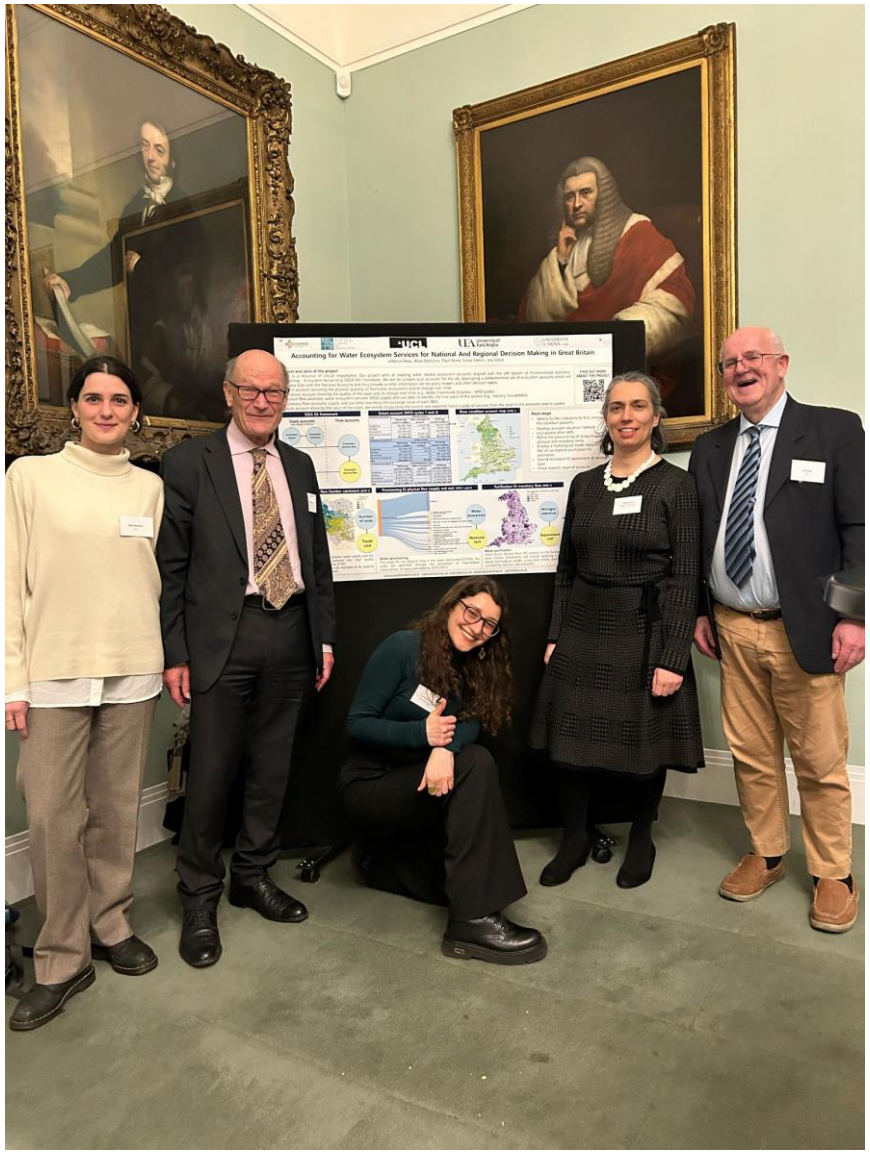
UK water ecosystem accounting for improved water management

ESCoE Conference on Economic Measurement 2026

Alice Bartolini, Paul Ekins, Silvia Ferrini, Joe Grice, Vittoria Reas, Martin Weale

19/05/2026

Research team



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UK and global water priorities

Independent Water Commission (Cunliffe Review) 2025
Comprehensive monitoring needed across the full water environment.

