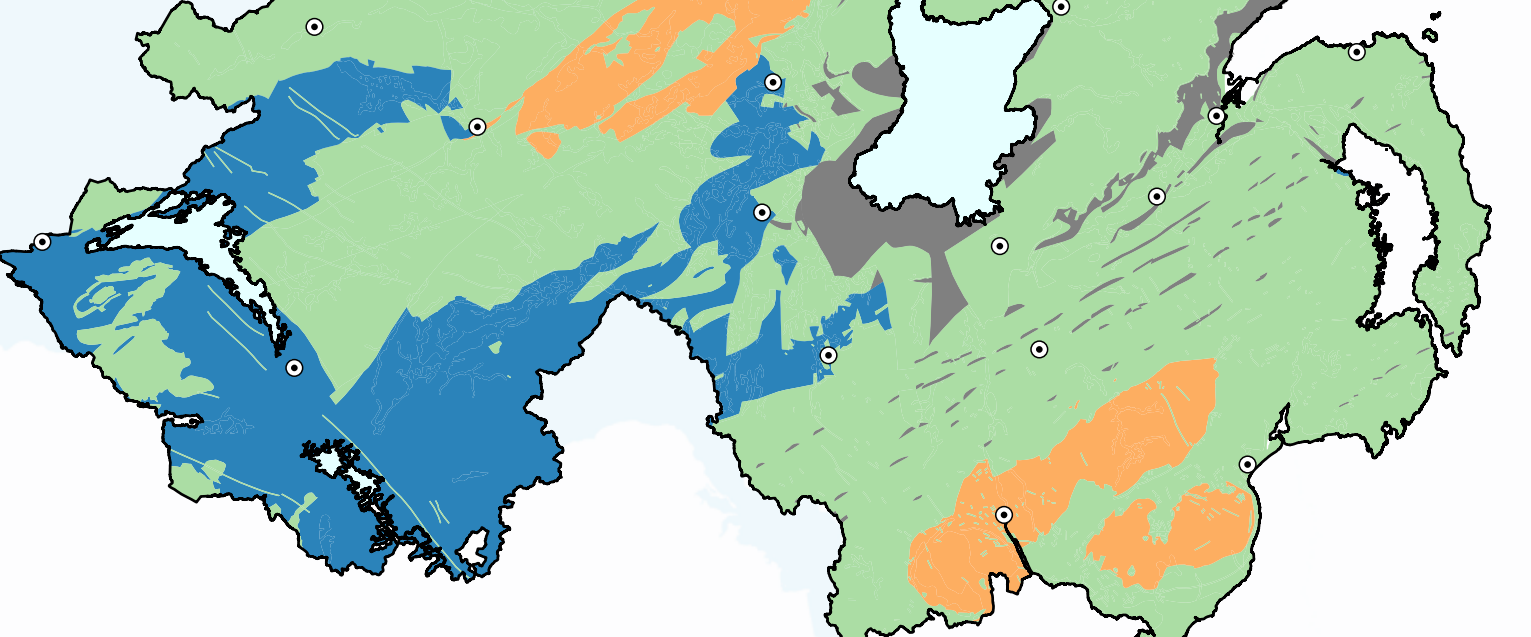
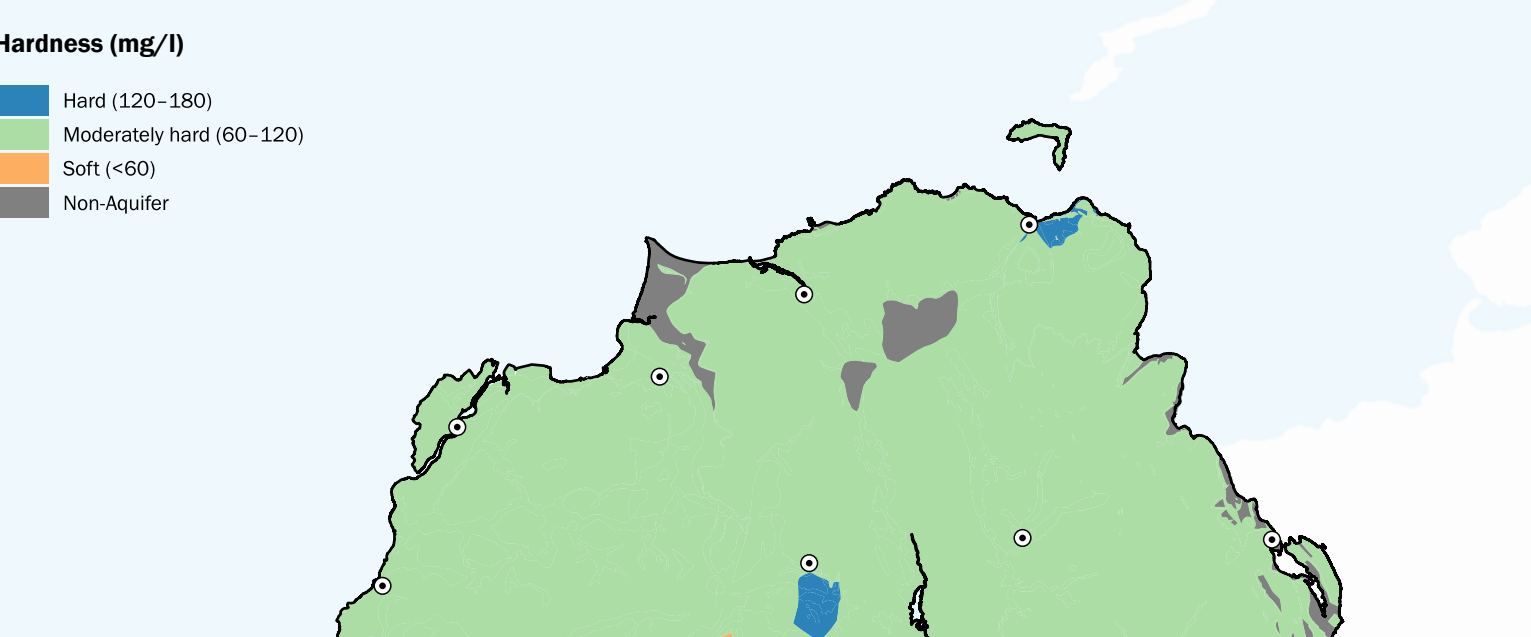
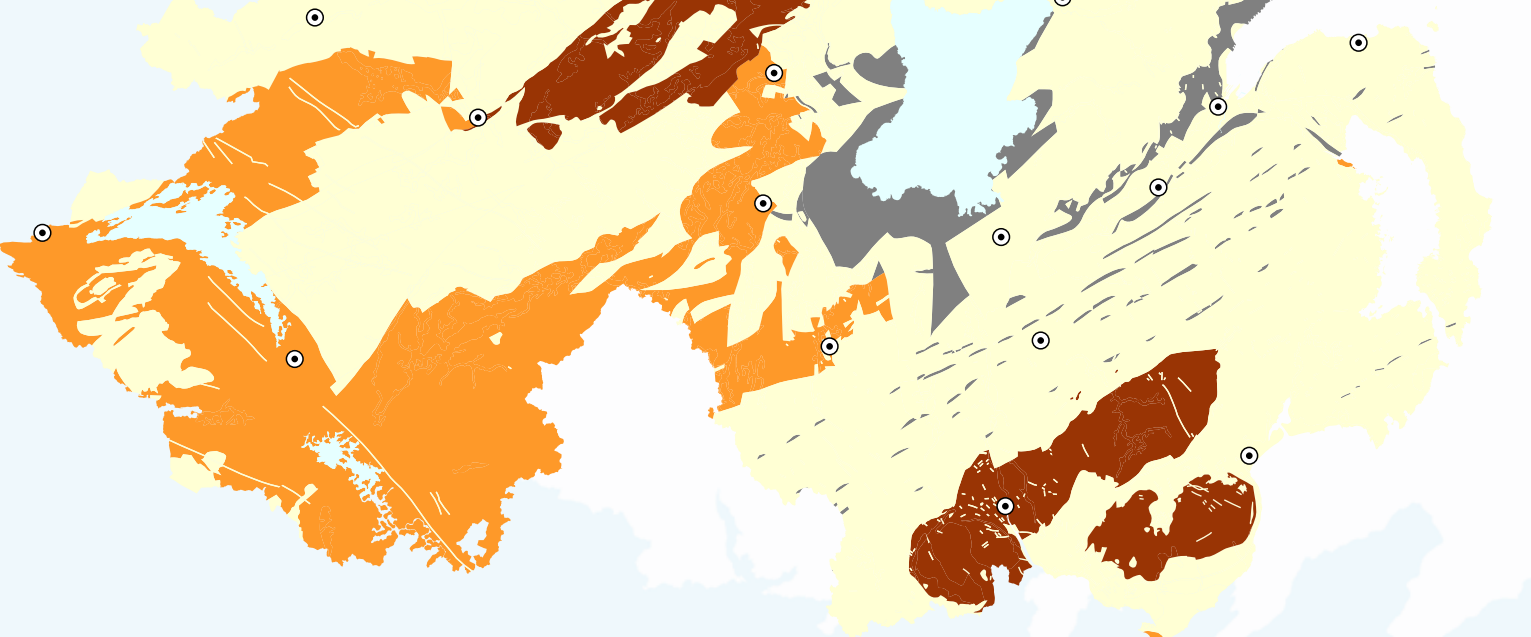
