# Can we trace sediment and soil organic matter transfers from land to water at a catchment scale?

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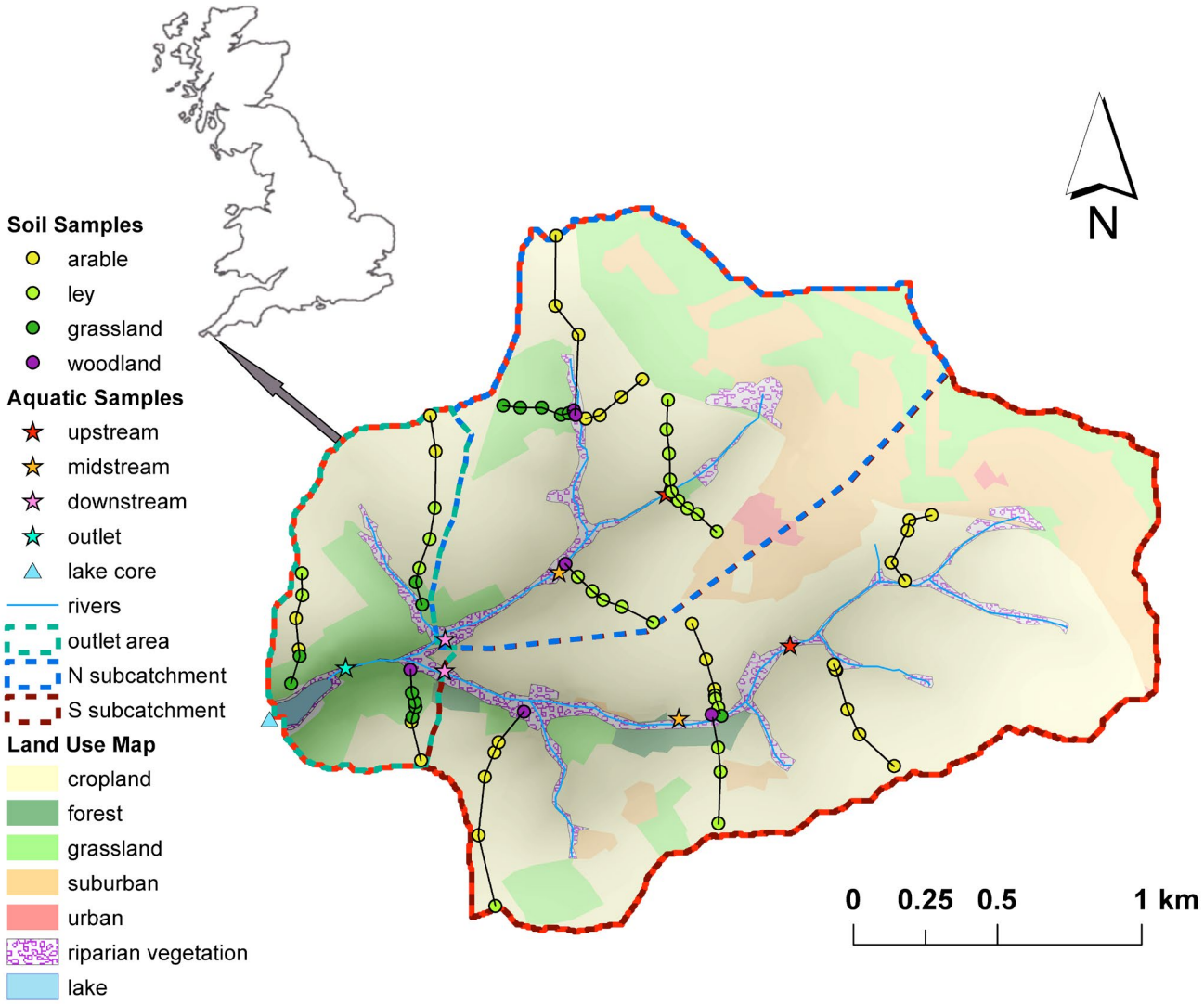
**Soils are essential for human wellbeing, providing important services including carbon storage and food security. Therefore understanding human impact on the flow of sediment and organic matter from soils to inland waters is important both for climate change mitigation and to protect water quality.**

In this study, we tested a new tool for tracing the origin of sediment and carbon from land to inland waters at a catchment scale, using a novel combination of nutrients (nitrogen and carbon) and plant-specific leaf-waxes (n-alkanes) to understand the sources of sediment and organic matter in river and lakes sediments from different land uses.



We found that it was possible to distinguish between arable and temporary grassland, permanent grassland, woodland, river and lake sediments, which was not possible in earlier approaches. Further, we found that riparian woodland adjacent to the streams was a major source of organic matter to lake sediments, followed by an important contribution from permanent grassland, which occupies the steep slopes surrounding the lake. Perhaps surprisingly, arable and temporary grassland land uses, which could be expected to be more prone to soil erosion and therefore sediment delivery, made a smaller contribution to the lake bed sediments. This shows the important role played by the woodland in buffering the flow of sediment from the higher risk land uses in the upper parts of the study catchment.

Over the past 50 years, the contribution of sediment and organic matter from land to Loe Pool appears to have increased, with an increasing contribution of woody vegetation. This points towards increased soil erosion rates but also to an increasing amount of woody vegetation adjacent to the two streams. The chemical composition of the lake sediments has shown evidence of nutrient enrichment reported at Loe Pool since the 1960s, a likely result of intensive agricultural practices and associated higher soil erosion rates during the 1960-1980's. However, the lake core also indicates improving water quality over the last decade, most likely linked to the land management changes introduced by the National Trust since the 1980s.

Our findings support the understanding of the important role of rivers in the transport and processing of terrestrial carbon. How much is stored in these freshwater systems and how much is released to the atmosphere is a major area of scientific research. This research provides a new tool for the study of these important questions, both from the point of view of climate change mitigation and the management of water quality.

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Full article entitled 'Tracing of particulate organic C sources across the terrestrial-aquatic continuum, a case study at the catchment scale (Carminowe Creek, southwest England)' is published in the journal *Science of the Total Environment.*