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

Peter Nailon:
Wear Rivers Trust

NORTHUMBRIAN WATER living water

WEAR Rivers Trust

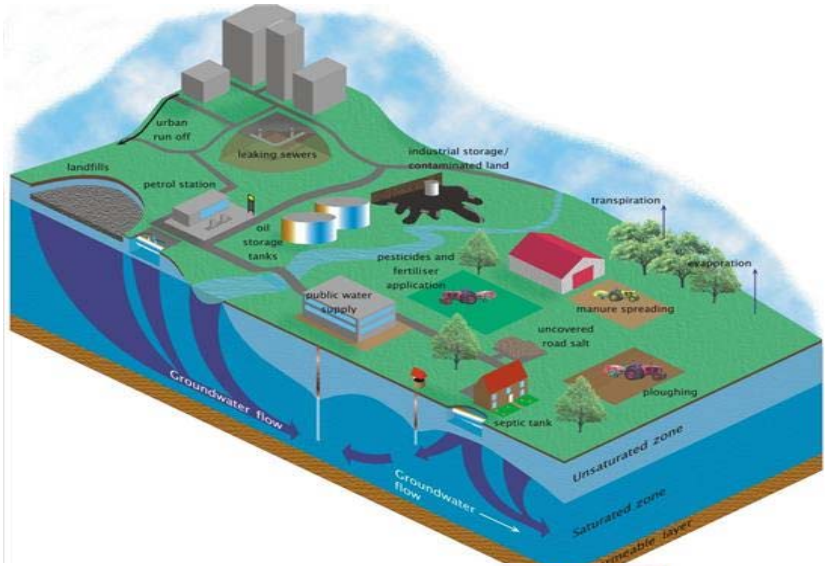
Durham University

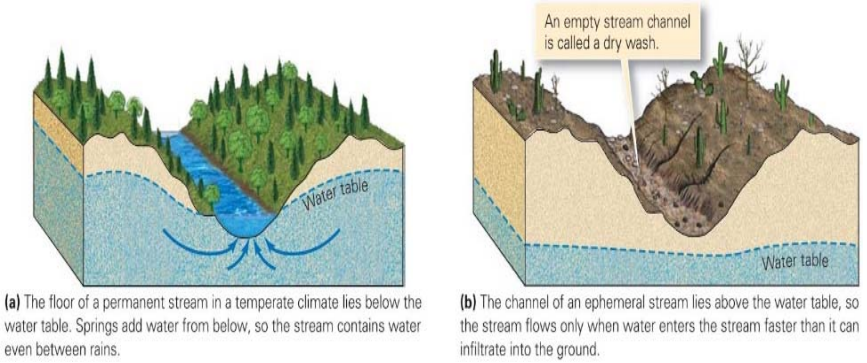
TOP SOIL Interreg North Sea Region European Regional Development Fund

EUROPEAN UNION

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)..





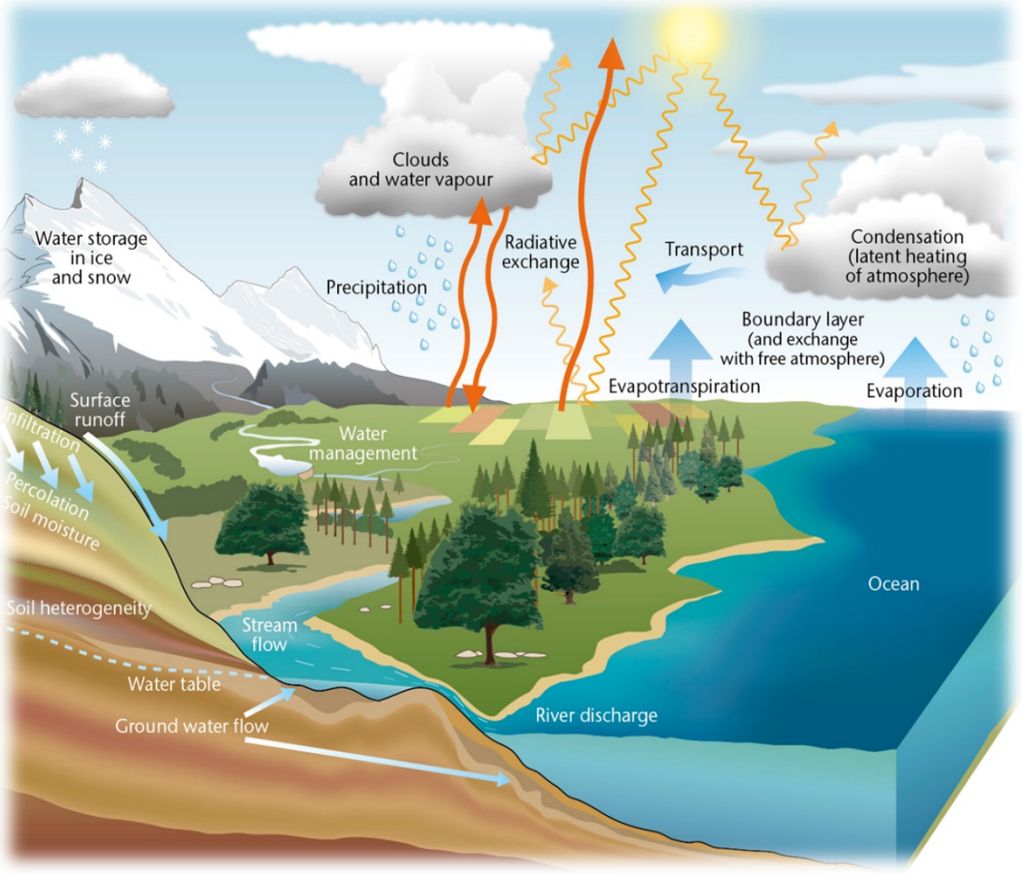
(a) The floor of a permanent stream in a temperate climate lies below the water table. Springs add water from below, so the stream contains water even between rains.

