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Nitrates Implementation Meeting- Lough Neagh catchment

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Water chemistry and nutrient loading from the catchment

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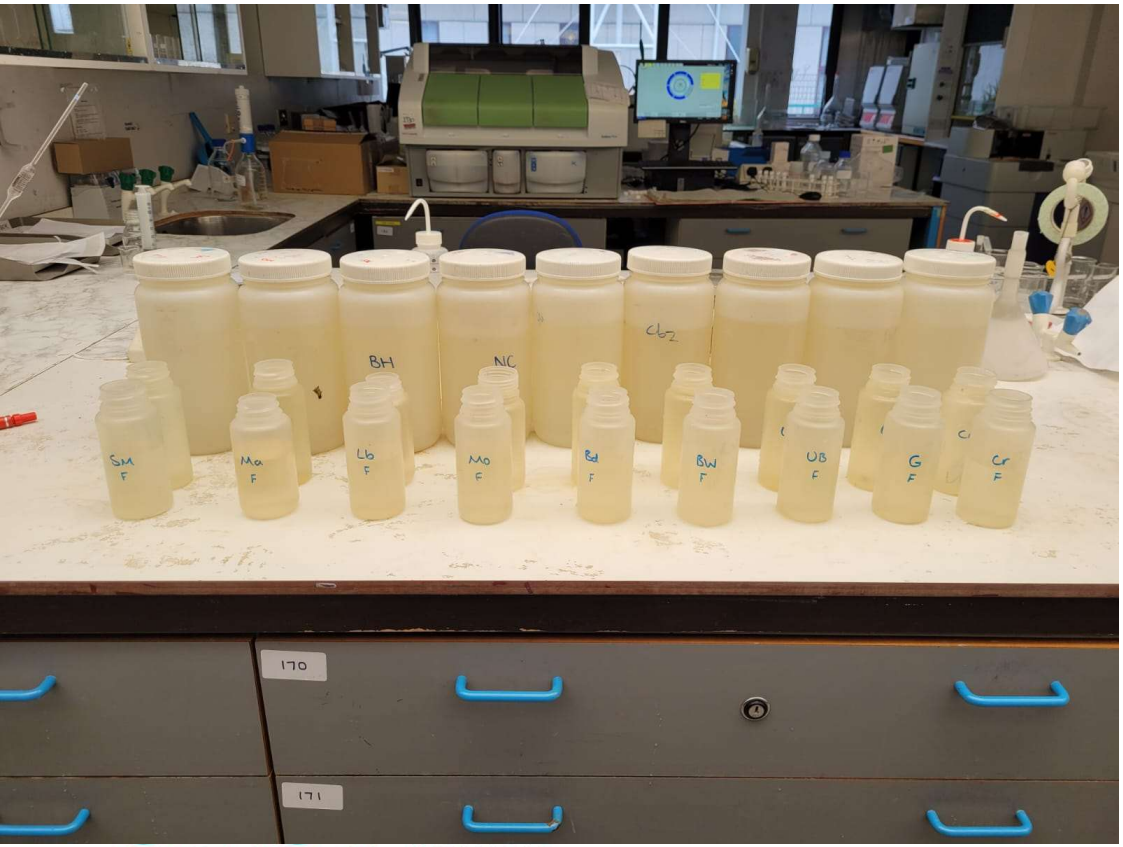
- Results from our Long-Term Ecological Research Project
- Trends in nutrient loading, N and P in Lough Neagh catchment
- Trends in lake water chemistry
- Lake water quality targets and input models, loading mass to achieve a target concentration of lake nutrient.