- Poor national-local coordination
- Poor understanding of value for money for intervention
- Cost and benefits assessed on an inconsistent basis
- No long-term comprehensive planning
- WFD fails to capture comprehensive picture and local changes
- Health risks are overlooked


nature water

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The global economy runs on water, not capital

Musonda Mumba, Henk Ovink & Johan Rockström

Nature Water **3**, 356–357 (2025) | Cite this article

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World Bank projections indicate that declining water quantities and quality can reduce GDP by 8% in high-income countries and by 10–15% in low-income countries by 2050 (World Bank, 2016).

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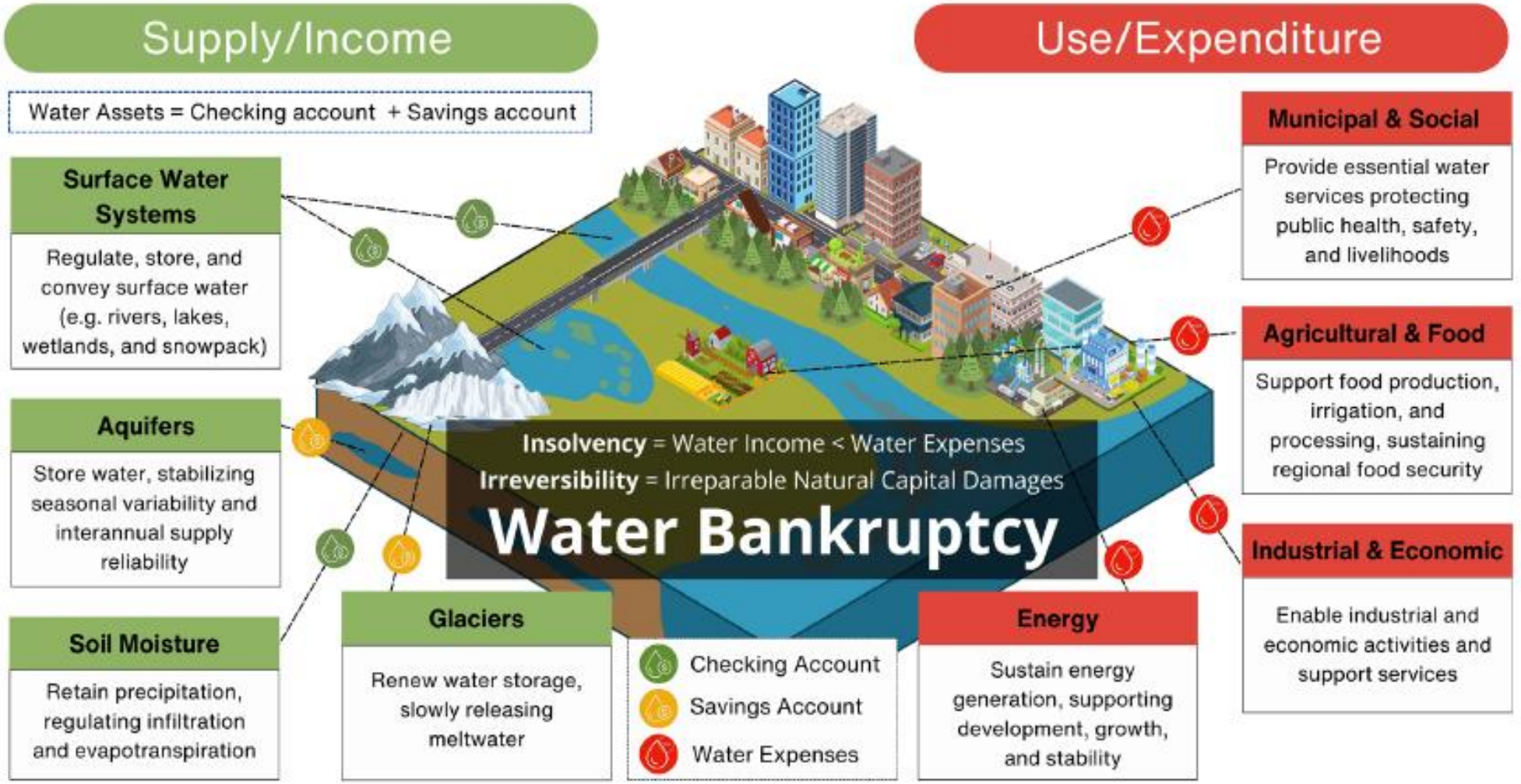
Global Water Bankruptcy



