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. 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 werneri

Brown Pot-bellied Snail grazes on Capping grounds

landforms, freshwater

living organisms

Organic material

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:

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.

Natural deposits of woody material create characteristic habitat mosaics and also help to retain water, offsetting artificial increases in drying.

Catchment-based approaches can promote service provision, e.g. by integrating projects across tributaries to mitigate urban floods.

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