Chemistry terms



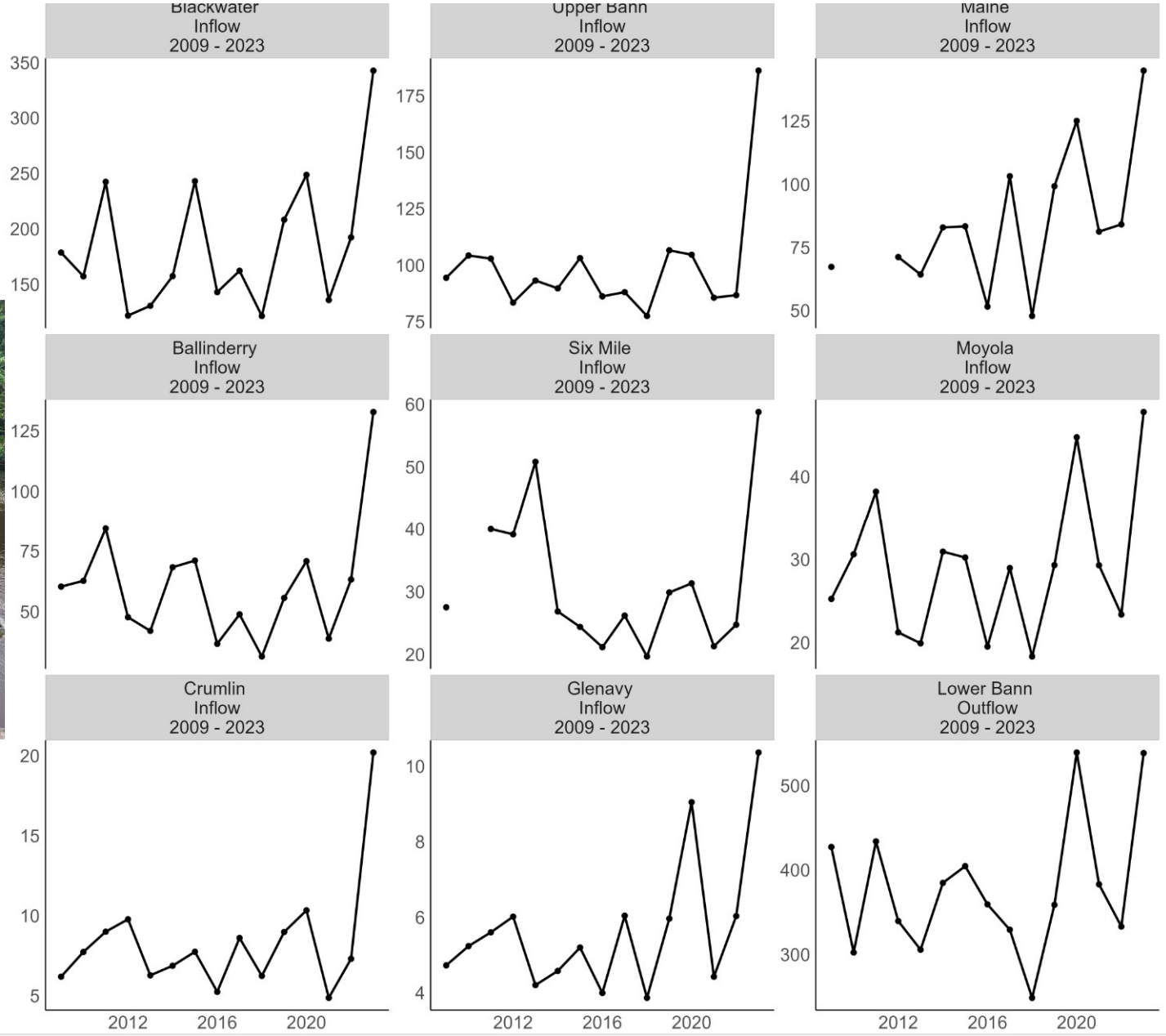
Total phosphorus TP – all forms of P in the water –
Suspended = Particulate P (PP)

Soluble (or dissolved) phosphorus – goes through a filter =

Total Soluble P (TSP) =
Soluble Reactive P – (SRP)
and
Soluble Organic P – (SOP)

Nutrient loadings – TP (T)