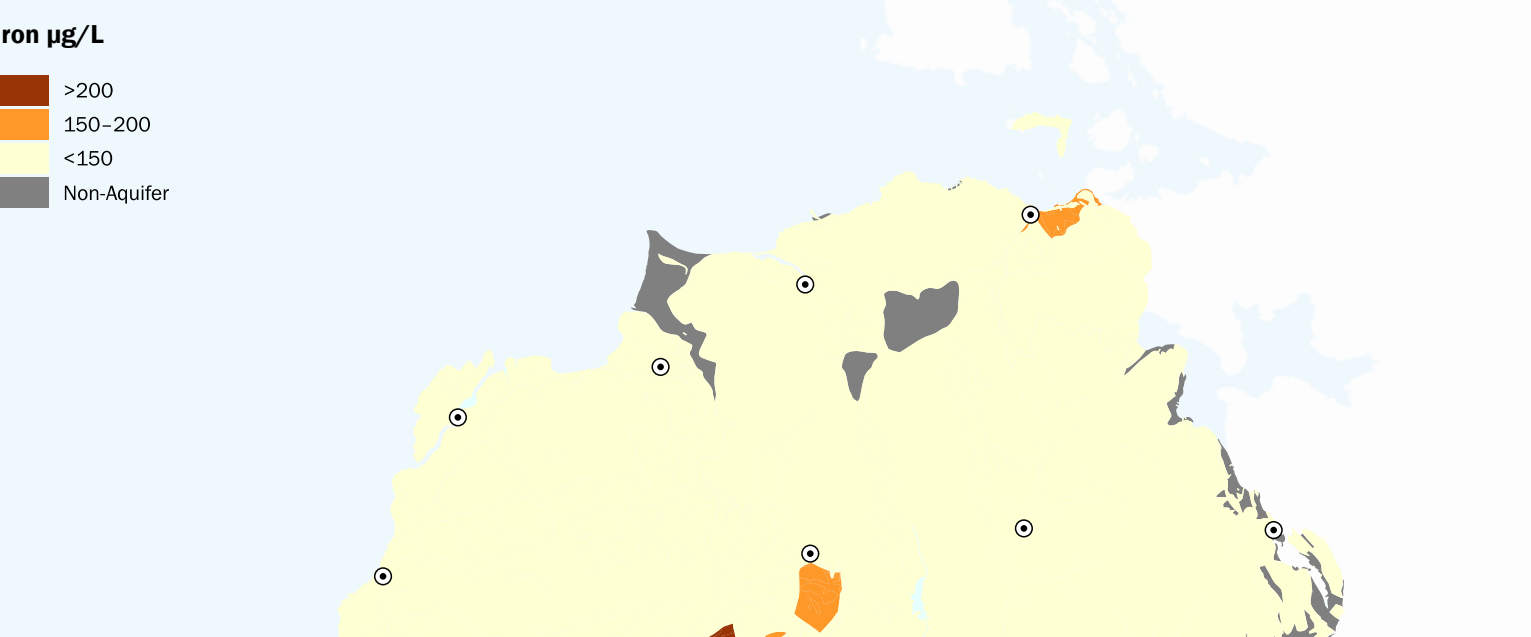
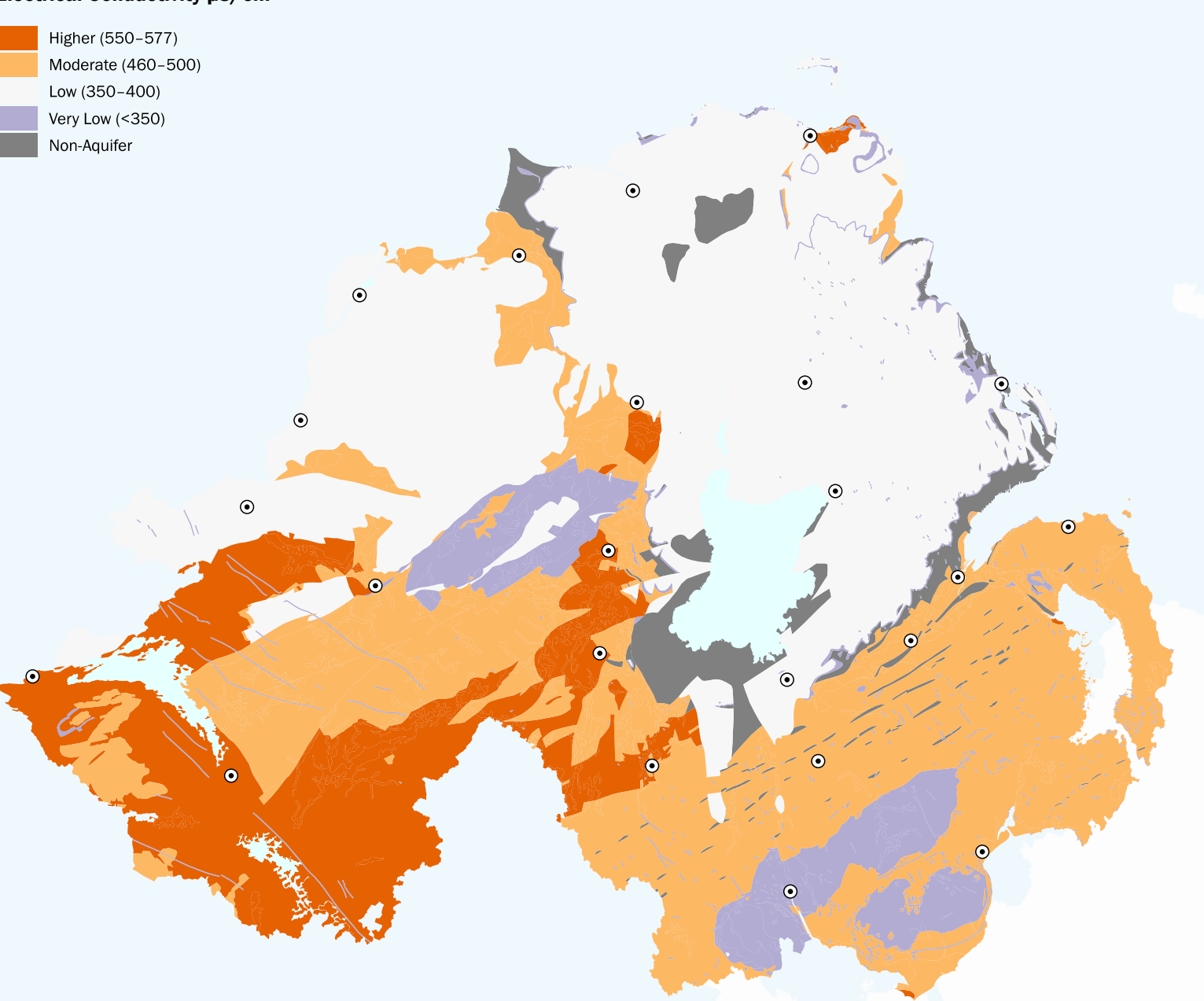