(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.

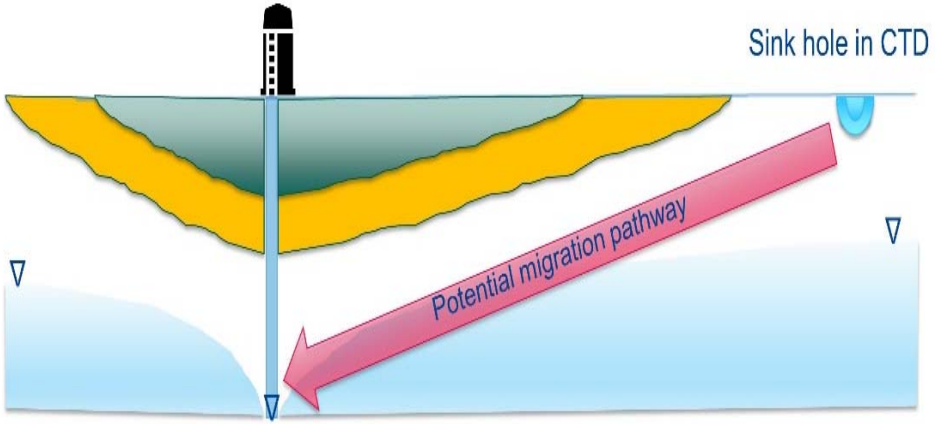


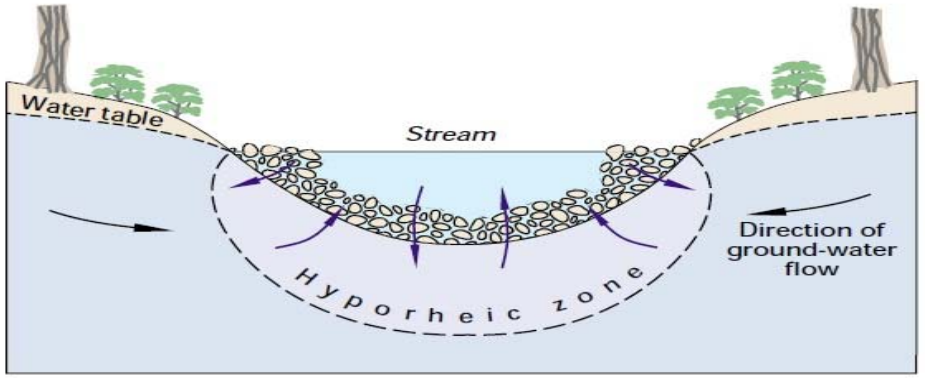
NORTHUMBRIAN WATER living water
WEAR Rivers Trust
Durham University

TOP SOIL Interreg North Sea Region
European Regional Development Fund
EUROPEAN UNION

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).





NORTHUMBRIAN WATER living water
WEAR Rivers Trust
Durham University

TOP SOIL Interreg North Sea Region
European Regional Development Fund
EUROPEAN UNION

How did you approach it?

