

Does Human Land Use Alter the Amount and Quality of Dissolved Organic Matter in Lotic Ecosystems?

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Dissolved organic matter (DOM) plays a pivotal role in a variety of environmental and ecosystem processes within aquatic systems. Agricultural land use, as a global change that has fundamentally altered terrestrial landscapes and soil environments, has led to alterations in the quantity and characteristics of DOM in fluvial systems. Recent studies have suggested that agricultural land use in watersheds may change the quantity, source, composition, reactivity, and ecological role of DOM in streams. These changes could have profound environmental and ecological ramifications not only for stream networks but also for downstream rivers and coastal oceans. Therefore, effective watershed management decisions should include monitoring and characterizing DOM from human-impacted watersheds, but relevant data to inform regulatory practices remain scarce. In this study, we synthesized literature data relating watershed human land use to DOM in lotic ecosystems, in an effort to capture any systematic patterns and provide baseline understanding of mechanisms regulating human influences on the properties of DOM in streams and rivers. Specifically, we evaluated how DOC concentration and DOM quality (mostly absorption and fluorescence indicators and DOC biodegradability in some cases) vary with watershed attributes, including watershed size, slope, land use/cover, watershed temperature, and stream order.