Data Brief: Sediment

A Norfolk Southern freight train carrying hazardous materials derailed in East Palestine, OH on February 3, 2023. This is a summary about sediment samples gathered after the derailment.

Key Points:

- **Sediment samples taken from February-November 2023 following the derailment do not provide enough information to make conclusions about exposure and health impacts.**
- **Exposure to contaminated sediment is not likely, but taking care when spending time in and around streams near the derailment site can limit the risk of being exposed.**

Sampling

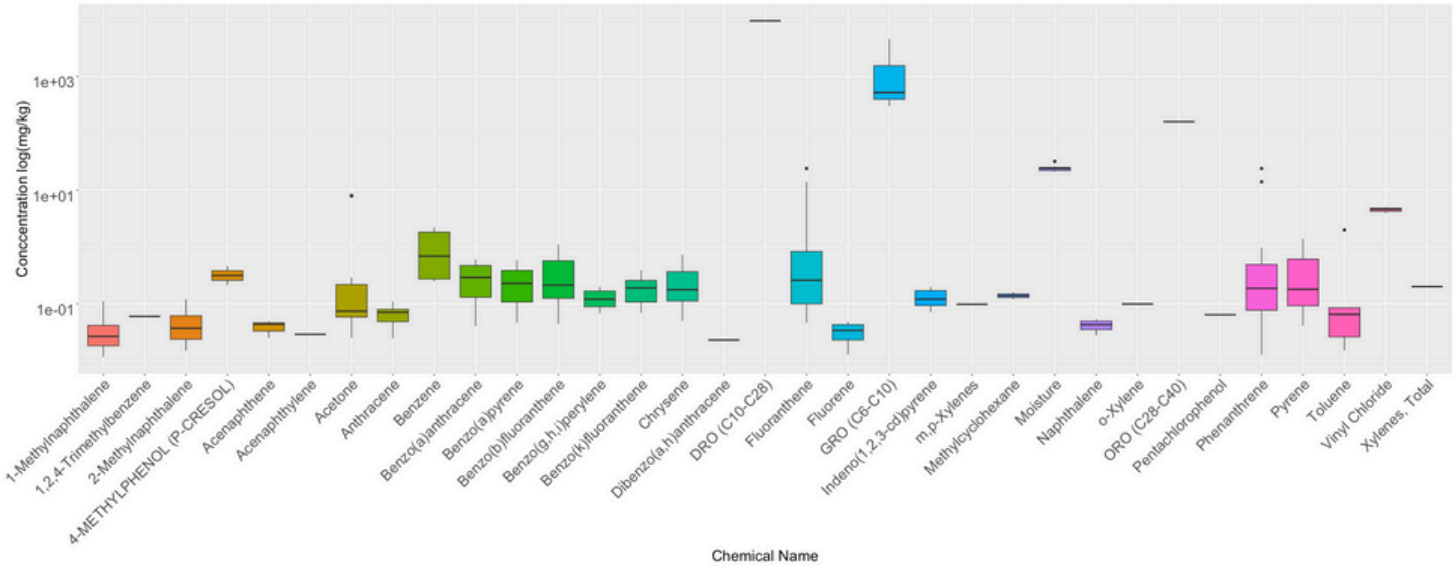
- Sediment is solid material that deposits and settles at the bottom of bodies of water.
- Samples of sediment from surface water were collected by the U.S. Environmental Protection Agency (EPA) and associated contractors from February 3 - November 10, 2023.
- Forty-nine samples were collected from 41 locations along Sulfur Run near and downstream from the derailment site.
- It is not clear what method was used to take the samples, and whether the method(s) were used consistently.

Findings

- EPA laboratories tested the samples for 140 chemicals, but not all samples were tested for all chemicals, making comparisons between samples more difficult.
- Out of 2,973 tests, 265 (8%) had values above the reporting limit. Of this 8%, about 1/3 had values less than twice the reporting limit.
- The chemicals with concentrations above the reporting limit in sediment samples are shown on page two in the figure. None of the chemicals above the reporting limit directly relate to the derailment, except for vinyl chloride.
    - The concentration is the amount of each hazard (chemical, in milligrams) in a kilogram of sediment. With a risk assessment, these values can tell us how much of the hazard can be eaten or drunk unintentionally from sediment in the streams, or through contact on objects.
    - The chemicals with the highest average concentration are DRO (Diesel Range Organics C10-C28), GRO (Gasoline Range Organics C6-C10), and ORO (Oil Range Organics C28-C40).

Reporting Limit:
The lowest possible level of a chemical that a lab is able to detect.

Figure: Concentration of chemicals from sediment samples with levels over the reporting limit. Sulfur Run, East Palestine, OH, February-November, 2023



Notes: Data were gathered by the U.S. EPA and summarized by the Ohio/Pennsylvania University Research Consortium. Values reported here are $\log_{10}$ of the measured concentrations, meaning that the original measurements were transformed to be more easily interpreted on this graph. Mg/kg is the same as ppm (parts per million.)

Conclusions

- The samples from the EPA cannot be used to draw conclusions about health risks because:
  - It takes time for chemicals to settle into sediments, and the samples were taken too soon after the derailment.
  - There are no data from prior sediment samples, and we need to compare the post-derailment samples to pre-derailment samples to see if there was a change in levels of different chemicals.
  - No samples were taken from upstream of the derailment site, which would have been valuable to compare to downstream samples to determine the impact of the derailment.
- The data presented here can be best used as a baseline to compare to longer-term samples.
- Exposure is how a person interacts with a hazard in their environment. Exposure to hazardous chemicals in sediment could be through eating, drinking, or absorbing through the skin.
  - These exposures are not common for sediment, and can be avoided by being careful with how you interact with soil and water. For example, try to avoid drinking untreated water from the river when swimming, boating, etc.

Future Directions

- EPA sampling teams should clarify what sampling methods were used. Core sampling, or taking a cylindrical sample of material below the surface using a special drill, should be used for all sediment sampling in the future as it provides the highest quality data.
- One way to get samples that represent pre-derailment levels would be to take core samples from nearby sites not impacted by the derailment.