Natural measures to prevent floods valuable but not 'a silver bullet'

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Credit: University of Bristol

Natural measures to manage flooding from rivers can play a valuable role in flood prevention, but a lack of monitoring means their true potential remains unclear, researchers say.

Such measures, including river restoration and tree planting, aim to restore processes that have been affected by human activities such as

farming, land management and house-building.

Natural flood management is an area of increasing interest for policy makers, but its implementation can present a complex balancing act between the needs of different groups, including the public, farmers and land owners. Mixed messages about the efficacy and scalability of natural flood management measures add to the uncertainty surrounding their benefits.

Now a team of experts, led by Dr Simon Dadson of the University of Oxford, and including Professor Paul Bates from the University of Bristol's School of Geographical Sciences, has compiled the evidence on natural flood management, in order to better inform policy decisions and show where crucial gaps in knowledge lie.

Published today in the *Proceedings of the Royal Society A*, the restatement clarifies the scientific evidence available from a variety of sources, ranging from field data to model projections and expert opinion.

Dr Dadson said: "Flooding is an extremely costly natural hazard in the UK, and we expect it to increase in the future as climate change leads to more extremes in our weather. The period between 1960 and 1990 was relatively flood-poor compared with what we've seen since and with what we are likely to see in the future.

"What we've found is that when it comes to natural flood management, there are some interventions for which there is very strong evidence, but these tend to be in small-scale river catchments. One of the main problems decision-makers face is that differences between catchments make it difficult to transfer evidence from one location to the other – and we don't yet know whether the effects in small catchments can be extrapolated to larger ones."

The authors say natural measures have proved useful at preventing flooding after minor rainstorms, and can be a worthwhile component of a larger package of flood prevention measures. For measures such as tree planting that aim to change the way rainfall runs off the land, the evidence of the impact on flooding is mixed. Meanwhile, measures to restore natural floodplains by "making room for the river", for example by removing flood walls and other obstacles, have been shown to reduce flood water levels.

Dr Dadson added: "There are always going to be some extreme floods, like we saw after Storm Desmond, that are simply overwhelming.

"Natural flood management can help if implemented well in carefully chosen locations, and it can bring important benefits to landscapes and wildlife, but it's not a silver bullet for the problem of flooding."

The restatement calls for increased monitoring and measurement of flood management impacts, with evidence gathered within a comprehensive framework.

Dr Dadson added: "Our message to Defra and the Environment Agency is that they need to establish more systematic large-scale surveys and monitoring programmes, and feed natural flood management into planning at the catchment scale.

"It's also really important that catchment-based schemes that have been instigated by communities and local wildlife or river trusts are monitored and evaluated so that the right lessons can be learned for the future."

Professor Paul Bates commented: "Whilst natural catchment management seems a very attractive option for managing flood risk, robust evidence for its effectiveness for anything other than small floods in small catchments is not yet there."

More information: A restatement of the natural science evidence concerning catchment-based "natural" flood management in the United Kingdom. *Proceedings of the Royal Society A: Mathematical, Physical and Engineering Sciences*. hdl.handle.net/1983/677ca43e-0 … 64-b7cd-fb10771f94c9

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