

Scratching below the surface: monitoring functioning under the river bed

This project is a joint venture between Roehampton University and the Riverfly Partnership. 'Scratching below the surface' aims to collect data on the functioning of a very active, but neglected, zone that lies beneath the stream bed and to find out how this varies with key environmental factors.

- Below the surface of stream beds lies an area called the hyporheic zone. This zone is the interface between the stream sediment and the groundwater aquifer (at a depth of 10-50cm into the stream bed).
- From our research we know that there is an abundant and diverse community (microbes, microscopic invertebrates and macroinvertebrates) in this zone, that it functions as a 'nursery' for the early stages of both macroinvertebrates and salmon/ trout and as a refuge for surface organisms during disturbances such as floods and droughts. The hyporheic zone also has an important role in cleaning river water, for example by breaking down pollutants.
- The hyporheic zone is an important part of the river ecosystem; but it is not currently monitored locally or nationally and we have little idea how it's functioning, and so its ability to provide these services, differs across rivers and with environmental factors such as acidity, pollution and land use.

In this project we will close this gap in our understanding of rivers.

- We want to collect data on hyporheic zone functioning across as many rivers as possible by asking participants of the Anglers' Riverfly Monitoring Initiative (ARMI) to bury and then retrieve two assays measuring decomposition (the breakdown of organic material by microscopic organisms).
- The two assays are the Rotten Cotton Index and the Tea Bag Index (see Table). Information on temperature and sediment are also recorded before findings are uploaded onto an online platform.
- We will use this information to develop a baseline for hyporheic zone functioning and provide additional information on riverine water quality that complements that already collected by ARMI volunteers.
- In the future we hope that this data will help to develop a Hyporheic Zone Health Score that will add to ARMI.
- We are undertaking a small pilot study in summer/ autumn 2016 with some ARMI hubs (already selected). We will then run workshops to explain the project further and to train ARMI volunteers who might be interested in undertaking this work.

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ROTTEN COTTON INDEX



Standardized strips of unbleached cotton are attached to nylon string



The strips are buried in the stream bed and retrieved after a period of time



The strips are dried and sent to Roehampton where a machine (tensiometer) measures tensile strength decomposition. More decomposition means higher function in the hyporheic zone.



Results are loaded onto an online platform.

TEA BAG INDEX



Paired tetrahedral bags of Green and Rooibos tea



The bags are buried in the stream bed and retrieved after a period of time



The bags are dried and weighed to determine how much tea has been broken down (decomposed). More decomposition means higher function in the hyporheic zone.



Results are loaded onto an online platform.