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Does changing connectivity due to beaver engineering result in changing hydrological function? Understanding the impacts of the return of the Eurasian beaver to Great Britain.

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The connectivity of landscapes is increasingly recognised as being a key control over their hydrological function and provides a valuable conceptual approach for understanding the environmental impacts of the return of beaver to European landscapes.

Beavers are the archetypal keystone species, which can profoundly alter ecosystem structure and function through their engineering activity, most notably the building of dams. Beaver dams, associated ponds and other structures such as canals can reduce downstream connectivity. However, conversely beaver engineering can also increase lateral connectivity pushing water sideways, connecting the channel and floodplain, creating complex wetland environments.

Changes in hydrological connectivity associated with beaver, has the potential to alter flow and sediment regimes, biogeochemical cycling and freshwater ecology. Results will be presented from hydrological monitoring across a range of sites in Great Britain where the Eurasian beaver (*Castor fiber*) has been reintroduced. Analysis will consider (1) does beaver engineering result in flow attenuation across scale and landuse? (2) Is flow attenuation manifested during both low and high flow conditions?

The return of beaver to intensively managed European landscapes may provide ecosystem service benefits, including natural flood management, water quality, sediment storage and habitat creation (Puttock et al., 2017, 2018). However, beaver activity such as damming and tree felling can also cause management issues (Auster et al., 2019). Therefore, it is critical to understand where and in what density beaver damming may occur. A modelling approach will be presented for determining beaver habitat suitability and dam capacity, which in conjunction with empirical monitoring aims to provide understanding at management and policy relevant scales.

References

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