Northern Ireland Groundwater Resources Map



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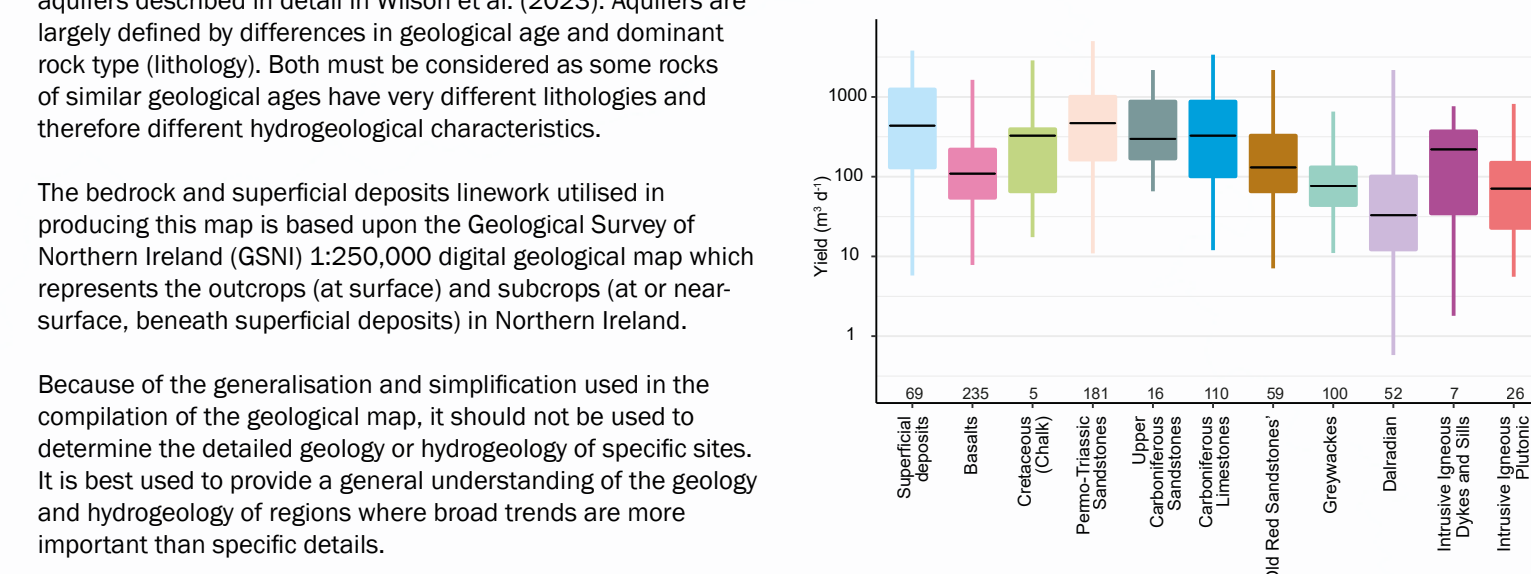
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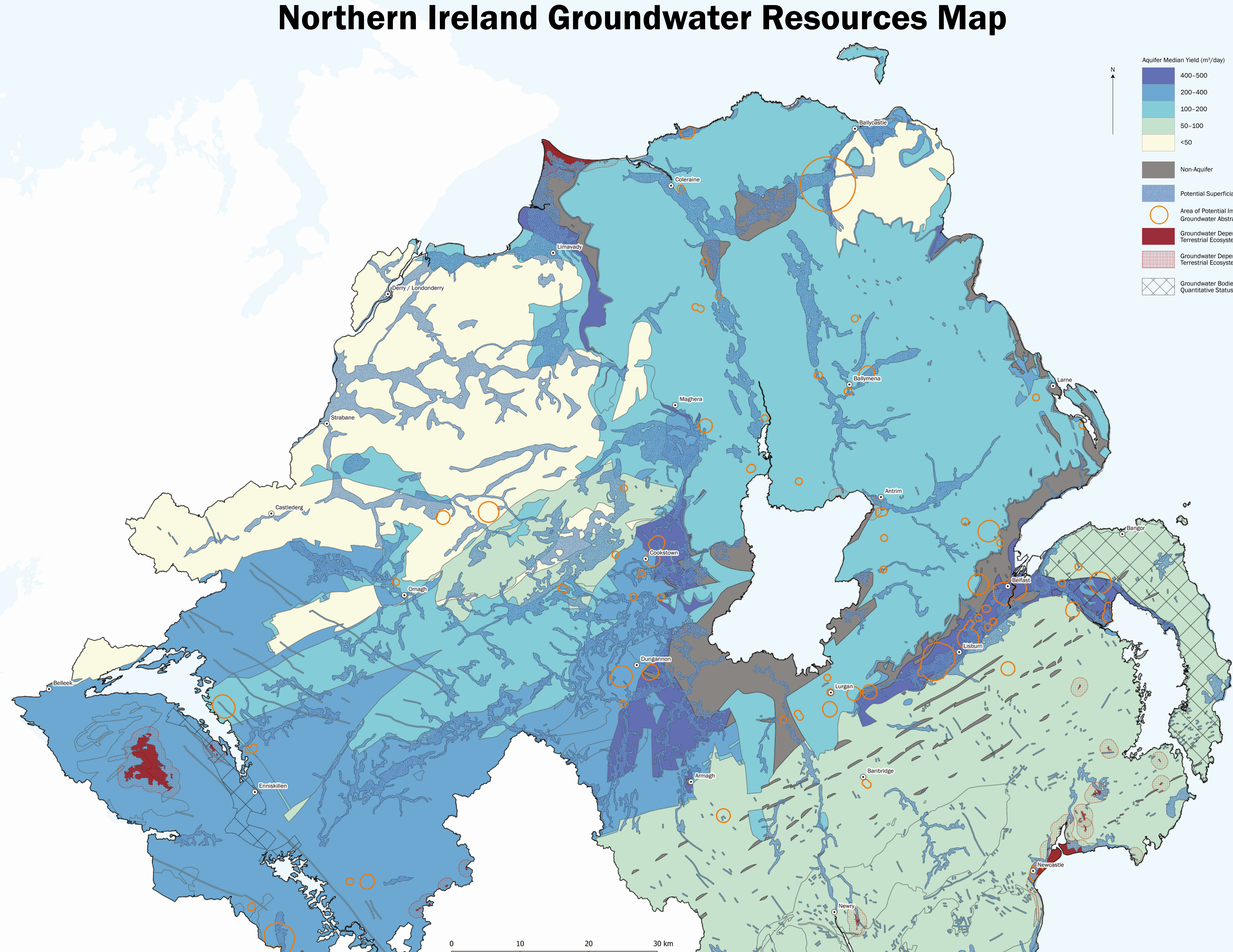
Aquifer	Aquifer Type	Number of Values	25th %ile	Median	Geometric Mean	75th %ile	Dominant Baseline Groundwater Chemistry
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Basalts	Fracture	235	55	109	105	218	Moderately mineralised, high pH, calcium bicarbonate or sodium or potassium bicarbonate type
Cretaceous (Chalk)	Fracture and Karst (Chalk); Intergranular (Greensands)	5	66	327	212	393	Weakly mineralised, high pH, bicarbonate dominated, no dominant cation
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About this map
This map was produced to show where groundwater resources are available in Northern Ireland. It is based on aquifer yield data held by the Geological Survey of Northern Ireland (GSNI) and the new aquifer classifications presented in Northern Ireland's Groundwater Environment (Wilson et al., 2023). While the map provides an estimate of the potential yields that could be abstracted by a single borehole, it is important to recognise groundwater as a valuable resource which should be used and managed sustainably as it also plays an important role in supporting surface water ecosystems. The potential for any new abstraction to impact either existing abstractions and/or groundwater flows to Groundwater Dependent Terrestrial Ecosystems (GWDEs) should be considered when planning for a new abstraction and will be an important aspect of the abstraction licence approval process. Therefore, this map also shows current licenced groundwater abstractions, groundwater bodies in poor quantitative status as classified by the 2021 Groundwater Directive, as well as GWDEs.

How are the aquifers defined?
Almost all Northern Ireland is underlain by one of eleven distinct aquifers described in detail in Wilson et al. (2023). Aquifers are largely defined by differences in geological age and dominant rock type (lithology). Both must be considered as some rocks of similar geological ages have very different lithologies and therefore different hydrological characteristics.



Because of the generalisation and simplification used in the compilation of the geological map, it should not be used to determine the detailed geology or hydrogeology of specific sites. It is best used to provide a general understanding of the geology and hydrogeology of regions where broad trends are more important than specific details.



Non-Aquifers
Non-aquifers consist of rocks that have such low permeability and storage capacity that they cannot generally provide useful groundwater supplies or significant groundwater flows.

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Data sources
Bedrock and superficial deposits aquifers of Northern Ireland
The Bedrock and Superficial Deposits Aquifers of Northern Ireland data is available from <https://gsni-data.bgs.ac.uk/gsnetwork/sr/eng/catalog/search/?metadata=veee2244-9534-4b81-8124-9a1c0d0272e>

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The GWDE data is available from: <https://www.opendatani.gov.uk/@department-of-agriculture-environment-and-rural-affairs/groundwater-dependent-terrestrial-ecosystems1>

Abstraction licensing data
The Abstraction Licensing data, last updated: 07/07/2023, available from <https://opendata-ni.gov.uk/datasets/abstraction-licensing/about>

Topographic mapping
The Northern Ireland outline is derived from <https://www.opendatani.gov.uk/@nra-property/semi-open-data-large-scale-boundaries-routine> and are used under the OGL V3.

