

Groundwater management as part of an integrated catchment-based approach in the UK

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Wear Rivers Trust

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WATER *living water*

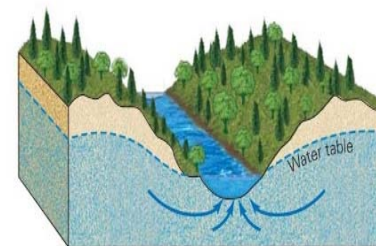


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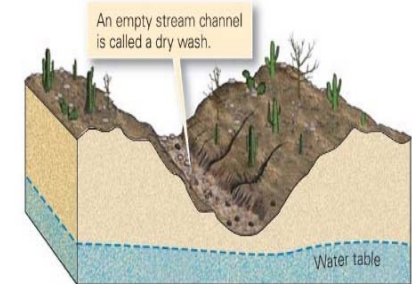


What has been the specific challenge in your pilot?

- To improve understanding of surface to groundwater interactions, influenced by fracture flow at locations across the Magnesian Limestone aquifer.
- Utilise this information to raise awareness amongst decision makers and to influence practical decision-making through the [Catchment Based Approach](#).
- UK2 aimed to understand groundwater systems from a water resources perspective (more later)..



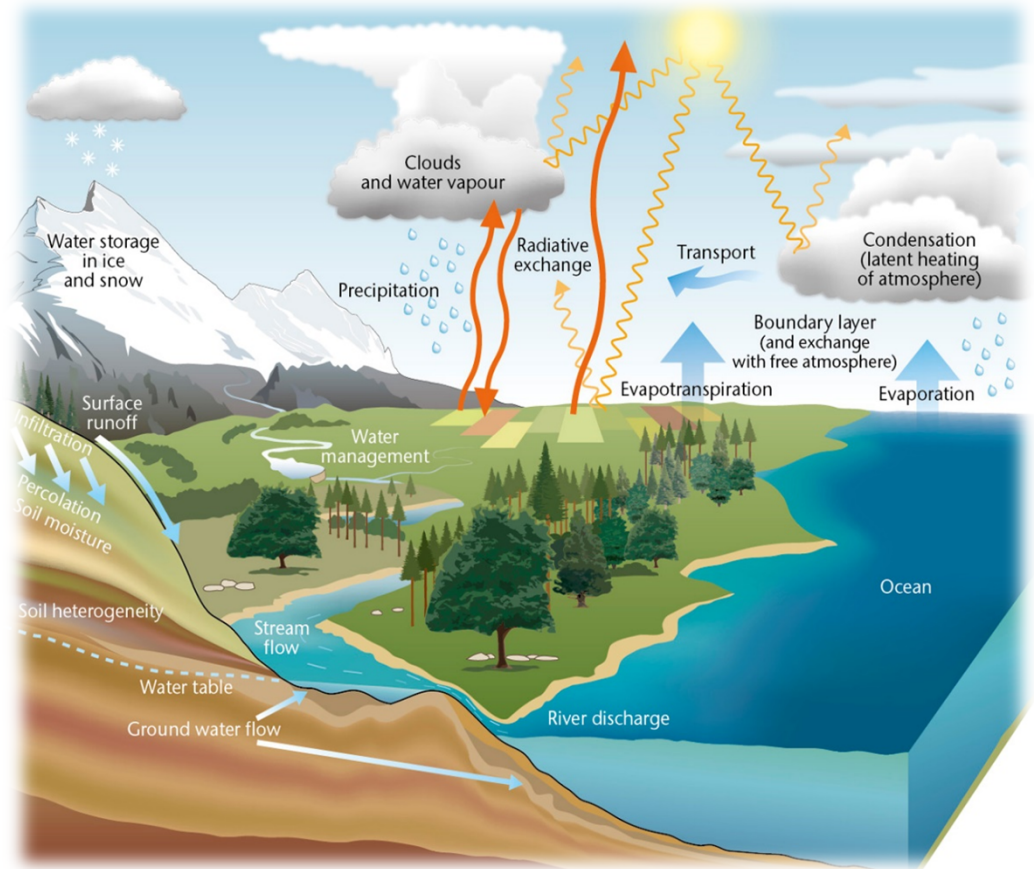
(a) The floor of a permanent stream in a temperate climate lies below the water table. Springs add water from below, so the stream contains water even between rains.



(b) The channel of an ephemeral stream lies above the water table, so the stream flows only when water enters the stream faster than it can infiltrate into the ground.