(UNU-INWEH, 2026)

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System of Environmental Economic Accounting

- 1953: First System of National Accounts (SNA). SNA revised and developed, with new versions published in 1968, 1993, 2008, and, most recently, 2025, https://unstats.un.org/unsd/nationalaccount/sna2025.asp.
- 1993: System of Environmental Economic Accounting (SEEA) *Handbook of National Accounting: Integrated Environmental and Economic Accounting*, United Nations, New York, https://seea.un.org/content/handbook-national-accounting-integrated-environmental-and-economic-accounting#:~:text=This%20handbook%20constitutes%20the%201993,publication/SeriesF/SeriesF_61E.pdf.
- 2003: New version of SEEA (https://seea.un.org/content/handbook-national-accounting-integrated-environmental-and-economic-accounting-2003)
- 2012 SEEA - Central Framework (UN SEEA CF) becomes an internationally agreed statistical standard (https://seea.un.org/content/seea-central-framework). Now being updated.
- 2012 SEEA-Water https://seea.un.org/content/seea-water
- 2013: Common International Classification for Ecosystem Services (CICES)
- 2014: SEEA Experimental Ecosystem Accounts (SEEA EEA) (https://seea.un.org/content/seea-experimental-ecosystem-accounting-1)
- 2017 Technical Note: Water Accounting (https://seea.un.org/sites/seea.un.org/files/water_note_final_27-10-17_clean.pdf)
- 2024: SEEA-Ecosystem Accounts (SEEA EA) agreed internationally and published in 2021 (https://seea.un.org/sites/seea.un.org/files/documents/EA/seea_ea_f124_web_12dec24.pdf)

