

Forest organic runoff breaks down faster than agricultural, urban runoff

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Dissolved organic matter in streams and rivers can be broken down by sunlight or bacteria, providing a fuel source for aquatic ecosystems and affecting carbon dioxide and carbon monoxide concentrations as the organic matter is mineralized. Researchers know that the amount of organic matter in streams fed by forest landscapes and those fed by watersheds affected by human activity, such as croplands, pasture, or urban environments, can differ greatly. What is less well known is how the organic matter from these various environments evolves as it flows downstream.

Taking water samples from the heads of seven Virginia rivers, Lu et al. studied how bacterial and photochemical reactions changed the concentration, [isotopic signature](#), and fluorescent properties of dissolved organic compounds. The authors find that the organic matter stemming from forested environments is more susceptible to degradation by sunlight than that from landscapes affected by human activity. This differing rate of photochemical degradation means that for streams affected by farm and urban runoff the organic loads remain at higher levels longer, resulting in greater organic content at the river outlet and an increased potential for driving hypoxic conditions in downstream waterways.

The authors suggest that the higher persistence of anthropogenic dissolved organic compounds could help explain an observed long-term increase in river organic compound concentrations in Europe and North America. The authors also suggest that the forest-derived dissolved

organic compounds may be more photoreactive because they haven't been exposed to as much light as those from landscapes affected by human activity, or because the [organic compounds](#) produced by plants rather than [urban runoff](#) bear varied [chemical compositions](#). They note, however, that more research is needed to determine the exact cause.

More information: Photochemical and Microbial Alteration of Dissolved Organic Matter in Temperate Headwater Streams Associated with Different Land Use, *Journal of Geophysical Research-Biogeosciences*, [doi:10.1002/jgrg.20048](https://doi.org/10.1002/jgrg.20048), 2013 .
[onlinelibrary.wiley.com/doi/10 ... /jgrg.20048/abstract](https://onlinelibrary.wiley.com/doi/10.1002/jgrg.20048/abstract)

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