Small streams have a big influence on our lives

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Small streams make up 70%-80% of the total channel length of river networks, and they strongly influence downstream portions these networks. The role small streams ? known as headstreams ? play in retaining or transmitting sediment and nutrients, providing habitat and refuge for diverse aquatic and riparian organisms, creating migration corridors, and governing connectivity at the watershed-scale is the subject of a review by Ellen Wohl of Colorado State University in the US. The article is published in a special issue on Headwater Regions in the journal *Frontiers of Earth Science*, which is jointly published by Higher Education Press in China and Springer.

Historically, headwater streams have been given little attention by researchers, policy makers, and landowners. However, we now know that these streams, which are so small that it takes little effort to jump across them, exert a critical influence on downstream portions of the river networks. Unfortunately, the importance of headwaters relative to other portions of a river network has often been overlooked which means that they lack the legal protections accorded to other portions of a river network.

In her article, Wohl draws attention to the fact that the scientific understanding of headwater streams is incomplete and she highlights a number of areas where research is needed. For instance, improved mapping, especially in determining the location of first-order channels is necessary. Also, a better understanding of resistance and resilience especially in response to natural and human-induced disturbances.

Improvements in assessing impacts from human alterations to land use and climate, and creating complete species inventories to understand biodiversity and the ecological resilience. Further topics are addressed in detail in the review.

"Because headwater streams are so widespread and can be difficult to recognize, people outside the community of river scientists are less likely to consider these small channels worthy of protection or to be actively hostile to the idea of extending regulatory authority to headwater streams," says Wohl. "As one of my colleagues put it, you would not expect a forest to remain healthy if you removed all of the leaves from every tree. So we cannot expect our freshwater resources to remain vital if we destroy much of the functioning of headwater streams."

More information: Ellen Wohl, The significance of small streams, *Frontiers of Earth Science* (2017). DOI: 10.1007/s11707-017-0647-y

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