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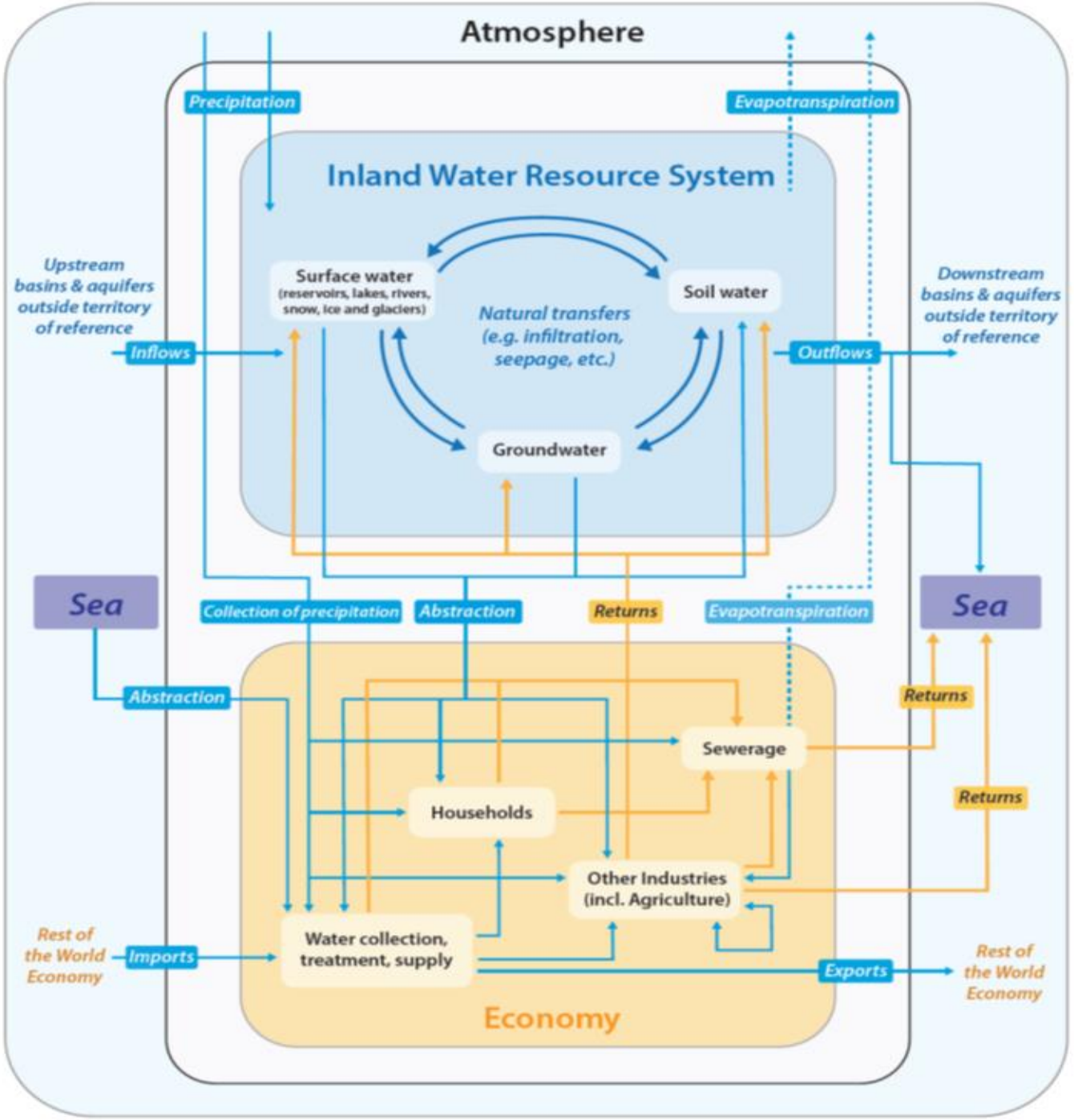