Moyola river



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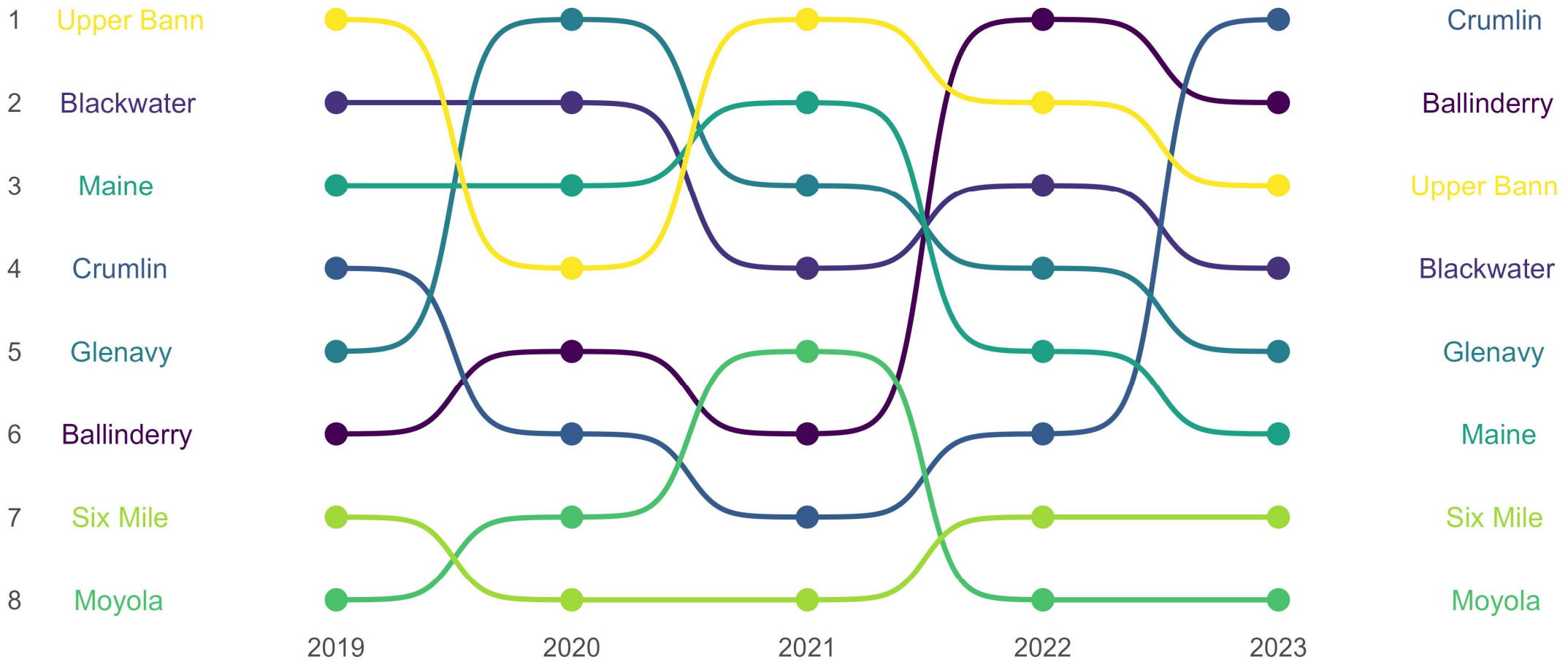
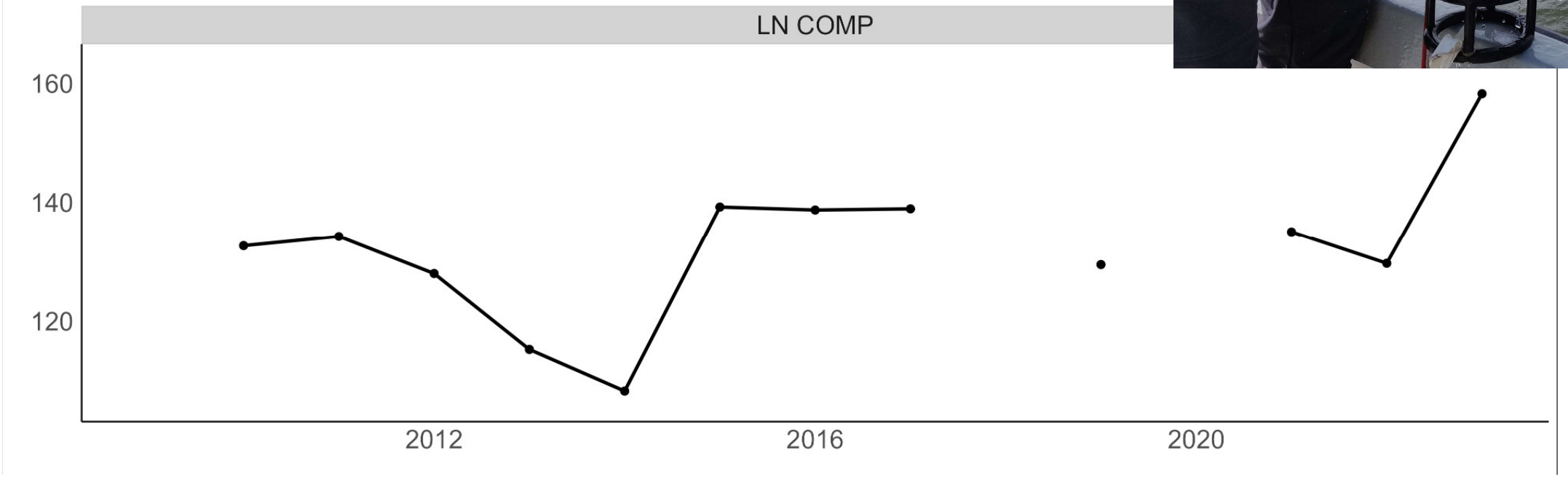
Total Phosphorus