The Ireland outline is derived from <https://data-osi.opendatani.gov.uk/datasets/irish-republic-national-statutory-boundaries-ungeneralised-2024/>

Cite this publication
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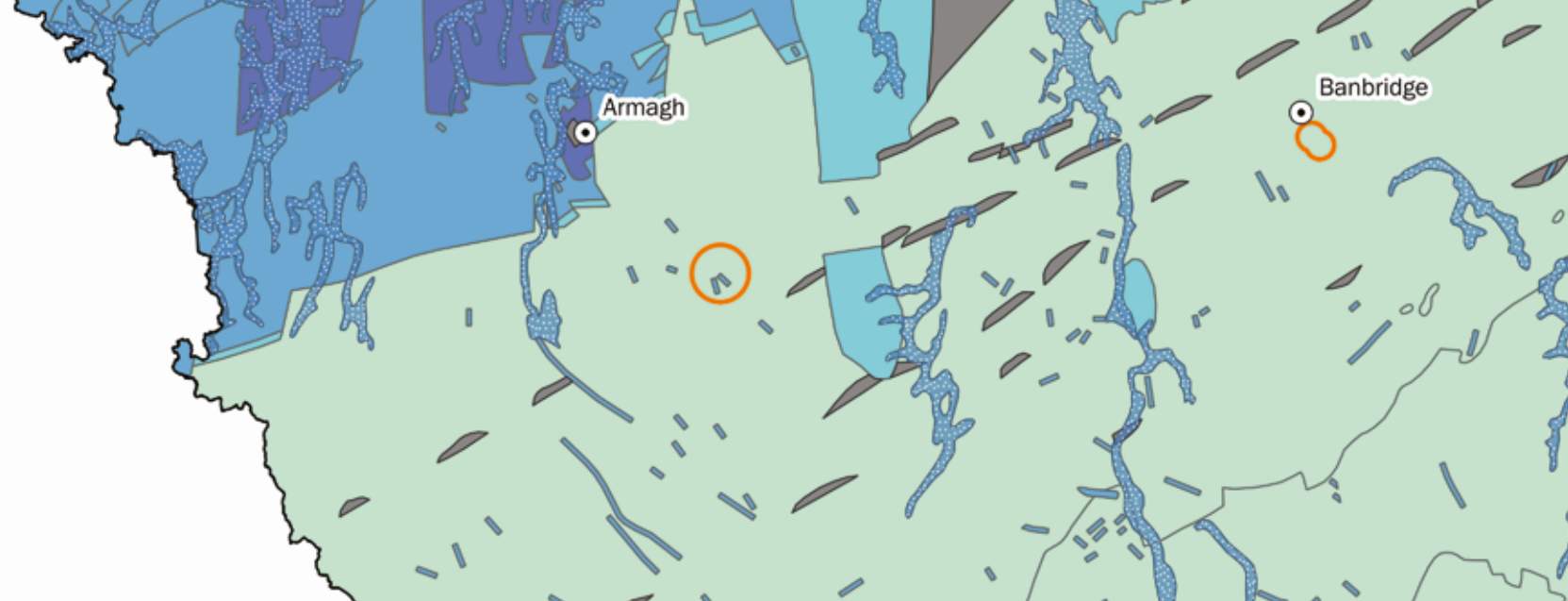
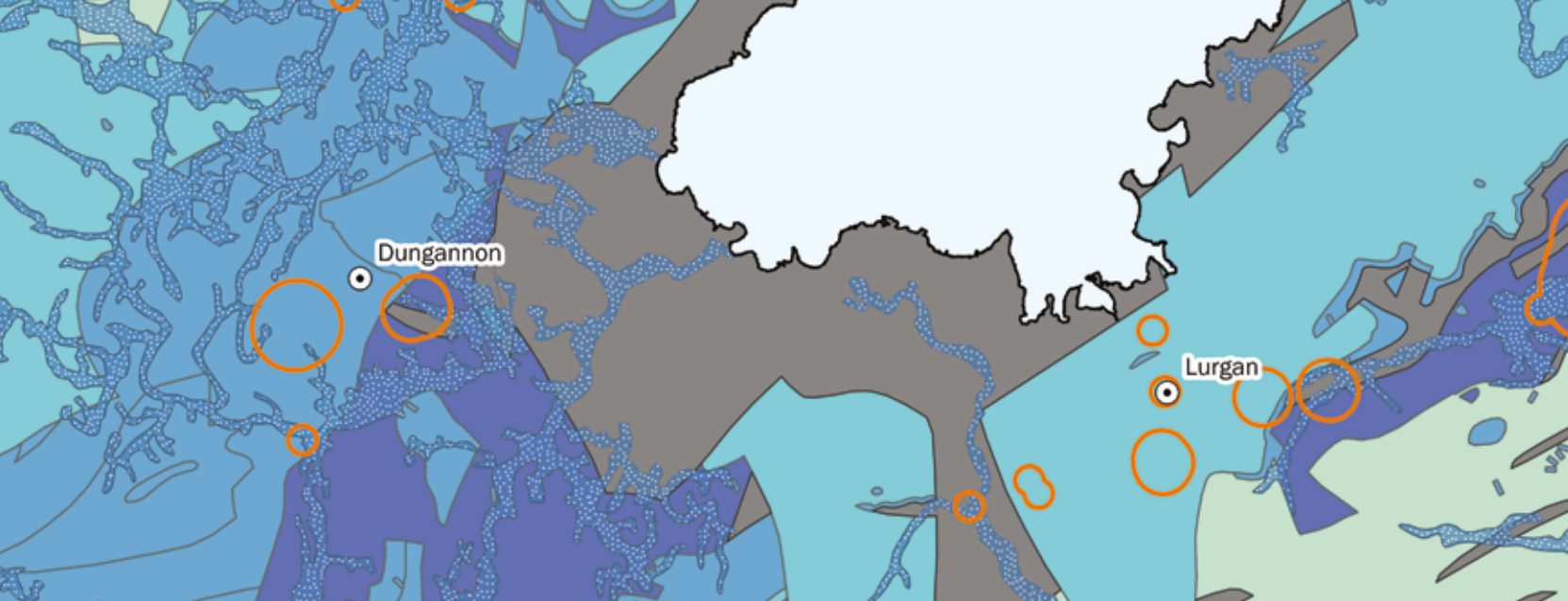
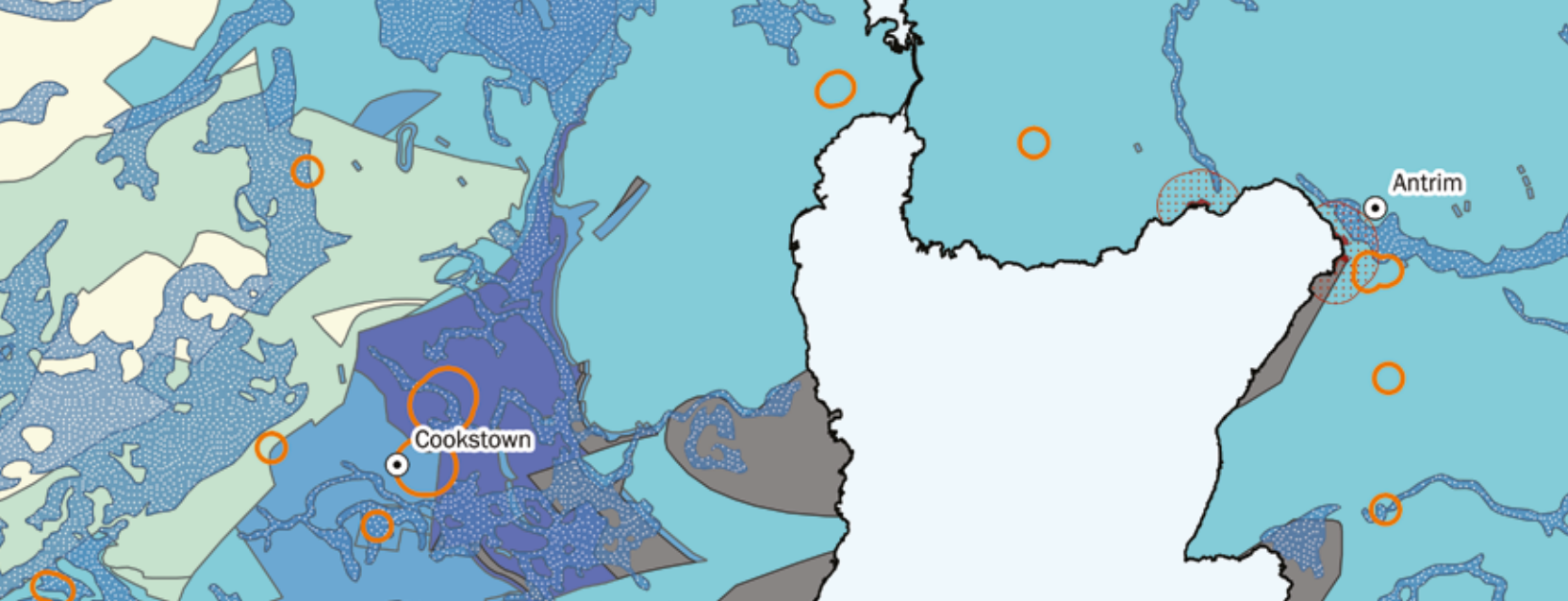
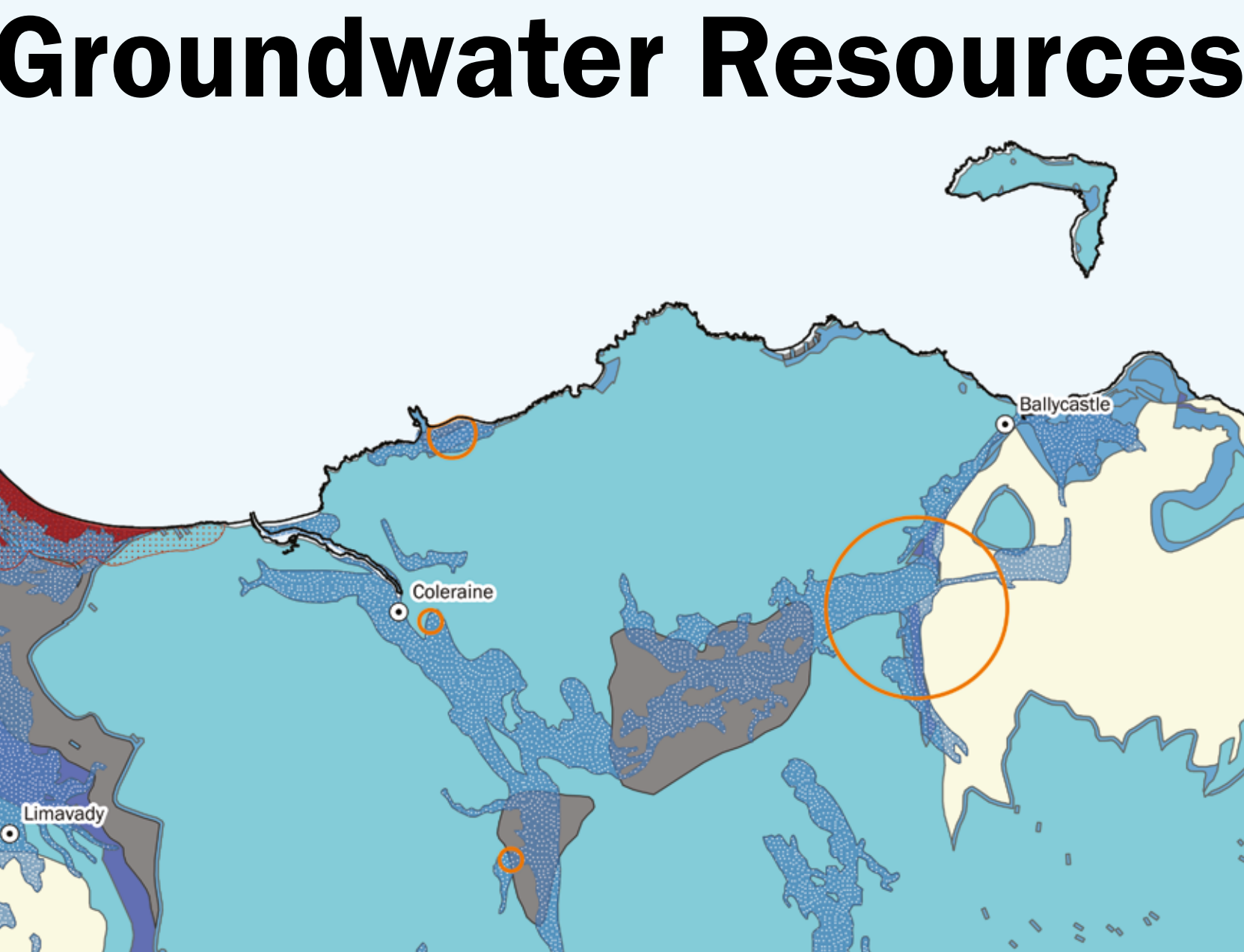
Geological Survey of Northern Ireland
7th Floor, Adelaide Street
Belfast
BT2 8FD
United Kingdom

