



An ecotoxicological assessment of wildfire ash produced in contrasting ecosystems

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The impacts of wildfires are of growing concern around the world with climate change and human activities set to continue to increase the vulnerability to severe wildfire in many regions. It is well established in fire-prone regions (e.g. Australia, Western USA, Iberian Peninsula) that wildfires can cause a range of considerable changes to the hydrological dynamics of freshwater catchments. Limited research, however, has focused on understanding the effects of ash contamination on aquatic biota, particularly in less fire-prone temperate regions (e.g. UK).

To address the research gap, this project provides a comparative assessment of the role of wildfire-generated ash as a potential source of diffuse contamination for downstream water bodies. Ash samples from wildfires in three contrasting ecosystems (i) UK upland heath (ii) Spanish pine forest and (iii) Australian Eucalypt plantation are used in a set of bioassays determining ash ecotoxicity on two species representing key functional levels of aquatic systems; a primary producer (*Pseudokirchneriella subcapitata*) and a food for fish species (*Daphnia magna*). Fulfilling established ecotoxicological guideline requirements, 48-hour acute toxicity tests were conducted on both species using a range of concentrations of each ash type. *Daphnia magna* were subjected to an acute immobilisation test, and an established technique for monitoring chlorophyll fluorescence was adapted for use here to provide a highly sensitive bioindicator of toxicity on *Pseudokirchneriella subcapitata*, through a 48-hr inhibition of photosynthesis test. This study constitutes the first of its kind to be undertaken using ash originating from the UK and relevant to temperate upland ecosystems.

This contribution will provide a summary of the methodology, results and preliminary analysis from this research project.