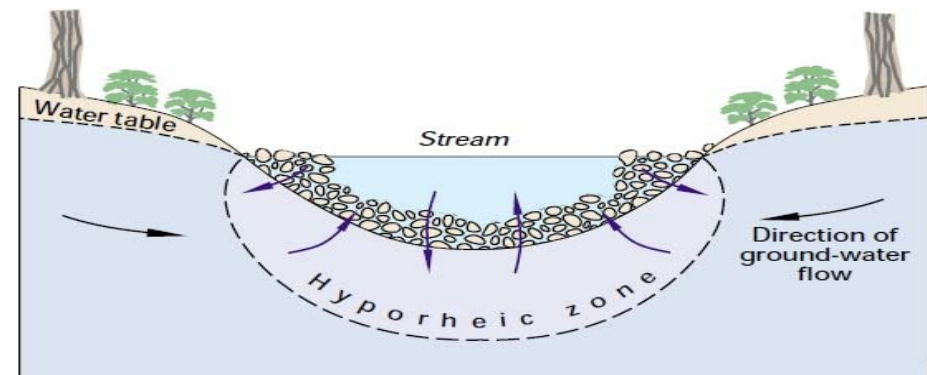
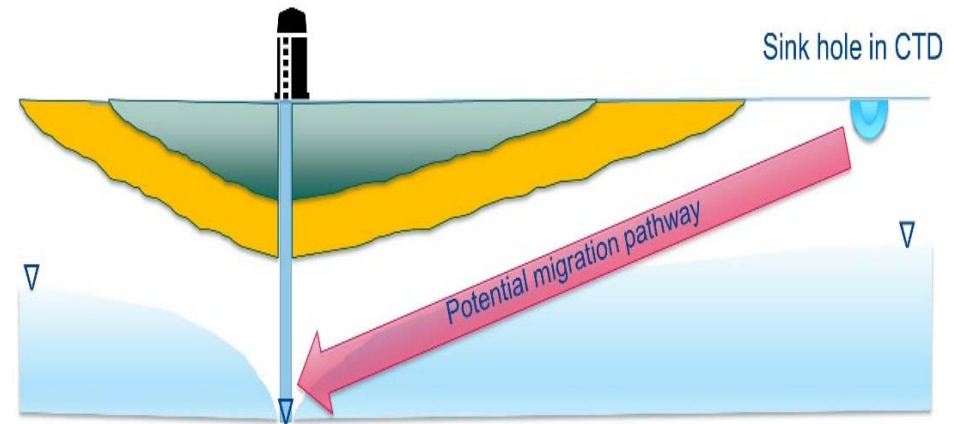
How did you approach it?

- Key Theme: Integrated land and water management to all corners of our network.
- Communicate the principle of connections and pathways between land, surface water and groundwater.



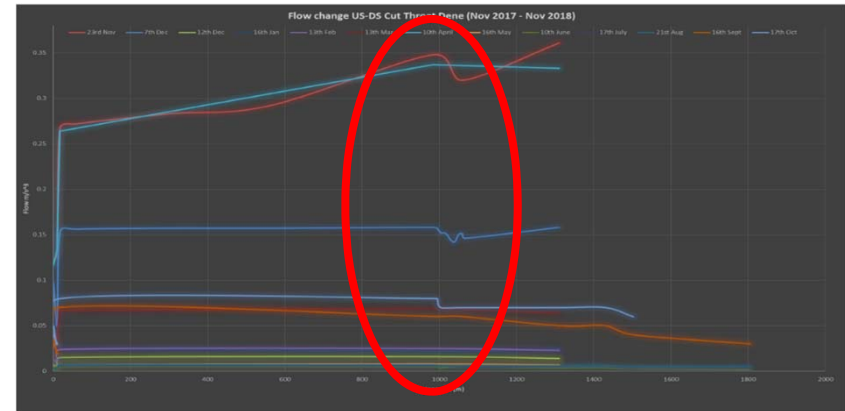
How did you approach it?

- Technical investigations:
 - Connectivity between poor quality surface water and drinking water boreholes (x2)
 - Catchment investigations of misconnections & legacy mine pollutions (x2).
 - Role of the hyporheic zone in storing and releasing contaminants (PhD).



How did you approach it?

- Information dissemination:
 - Urban: highway run off; domestic and industrial drainage. Implications for clean/dirty water separation and increasing use of SuDS.
 - Rural: soil management: minimum tillage, nutrient planning, water retention Direct infiltration to ground; indirect via run off and erosion into “leaky” streams.



How did you approach it?

- Influencing land and water managers to take GW into account in their decision making:
 - Development by the Environment agency of GW risk maps, showing areas of greatest vulnerability based on thickness of glacial drift.
 - Joined up regulatory approach: Environment Agency, Natural England, Local Authorities: WP6 Durham case study Nov 2018.
 - Influencing Local Authority strategic development, flood risk and environmental planning to explicitly consider GW, eg DCC plan on a page. Integration into climate change planning.
 - Farmer networking: tillage demo.
 - GW ‘talking head’ PP by NW.
 - Driving a regional approach to FRW planning, in conjunction with the Interreg Soilcare project <https://www.soilcare->

TOP SOIL Interreg North Sea Region **FREE FARMING RULES FOR WATER EVENT**
.....Sponsored by.....