Conceptual Models
The maps presented represent the bedrock geology encountered directly below the soils and superficial deposits. The conceptual models help to visualise the three-dimensional nature of aquifers and are a reminder that hydrogeological maps must be interpreted with a depth component in mind.

Superficial Deposits Aquifer - Intergranular Flow (Alluvium and Glaciofluvial Sands and Gravels only)
Discharge from springs where water table intersects ground surface
Unconfined alluvial aquifer at outcrop
Unconfined glaciofluvial sand and gravel aquifer at outcrop
Little recharge where low permeability sediments overlie aquifer - most rainfall runs off to rivers
Discharge at baseflow to rivers
Groundwater flow from higher ground towards valley centres
Recharge
Groundwater flow
Water table
Spring
Surface water flow

Permo-Triassic Sandstone Aquifer - Intergranular and Fracture Flow
Fractured dykes and permeable faults can be recharge pathways
Most recharge is by infiltration of rain water through sinkholes in river beds or lineation outcrops
Some direct rainfall recharge where karstic limestone are exposed at surface
Main recharge mechanism is direct rainfall infiltration at aquifer outcrop
Discharge through base of superficial aquifers to underlying bedrock aquifers
Low permeability lacustrine sediments restrict recharge over much of the catchment
Weathered zone
Fractured zone
Recharge
Groundwater flow
Sinkhole
Spring
Surface water flow