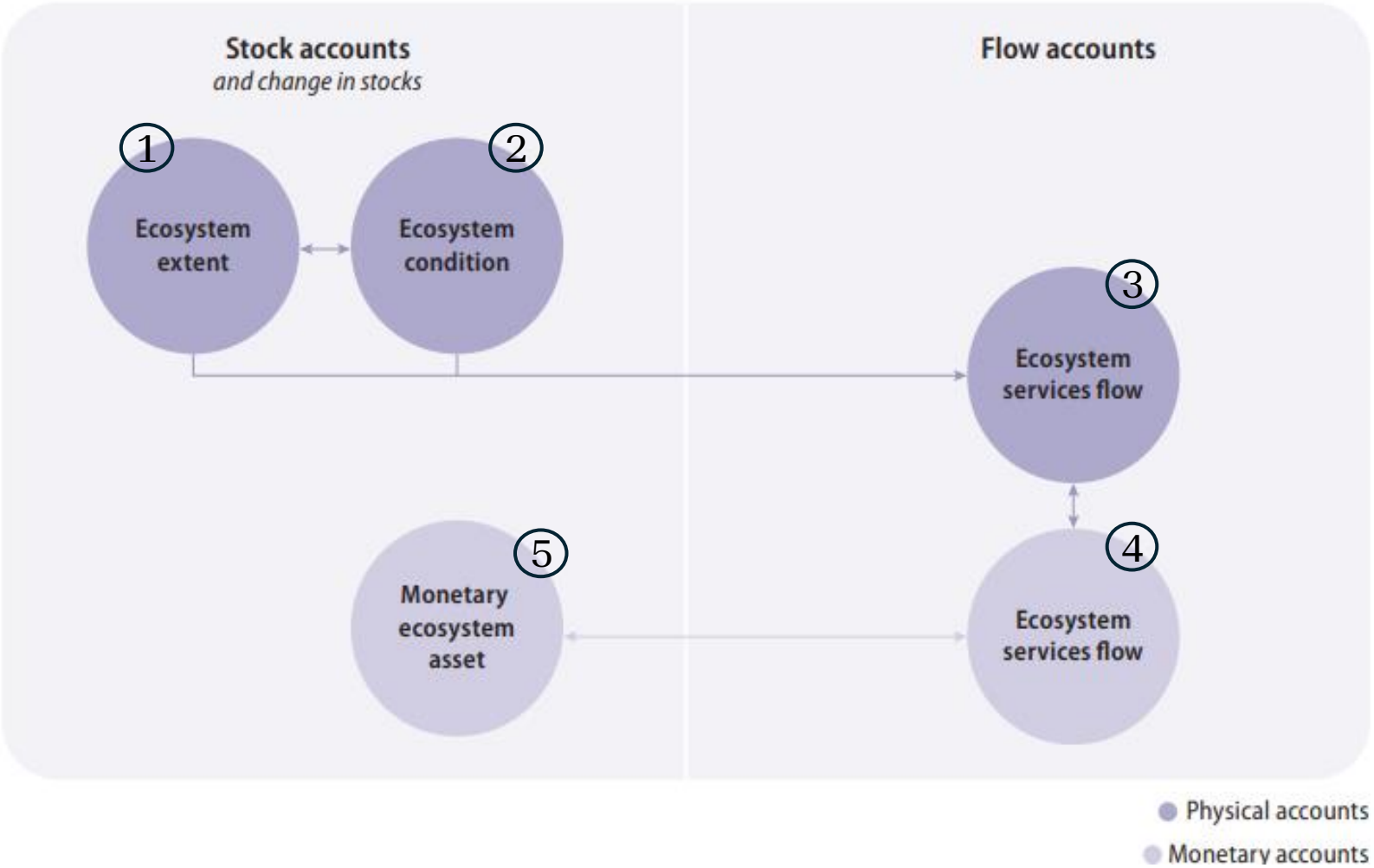
Water resources and the economy (Vardon et al., 2023)



