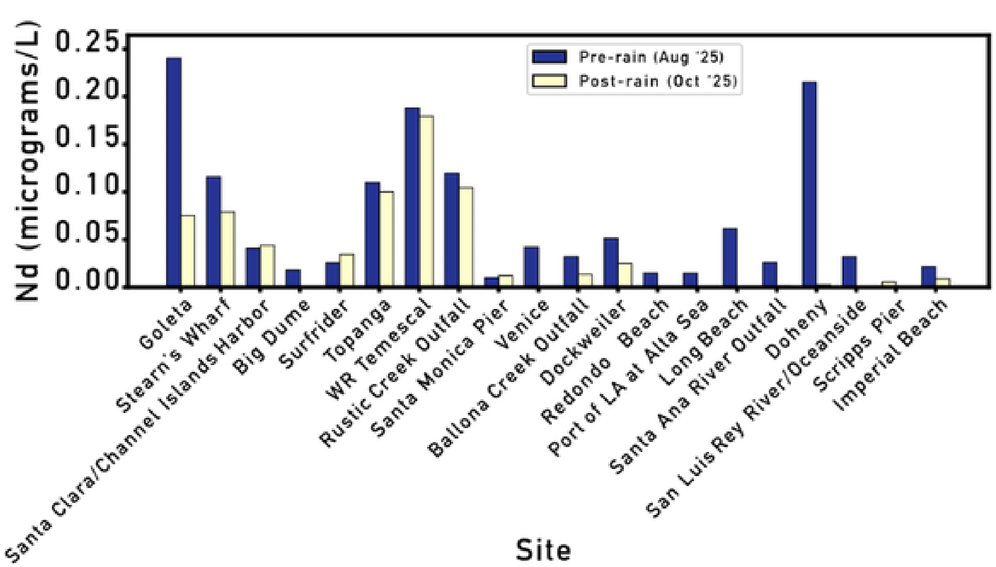

Figure 11. Total dissolvable neodymium concentration in seawater at locations (ordered North to South). Red highlighted sites are located directly in the burn scar (Palisades fire) or are draining burn scar areas (Eaton fire). There is no EPA aquatic life standard for neodymium.