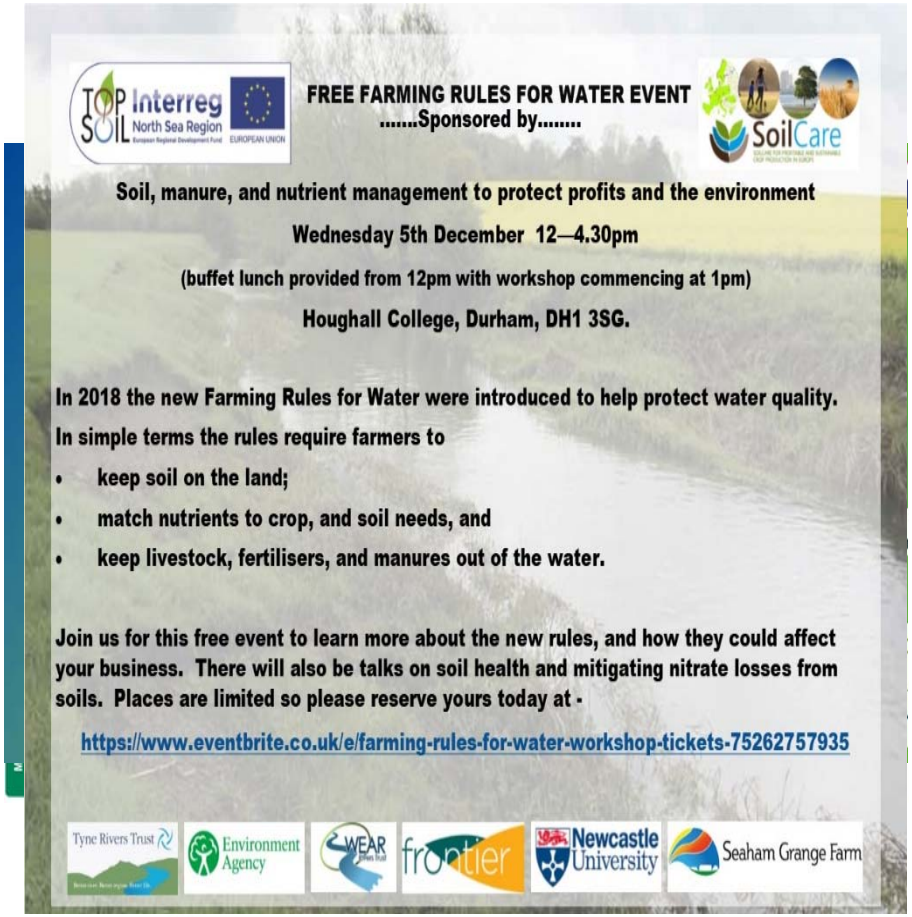
- Information dissemination:
  - Urban: highway run off; domestic and industrial drainage. Implications for clean/dirty water separation and increasing use of SuDS.
  - Rural: soil management: minimum tillage, nutrient planning, water retention Direct infiltration to ground; indirect via run off and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

NORTHUMBRIAN WATER living water
WEAR Rivers Trust
Durham University

TOP SOIL Interreg North Sea Region
European Regional Development Fund
EUROPEAN UNION

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-



NORTHUMBRIAN WATER living water · WEAR Rivers Trust · Durham University

TOP SOIL Interreg North Sea Region European Regional Development Fund · EUROPEAN UNION

UK1 Farming Rules for Water Network

frontier

Newcastle University

NORTHUMBERLAND RIVERS TRUST

A clear solution for farmers
CATCHMENT SENSITIVE FARMING

nflg Northern Farmers & Landowners Group

Environment Agency

East Durham College.

ECC

Tyne Rivers Trust
Better river. Better region. Better life.

Seaham Grange Farm

NFU the voice of British farming

NORTHUMBRIAN WATER *living water*

Durham University

TOP SOIL Interreg North Sea Region
European Regional Development Fund
EUROPEAN UNION

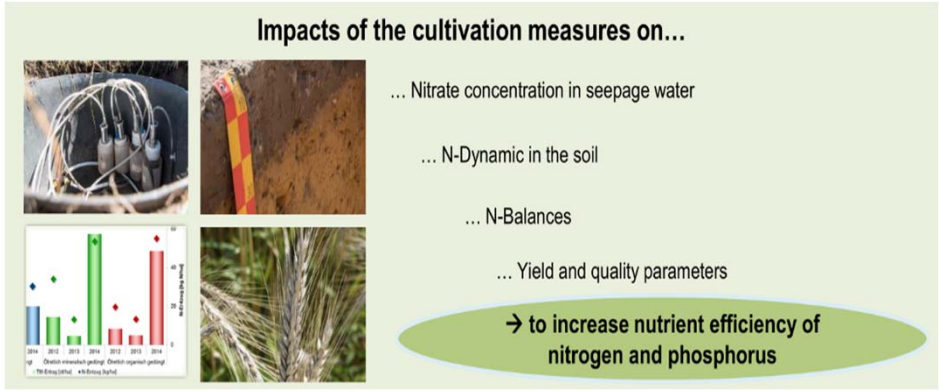
How did you approach it?

- 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

NORTHUMBRIAN WATER living water
WEAR Rivers Trust
Durham University

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.



NORTHUMBRIAN WATER living water
WEAR Rivers Trust
Durham University

TOP SOIL Interreg North Sea Region
European Regional Development Fund
EUROPEAN UNION

Questions
(non-Brexit related)

TOP SOIL Interreg North Sea Region
European Regional Development Fund
EUROPEAN UNION

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

NORTHUMBRIAN WATER living water · WEAR Rivers Trust · Durham University

TOPSOIL · Interreg North Sea Region · European Regional Development Fund · EUROPEAN UNION