Soil, manure, and nutrient management to protect profits and the environment
Wednesday 5th December 12–4.30pm
(buffet lunch provided from 12pm with workshop commencing at 1pm)
Houghall College, Durham, DH1 3SG.

In 2018 the new Farming Rules for Water were introduced to help protect water quality. In simple terms the rules require farmers to

- keep soil on the land;
- match nutrients to crop, and soil needs, and
- keep livestock, fertilisers, and manures out of the water.

Join us for this free event to learn more about the new rules, and how they could affect your business. There will also be talks on soil health and mitigating nitrate losses from soils. Places are limited so please reserve yours today at -

<https://www.eventbrite.co.uk/e/farming-rules-for-water-workshop-tickets-75262757935>

UK1 Farming Rules for Water Network



NORTHUMBERLAND RIVERS TRUST



A clear solution for farmers
CATCHMENT SENSITIVE FARMING



Northern Farmers & Landowners Group



Environment Agency



Seaham Grange Farm



the voice of British farming

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Interreg North Sea Region
European Regional Development Fund



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How did you approach it?

- Education and community engagement
 - Development of interactive storymaps to support communication.
 - Inform and influence local politicians, community leaders and opinion formers.
 - Working with schools. Supporting the National Curriculum whilst communicating our message.
 - Reach widest possible audiences

How the first railway in the world helps spreading the TOPSOIL message

The famous Stockton & Darlington Railway in the UK opened up on 27 September 1825, connecting coal mines at Shildon in county Durham to Darlington with a speed of 15 miles per hour. This was the first passenger railway in the world to use steam trains. On September 27th, the railway celebrated its 194th anniversary. But enough now about history. What does this have to do with our TOPSOIL project?

TOPSOIL at the National Railway Museum

The Wear Rivers Trust works with many diverse groups and used this anniversary to inform the varied and influential audience about the interaction of surface and groundwater, hence the TOPSOIL project. Trish Pemberton (see picture) is a local ex-councillor and town mayor who plays a key role in the dissemination of WRT's involvement in the TOPSOIL project. Besides, she is a retired teacher who volunteers with Wear Rivers Trust supporting the primary schools programme, which brings us to how TOPSOIL is working it's way into the classroom...

TOPSOIL, the first railway and school teachers

The primary school teachers in the picture have engaged with Wear Rivers Trust school projects and will receive an education pack which, amongs many other items, will contain information on the water cycle including groundwater, specifically referencing the TOPSOIL project. Who knows, maybe our TOPSOIL catalogue will become compulsory class. Because we like to dream big...

Trish Pemberton and Peter Nailon

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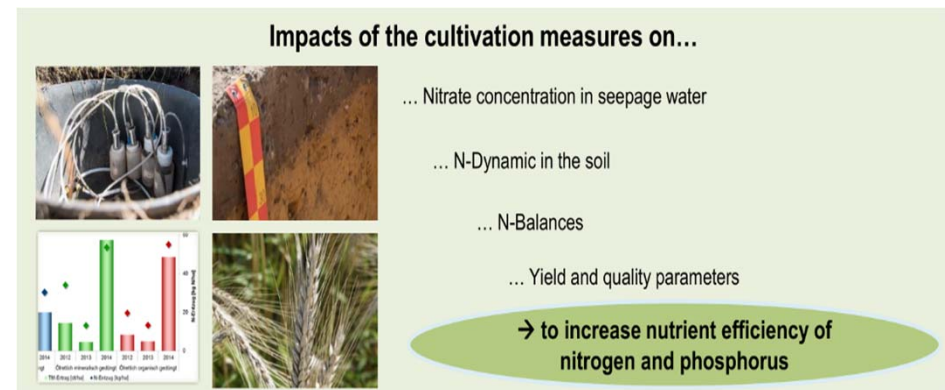
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Which Pilots addressed similar issues, and did they approach it differently?

- UK2 developed a collaborative model based on the Catchment Based Approach.
- Common synergies shared with pilots investigating nutrient management and percolation of nitrates to GW, e.g. OOWV Wehnen field trials completed by the Chamber of Ag.





**Questions
(non-Brexit related)**



Q) Benefits of cooperation amongst North Sea Region partners?

- Impact of agricultural nitrates is the most common theme shared across Topsoil pilots.
- Insights into how other pilots approach farmer engagement and the methods used to mitigate and measure nitrate infiltration to GW.
- Ability to brainstorm innovative ideas among experts & share new technologies