SEEA EA water accounts – key output



1. From area to volume
2. Nitrogen and e. coli concentration as condition indicators complementary to WFD
3. Water provisioning physical flow
4. Towards water provisioning valuation
5. Ecosystem asset valuation – SNA25 focus on depletion

1. Extent account: from area to volume

Grid-to-Grid hydrological model. Million m3.

	2007	2015	2017	2018	2019	2020	2021	2022	2023	2024
East of England	61.0	52.4	50.6	51.7	50.8	58.4	58.6	46.9	59.5	64.2
East Midlands	81.0	67.5	68.8	69.9	83.9	75.4	74.5	66.6	82.9	85.9
West Midlands	76.3	66.9	63.4	65.9	76.2	72.2	67.9	59.5	73.9	78.9
North East	31.3	34.0	29.0	30.5	34.0	32.9	30.9	29.0	34.8	32.1
North West	63.6	68.5	65.6	58.7	68.9	71.1	62.6	58.8	70.7	69.6
South East	75.3	64.6	62.0	62.6	65.6	73.5	70.6	59.8	75.7	83.7
South West	79.1	69.9	67.1	69.3	74.5	77.9	72.5	62.1	80.9	85.6
London	13.2	11.1	10.8	10.9	11.2	12.7	12.3	10.4	12.9	14.3
Yorkshire and the Humber	95.1	93.5	84.9	87.4	98.8	97.1	91.0	83.5	101.9	97.5
England	**575.8**	**528.5**	**502.3**	**507.0**	**564.0**	**571.5**	**540.9**	**476.7**	**593.3**	**612.0**
Wales	**77.96**	**79.34**	**74.02**	**72.73**	**81.05**	**82.34**	**75.14**	**66.73**	**82.16**	**81.21**
Scotland	**294.61**	**323.47**	**281.42**	**268.30**	**292.69**	**311.54**	**268.74**	**282.84**	**285.98**	**285.98**

Source: Bell et al. 2009

Until now, water extent has been measured in area using land cover maps. This account introduces volumes as a more informative measure of water availability.