Lough Neagh inflow rivers ranked according to annual loading per km^2

Position 1 indicates the river which contributed the most and position 8 indicates the river which contributed the least



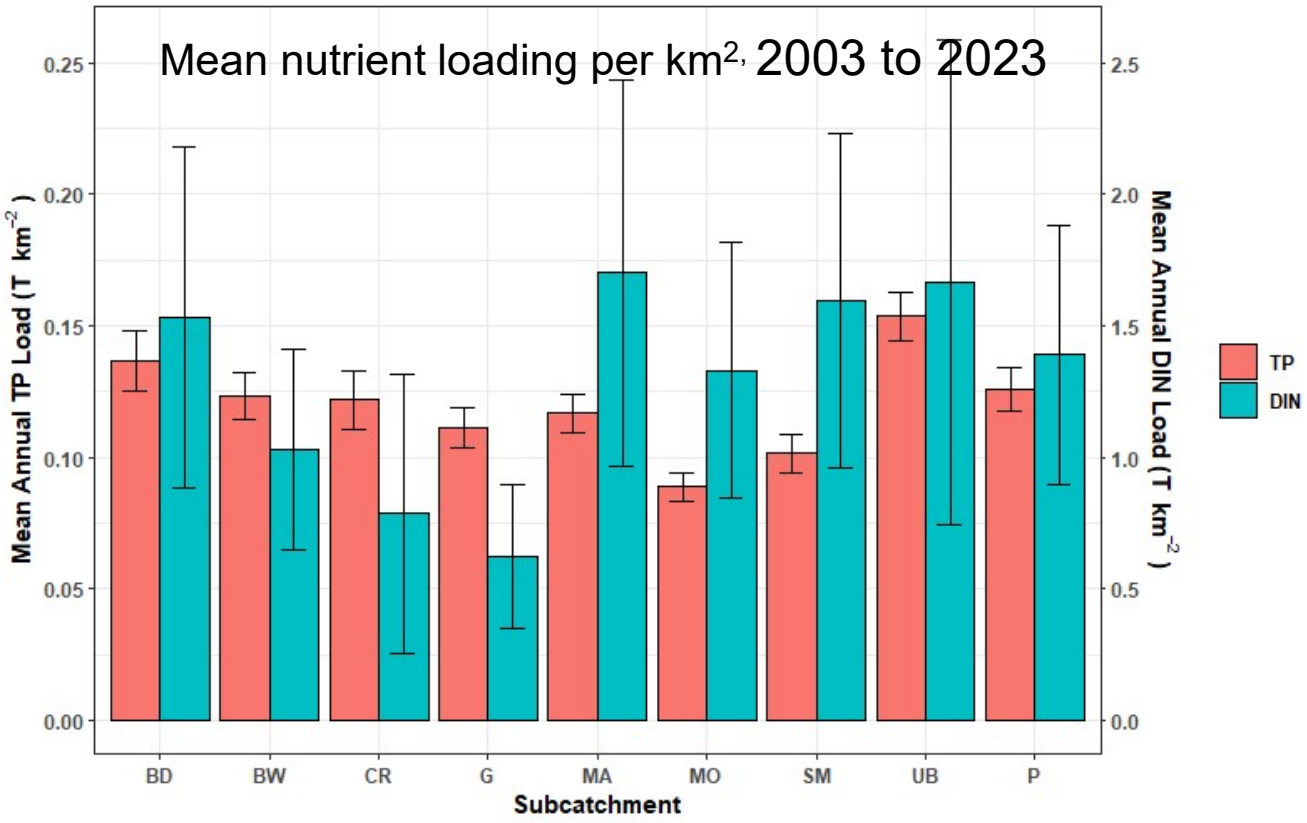
TP concentrations in the lake (micrograms/L)