Carboniferous Limestones Aquifer - Karstic Flow
Fractured dykes and permeable faults can be recharge pathways
Most recharge is by infiltration of rain water through sinkholes in river beds or lineation outcrops
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Recharge
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Sinkhole
Spring
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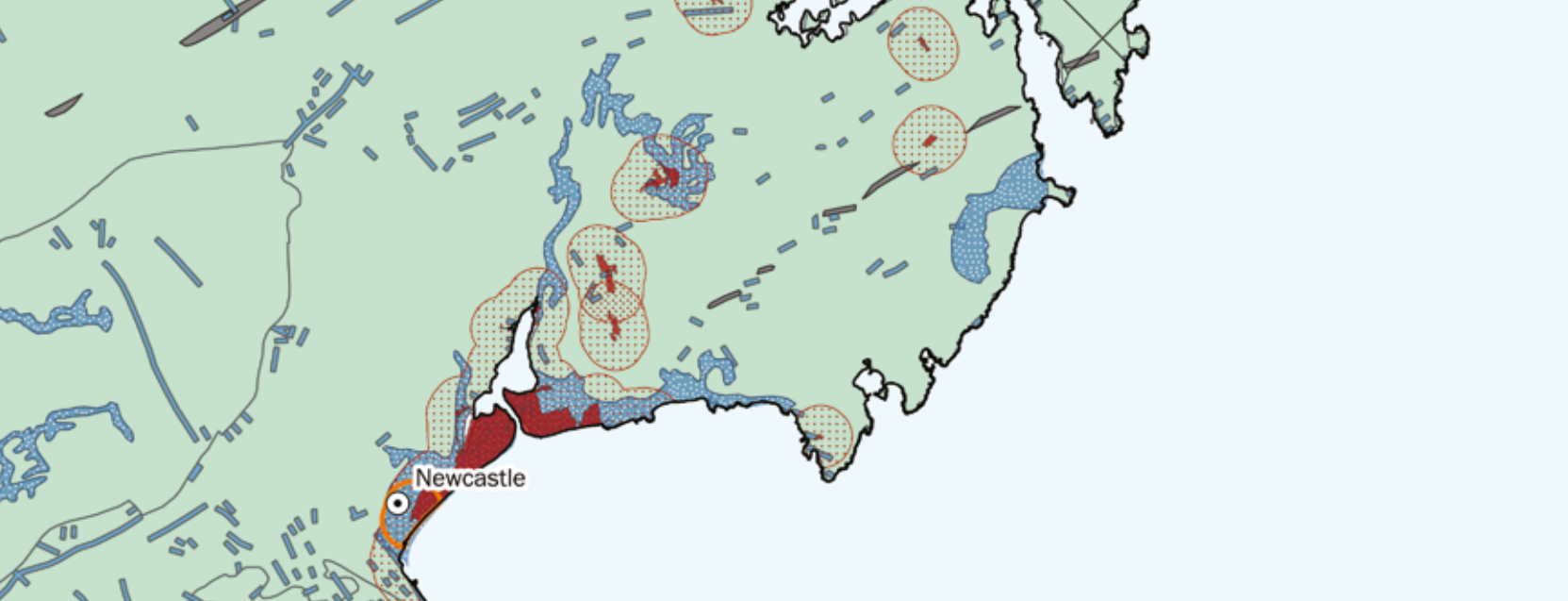
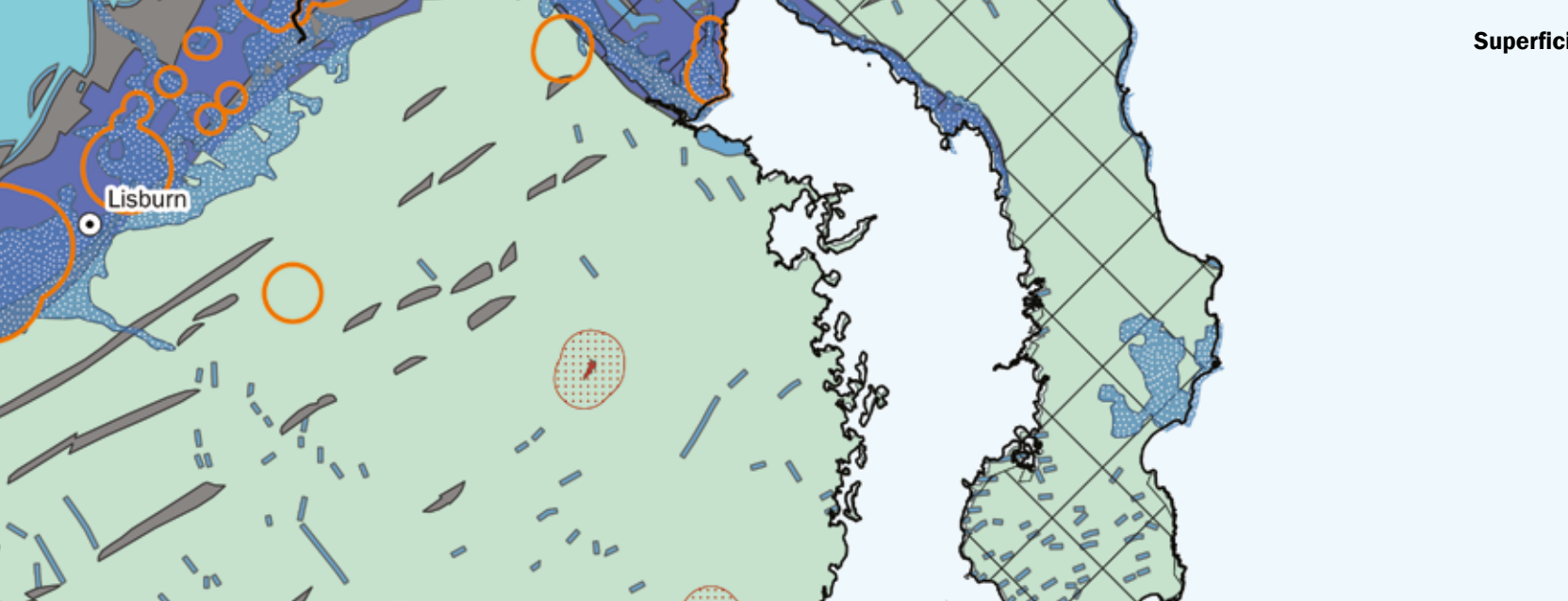
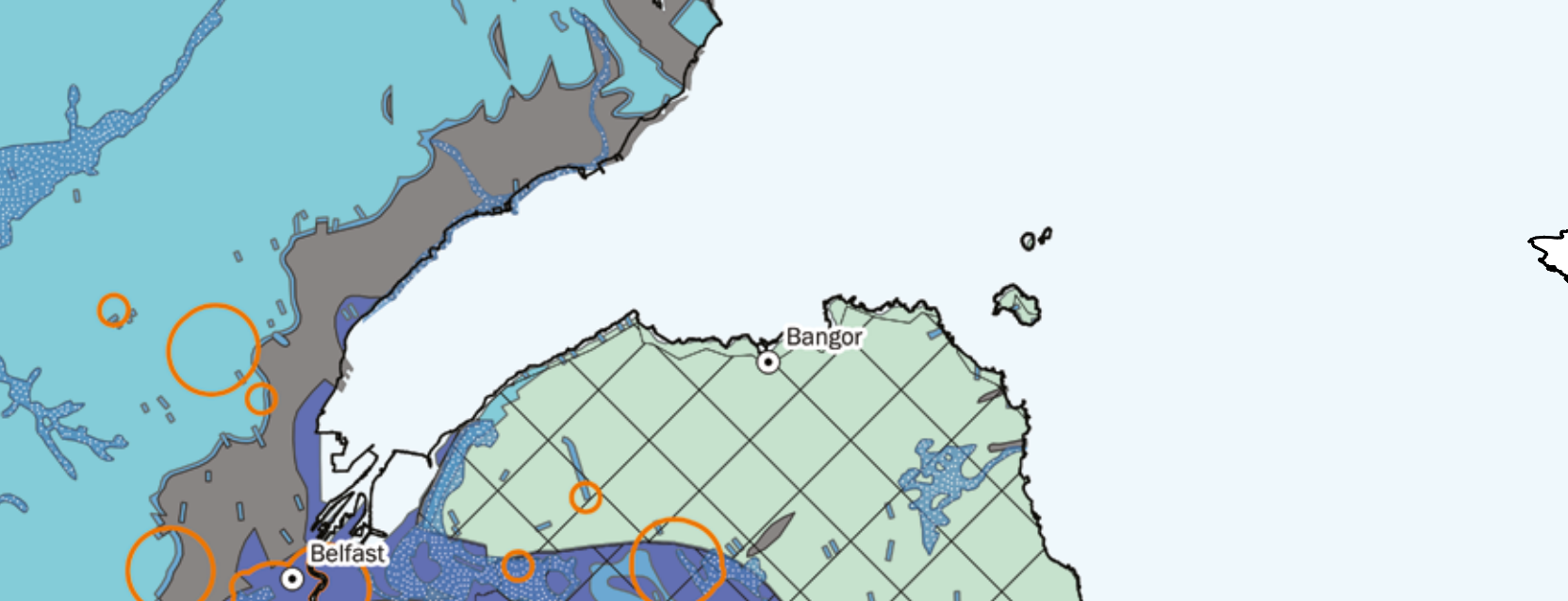
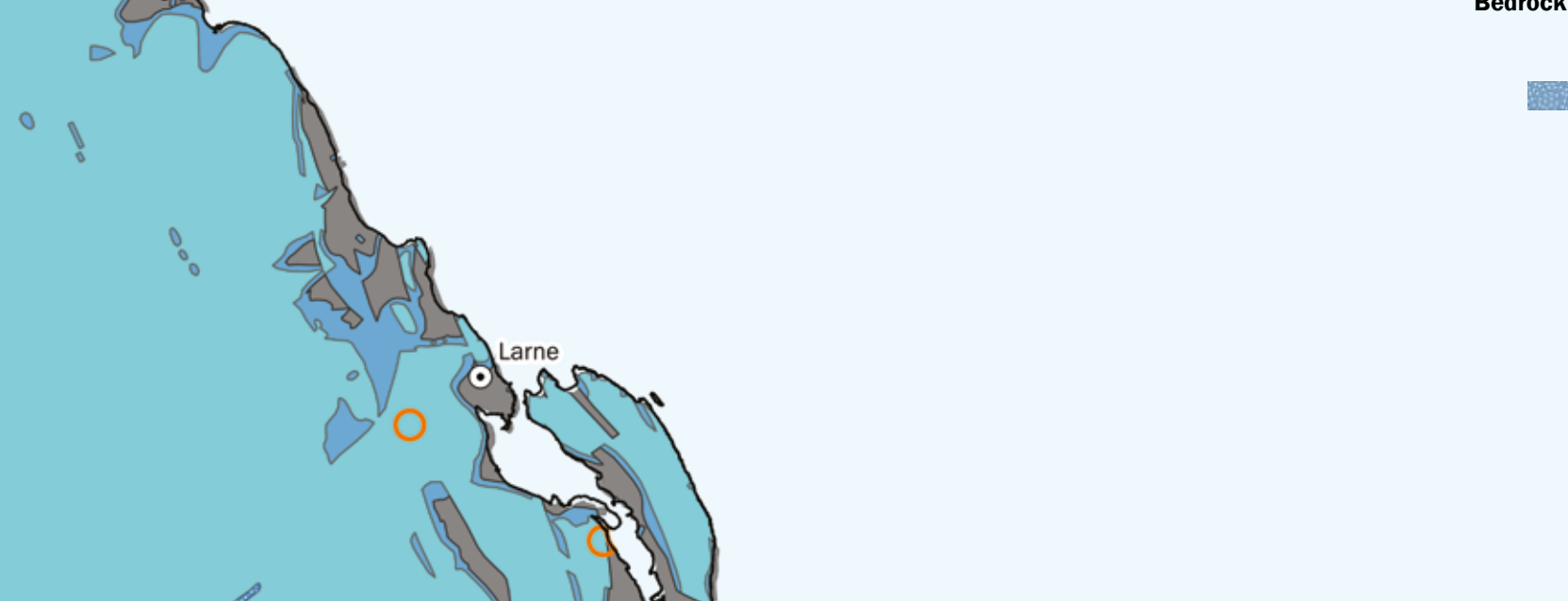
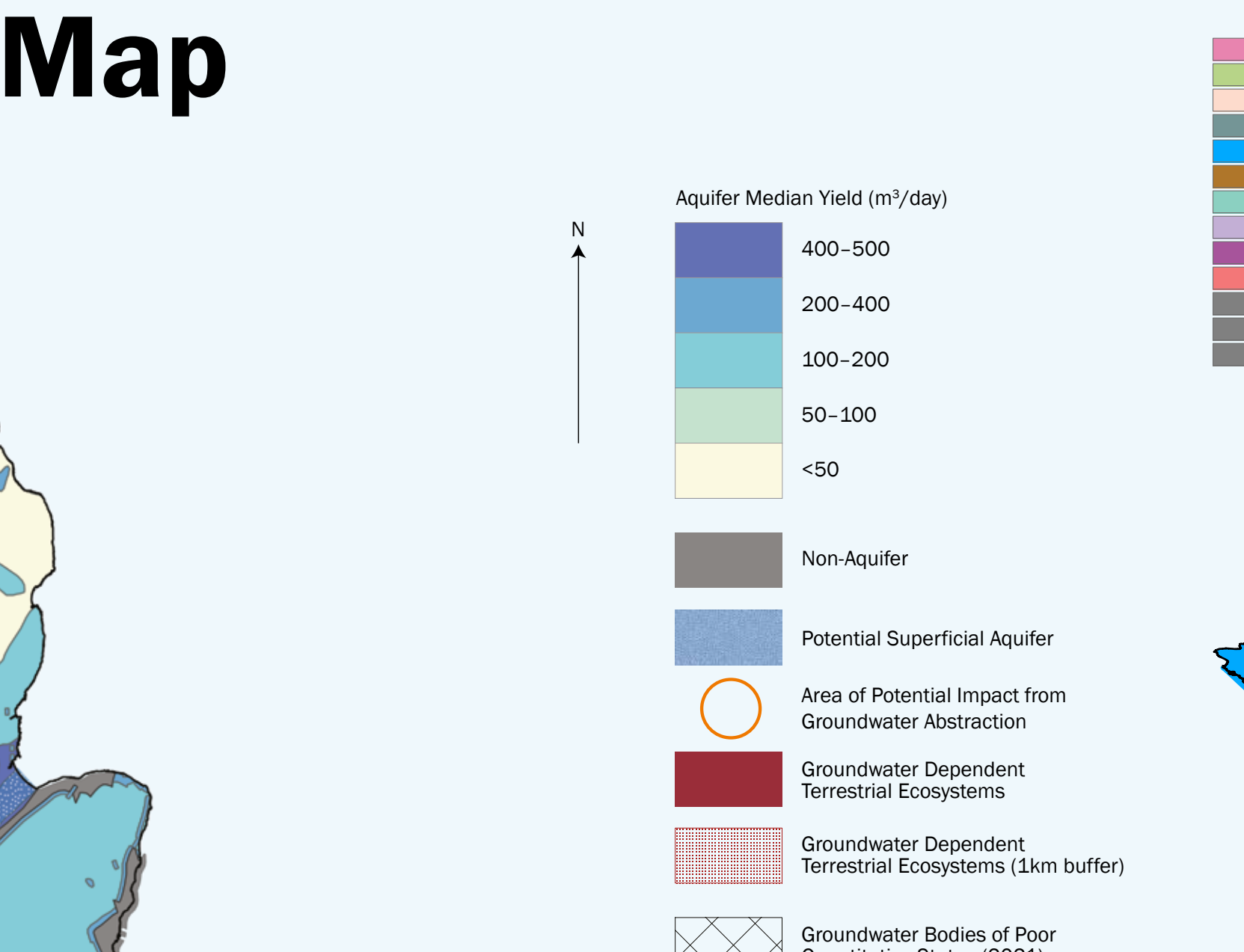
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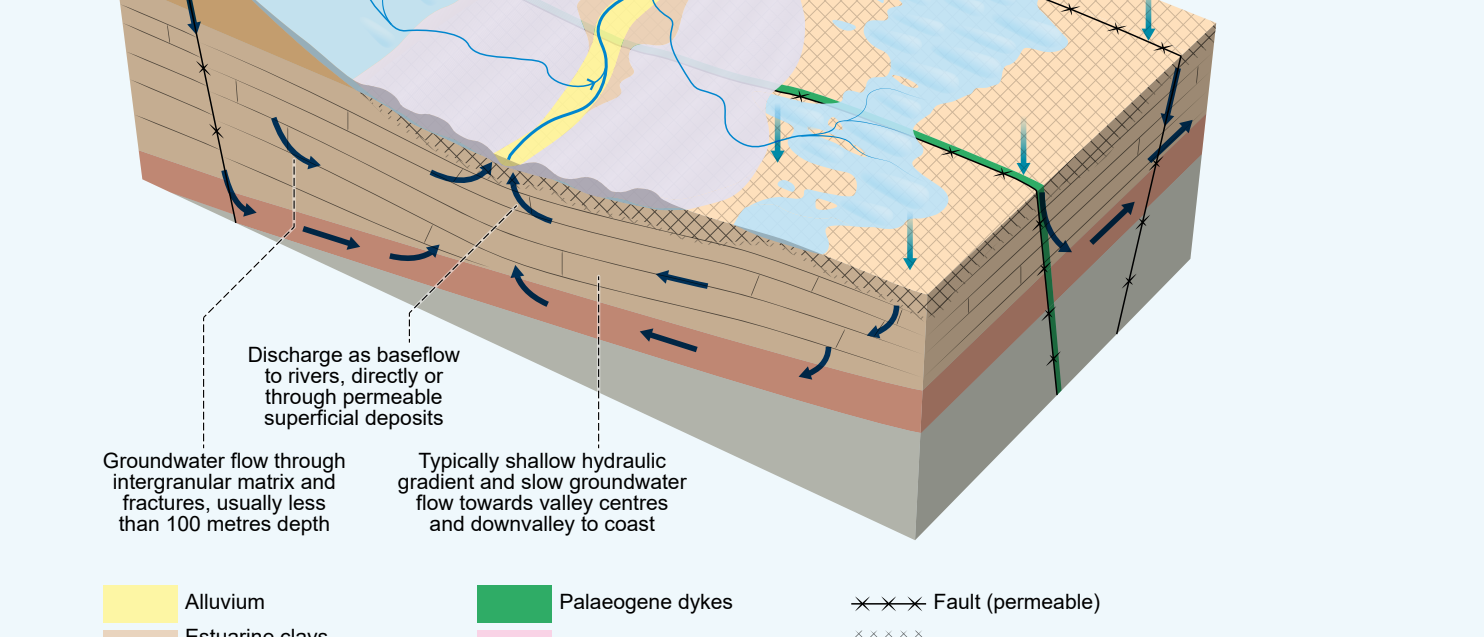
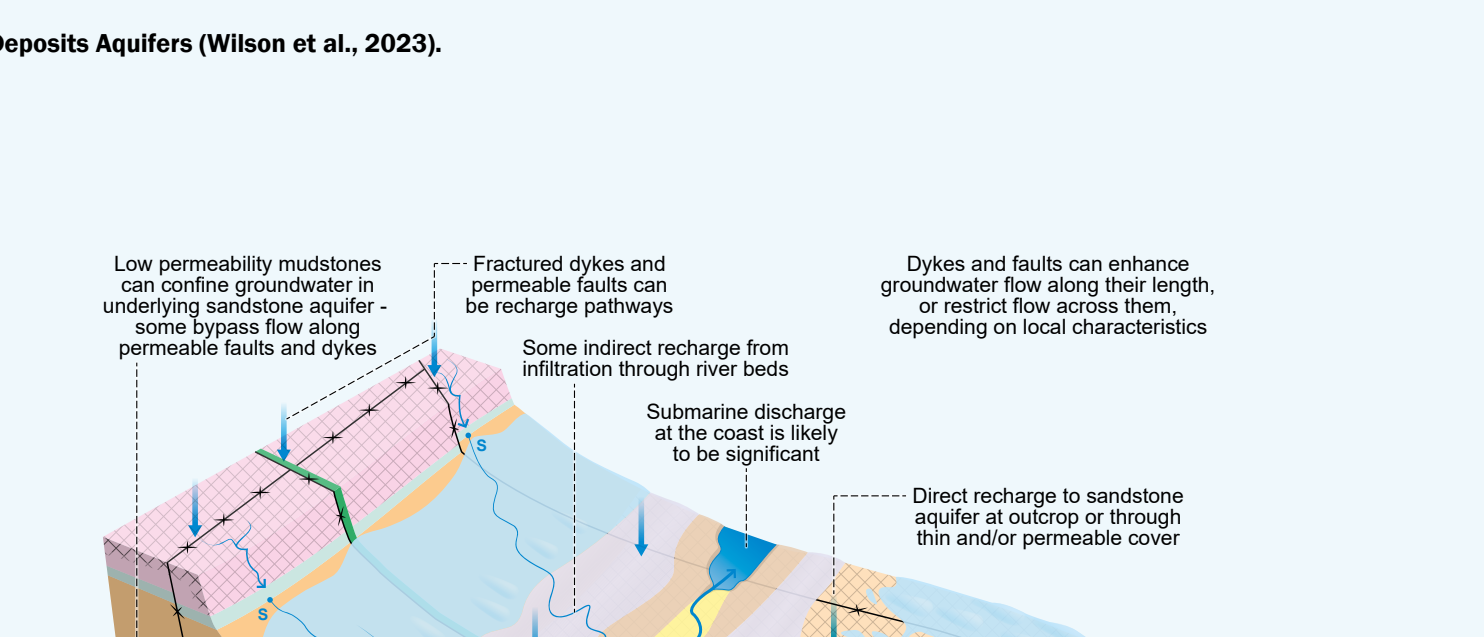
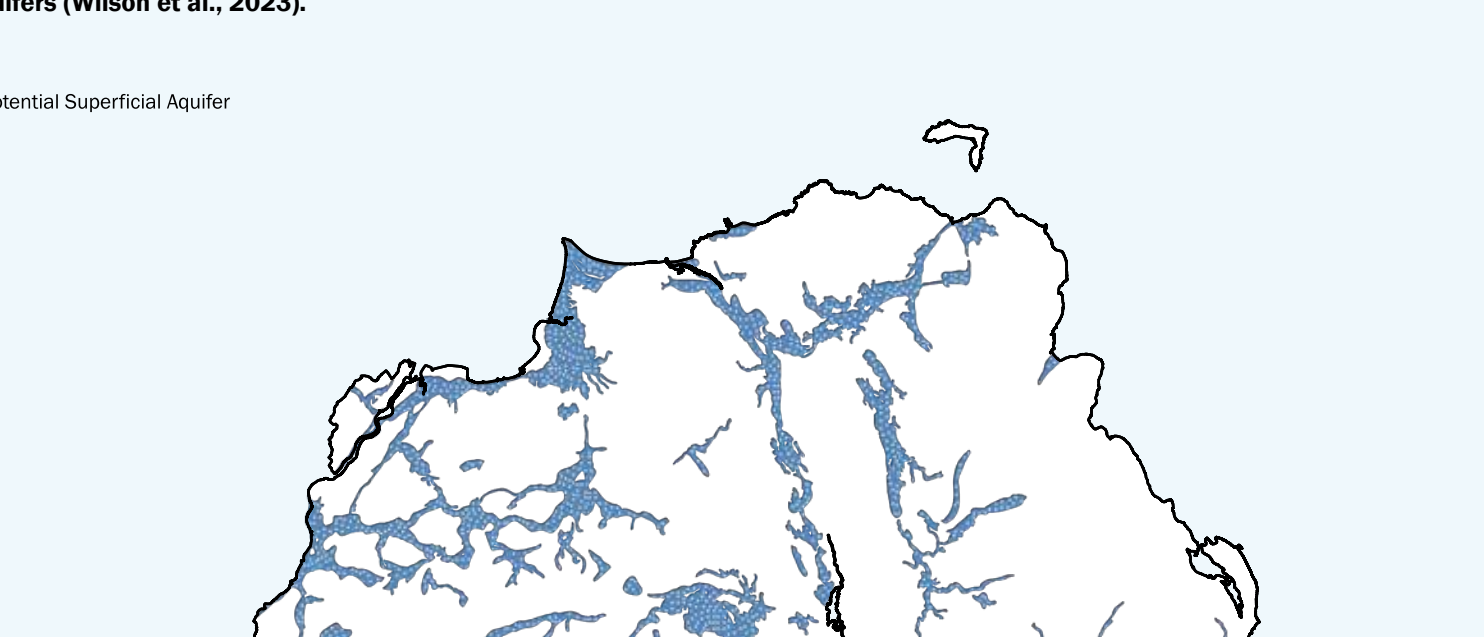
