

The natural capital of temporary rivers: characterizing the value of our aquatic-terrestrial ecosystems

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What are temporary rivers?



Temporary rivers are those in which water **sometimes stops flowing**; many also **lose** some or all **surface water**¹. In the **UK**, **temporary rivers** are **diverse** and include many different types, from headwater streams in remote uplands (A-C) to karst limestone rivers (D-E) and ‘winterbourne’ chalk streams in southern England (F).

Exploring the natural capital of temporary rivers

Natural capital comprises **assets** – all the **physical and biological elements** of the natural environment. The natural assets of temporary rivers – and other ecosystems – **include**:



Aquatic and terrestrial natural assets enhance biodiversity in temporary rivers

Some rare specialists live only in temporary rivers...
...such as mayfly *Paraleptophlebia wernerii*²



One-time, site-specific comparisons suggest that temporary rivers support fewer taxa than perennial rivers³. But ‘time-sharing’ of a wet-dry habitat mosaic by aquatic and terrestrial species manifests as diverse, dynamic communities⁴. Aquatic invertebrate diversity is also enhanced by rare specialists².

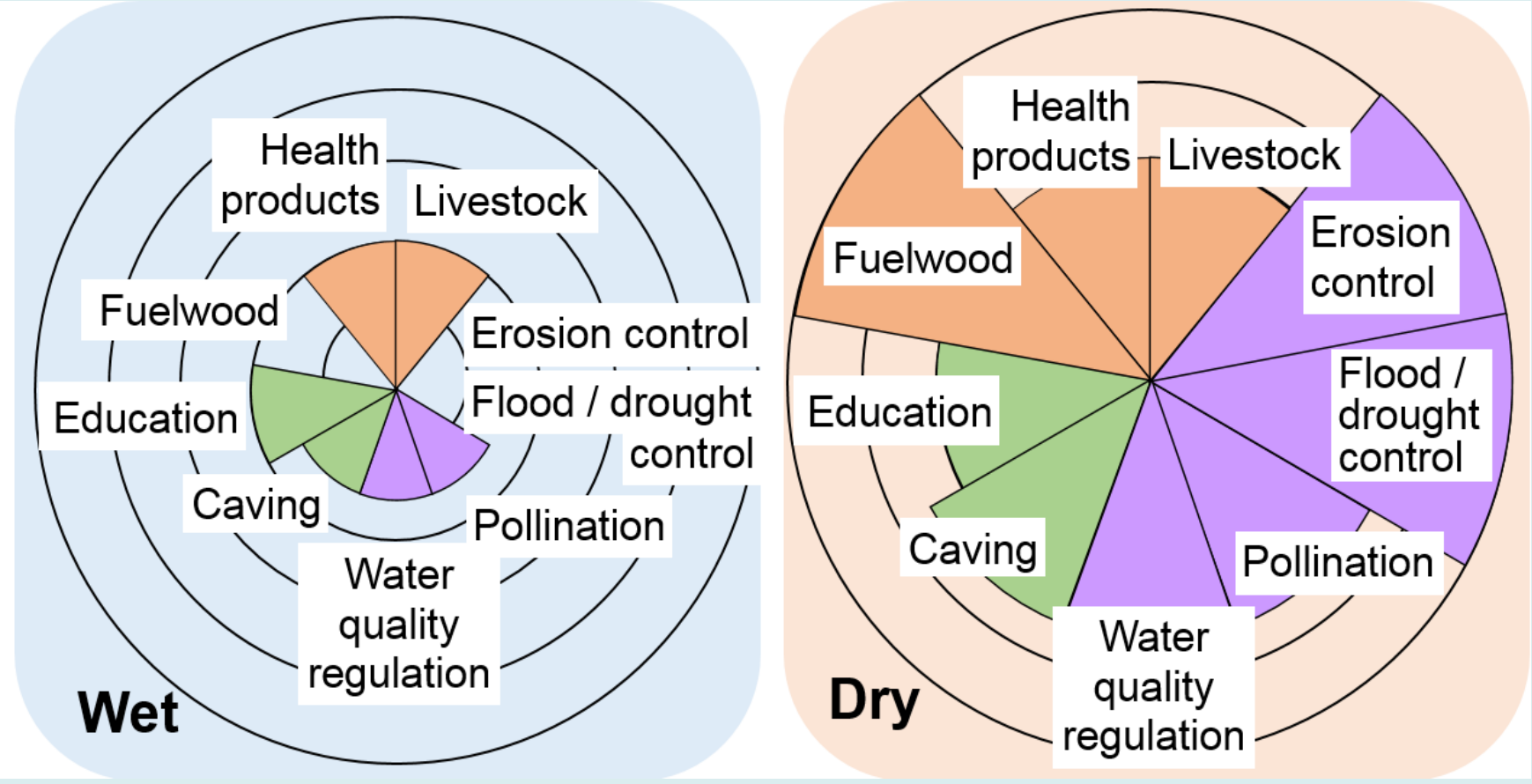


Assets interact to deliver different ecosystem services during wet and dry phases

Physical and biological assets interact to perform **natural functions** that **deliver services** from which we benefit. Some **wet phase** goods and services are tangible and visible, including drinking water and recreational fishing. **Dry phase** services are less visible and less valued, but some services **are enhanced or unique**, as shown in the photos and summarized in the ‘benefits wheels’ below:



Natural and historic features interact to create distinctive landscapes with **aesthetic value**. Terrestrial plants provide habitat for insects that can **pollinate** crops in nearby fields.