Estimated catchment TP loadings needed to achieve lake P targets

We know from linked E&I project about internal loading of P from sediment and its contribution

	Current mean TP load	B/P boundary supporting TP load
T yr-1	555.6	260
T , km-2 yr-1	0.125	0.058



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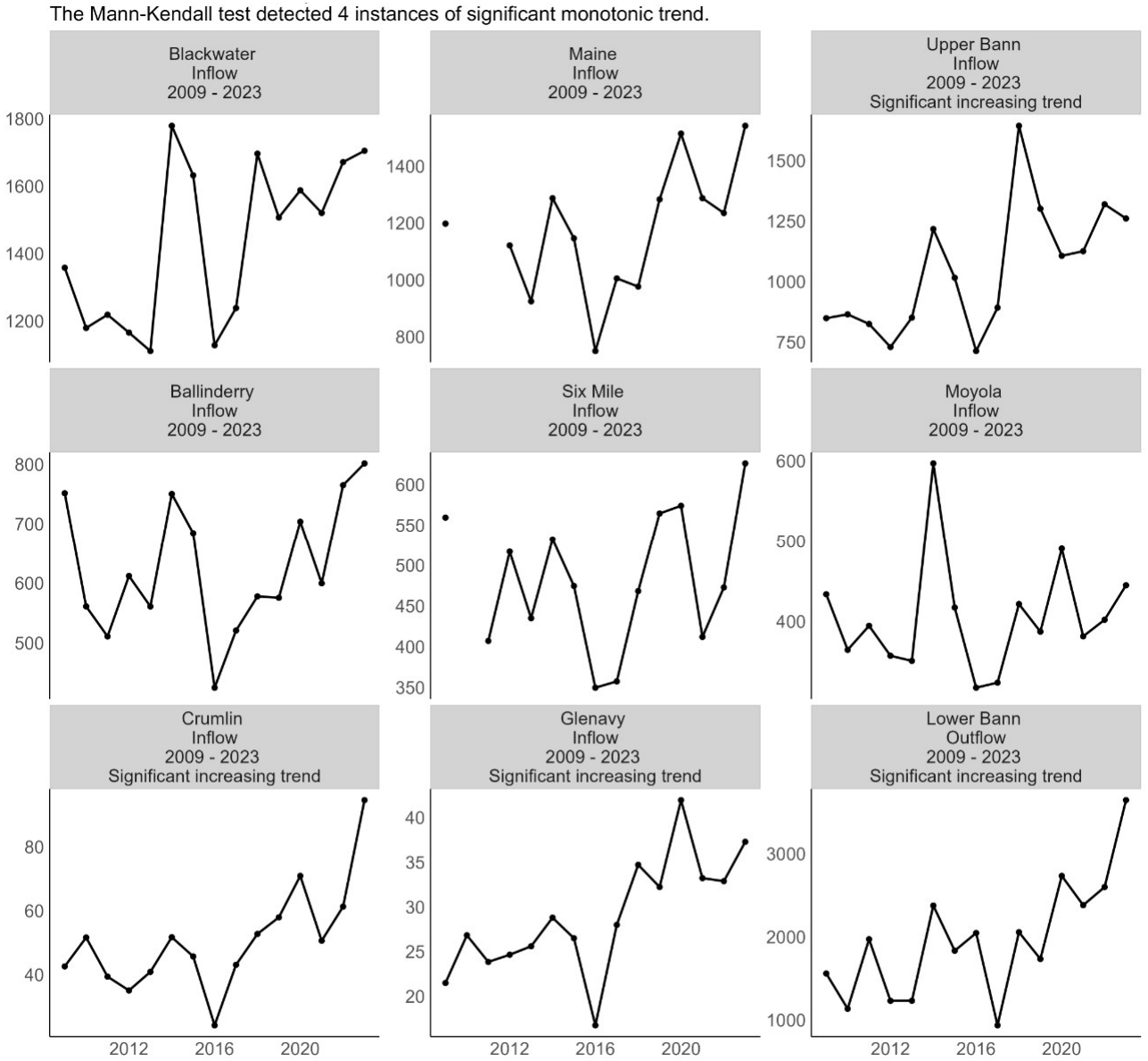
Chemistry terms