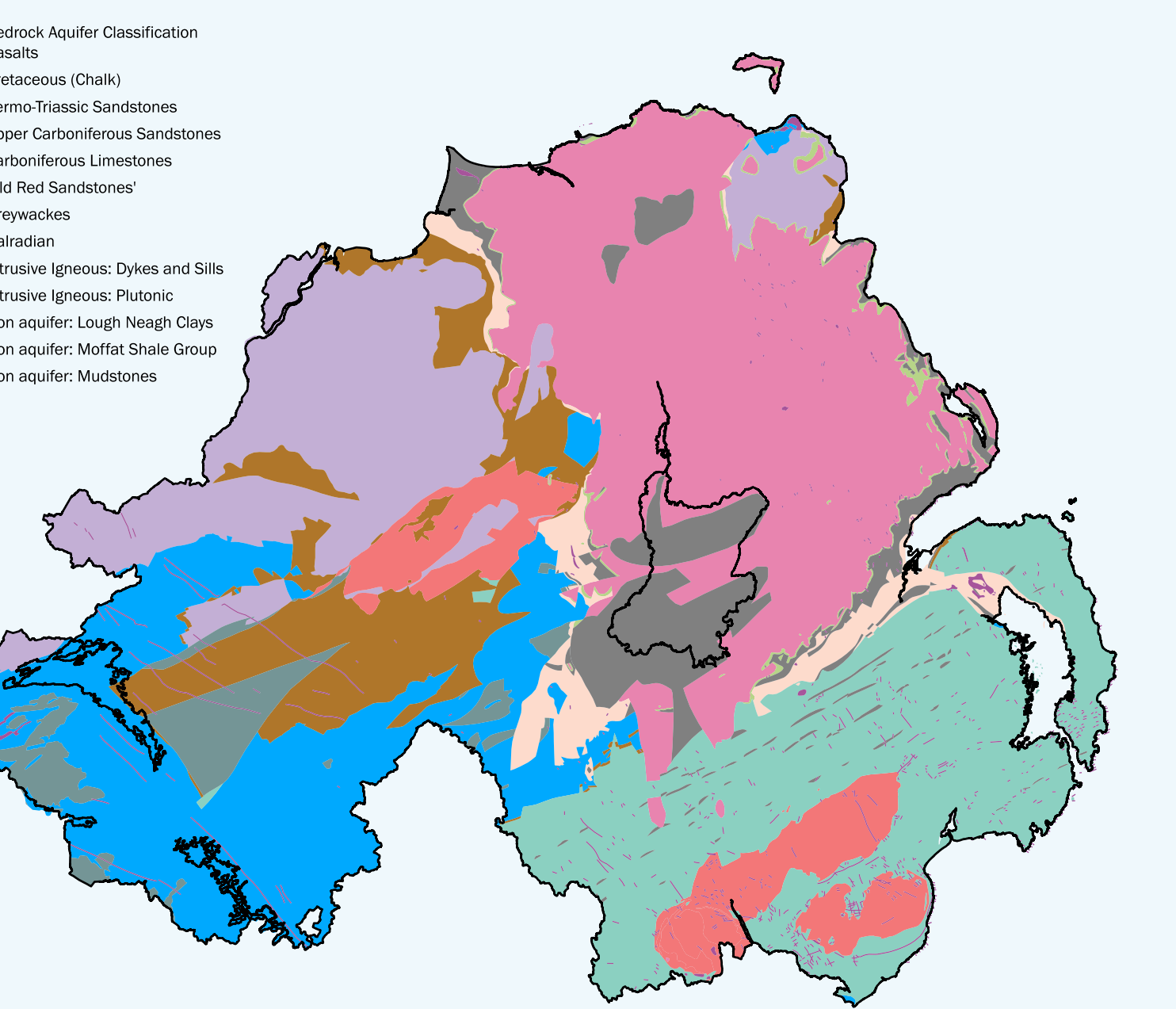
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Basalts	Fracture	235	55	109	105	218	Moderately mineralised, high pH, calcium bicarbonate or sodium or potassium bicarbonate type
Cretaceous (Chalk)	Fracture and Karst (Chalk); Intergranular (Greensands)	5	66	327	212	393	Weakly mineralised, high pH, bicarbonate dominated, no dominant cation
Permo-Triassic Sandstone	Intergranular and Fracture	181	164	469	385	1003	Highly mineralised, high pH, bicarbonate dominated with no dominant cation (minority calcium dominated)
Upper Carboniferous Sandstone	Fracture	16	169	300	309	873	Highly mineralised, high pH, bicarbonate dominated, no dominant cation
Carboniferous Limestones	Fracture and Karst	110	101	327	236	873	Highly mineralised, moderate pH, calcium bicarbonate type (minor sulphate)
'Old Red Sandstones'	Fracture	59	65	131	123	327	Moderately mineralised, moderate pH, either no dominant cation or a slight dominance by calcium. Two distinct anionic groups: one dominated by bicarbonate and the other with no dominant anion
Greywackes	Fracture	100	44	77	69	131	Moderately mineralised, moderate pH, bicarbonate dominated or no dominant anion; no dominant cation (minority calcium)
Dalriadan	Fracture	52	12	33	37	101	Moderately mineralised, low pH, calcium bicarbonate or no dominant anion or cation
Intrusive Igneous: Plutonic	Fracture	26	23	71	76	150	Weakly mineralised, low pH, bicarbonate dominated with no dominant cation
Intrusive Igneous: Dykes and Sills	Fracture	7	35	2			