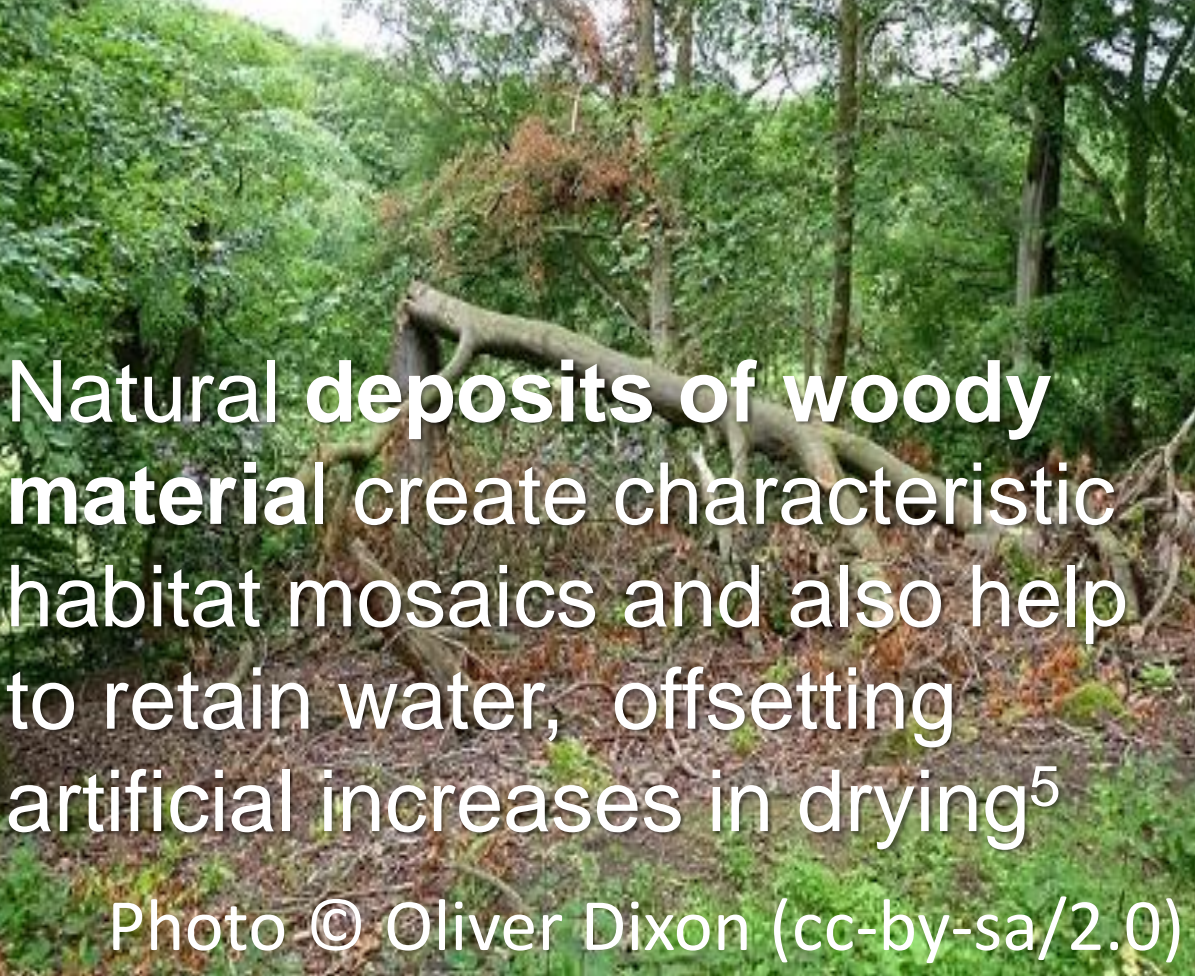
Service provision is at risk due to human activity



Physical habitat modification, water abstraction and climate change alter flow regimes. Media reports of drought and over-abstraction impacts contribute to the perception of dry channels as ‘bad’, while people overlook **assets and services linked to natural intermittence**. Such **perceptions may exacerbate** the risks temporary rivers face.

Management to support the natural functioning of temporary rivers

Interventions to enhance and protect temporary rivers should pursue flow regimes that promote **natural ecosystem processes**, including shifts between wet and dry states. Otherwise, natural assets including specialist species may be lost, and ecosystem service provision compromised.



Catchment-based approaches can promote service provision, e.g. integrating projects across tributaries can stagger downstream water movement to mitigate urban floods⁵.

Major **gaps** in our **knowledge of assets** limit effective management of temporary rivers. We know little about:

- the **terrestrial communities** that inhabit dry channels;
- rivers **beyond the English chalk** and karst limestone;
- small **headwaters** in remote uplands.

Addressing these gaps is vital to protect the natural assets that deliver ecosystem services across wet and dry phases.

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References
¹Datry et al. 2017. DOI 10.1016/B978-0-12-803835-2.00011-5; ²Armitage, Bass 2013. Proc Dorset Nat Hist Archaeol Soc 134 43-55; ³Datry et al. 2014. DOI 10.1111/j.1600-0587.2013.00287.x; ⁴Stubbington et al. 2017 DOI 10.1002/wat2.1223; ⁵Burgess-Gamble et al. 2018. Working with Natural Processes – Evidence Directory, SC150005/R1.