- Dissolved Inorganic N - DIN
- Made up of nitrate, nitrite and ammonium
- Dominated by nitrate mostly in our water samples

Nutrient loadings – Dissolved Inorganic N (T) (dominated by nitrate)

Ballinderry River



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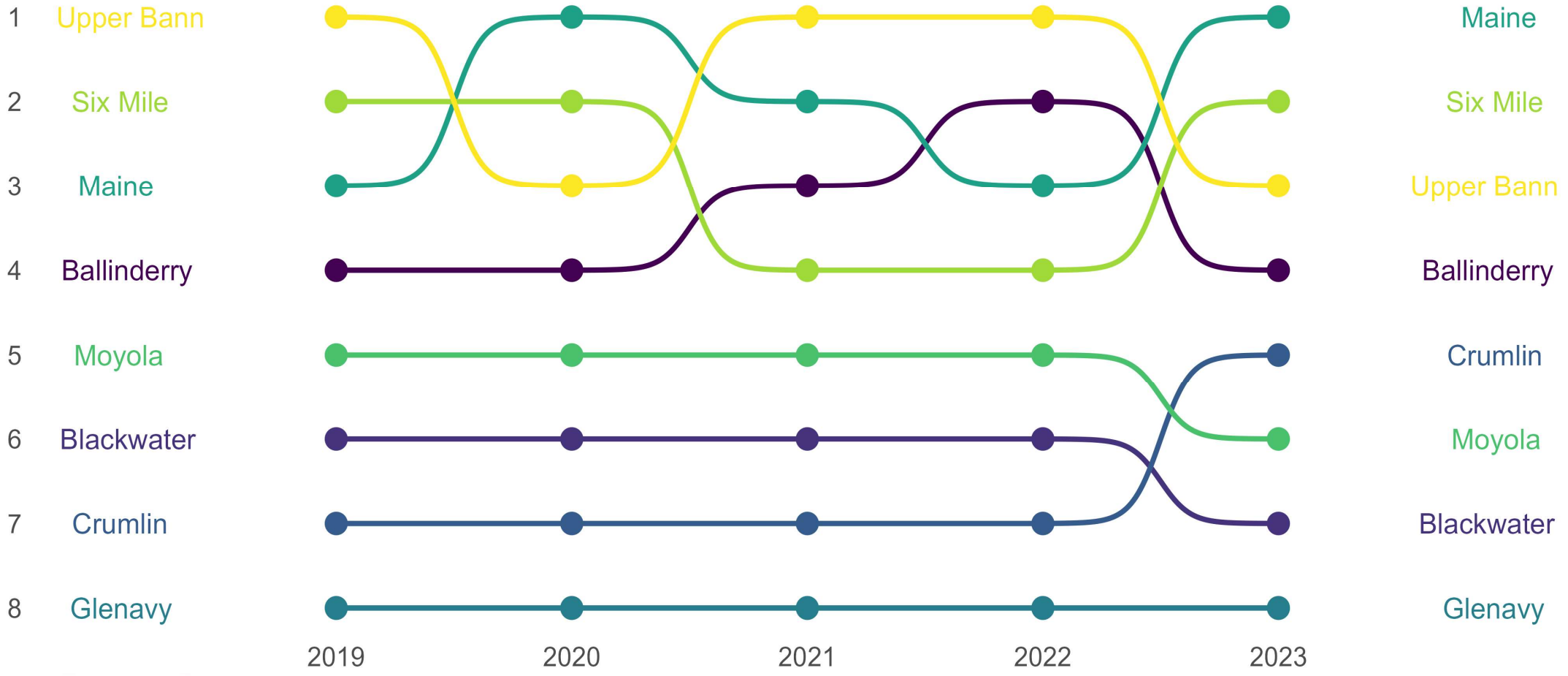
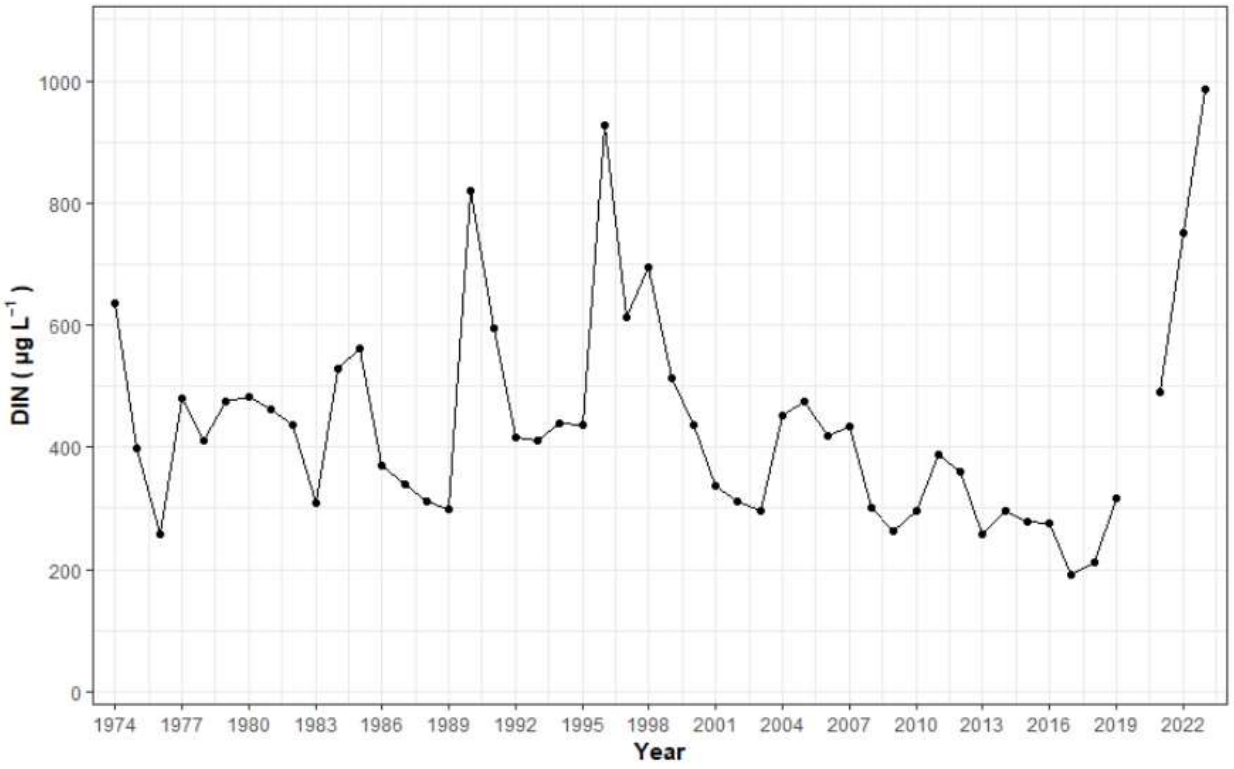
Dissolved Inorganic Nitrogen

Lough Neagh inflow rivers ranked according to annual loading per km^2

Position 1 indicates the river which contributed the most and position 8 indicates the river which contributed the least



Long-term lake DIN: 1974 - 2023



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- Decreasing trend from 1974 – 2019 ($p < 0.001$)
- Unlike TP load, **DIN load significant control on lake DIN concentration** (1990 – 2023: $R^2 = 0.47$, $p < 0.001$)

Year	DIN Load (T/yr)
2019	6660.7
2021	6290.1
2022	6927.9
2023	7566.2

N loading targets for Lough Neagh

In contrast to P, lake N responds quickly to changes in catchment inputs

Good news that legacy N in lake sediment is not a large issue (Jeppesen et al., 2024)

TN targets (WFD) have been agreed for Lough Neagh

In linked research work we can use lake nutrient models and develop target inputs of N that will support lake N concentrations

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Thank you
Hundreds of scientists have been involved in the collection and analyses of this data over the last 50 years