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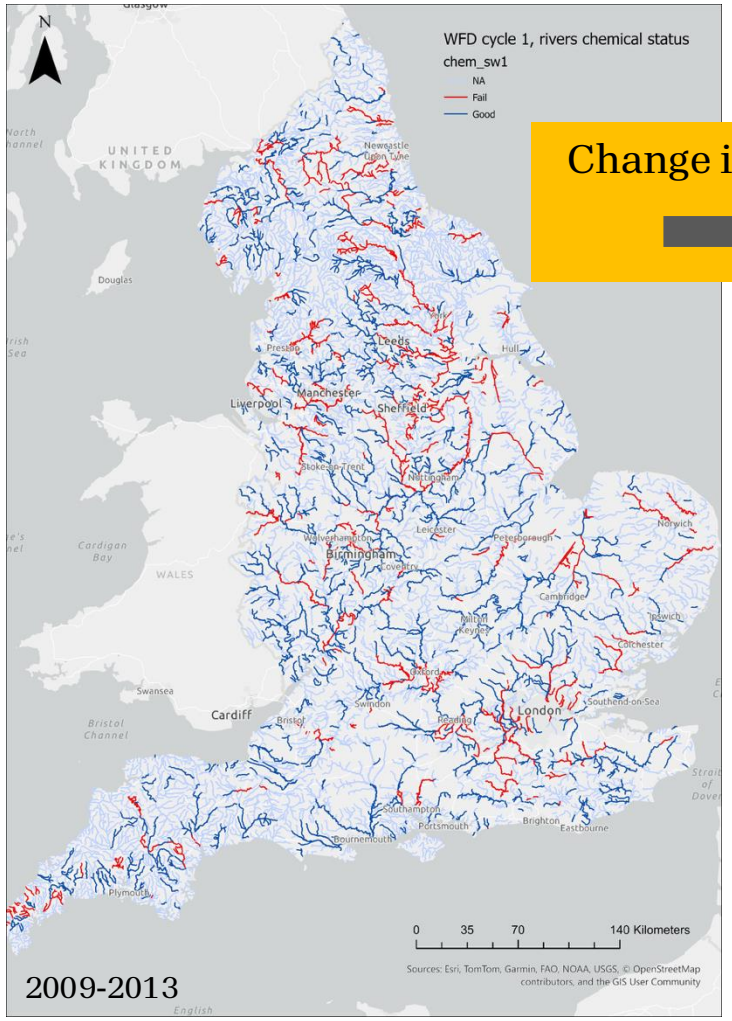
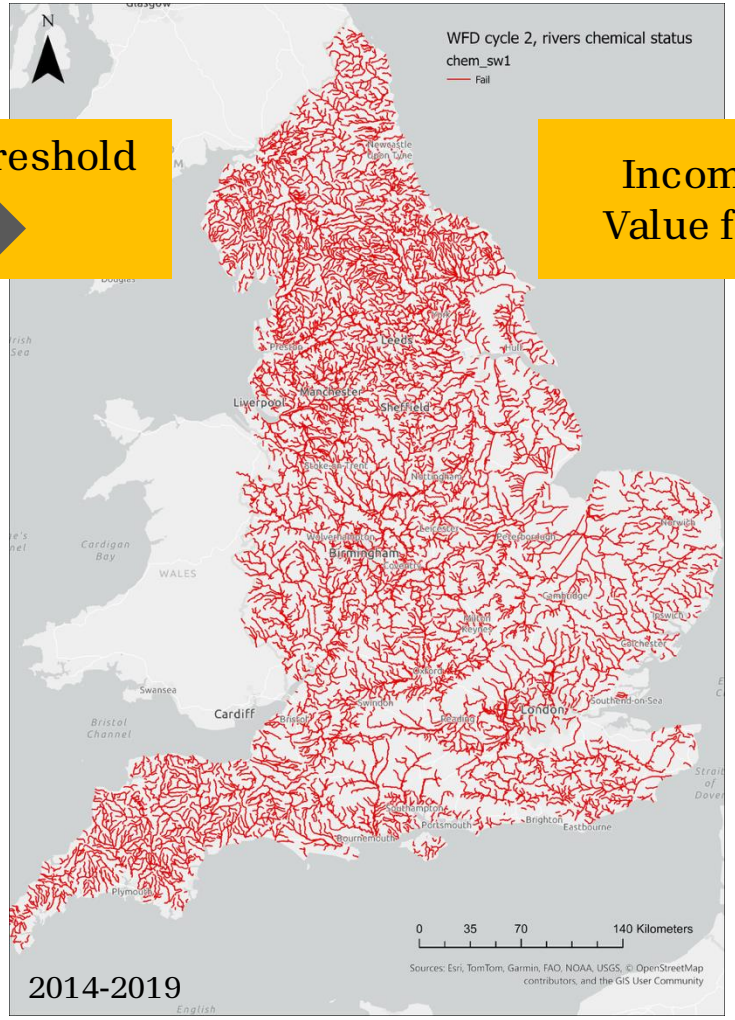
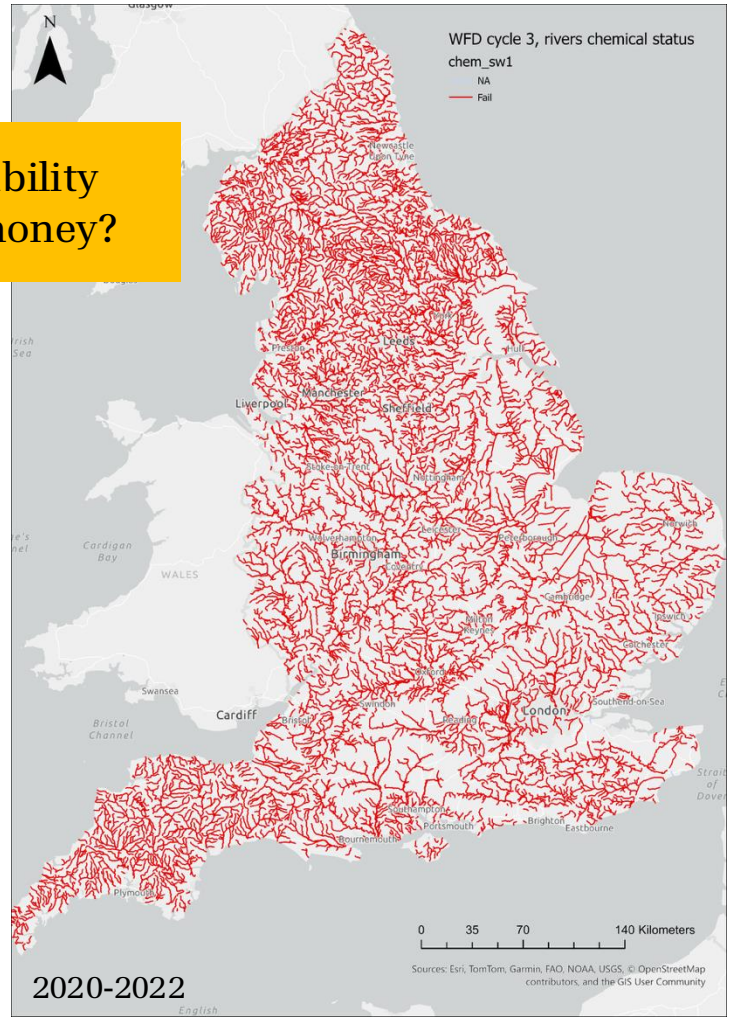
2. Condition account, is what exists enough?



Change in threshold



Incompatibility
Value for money?



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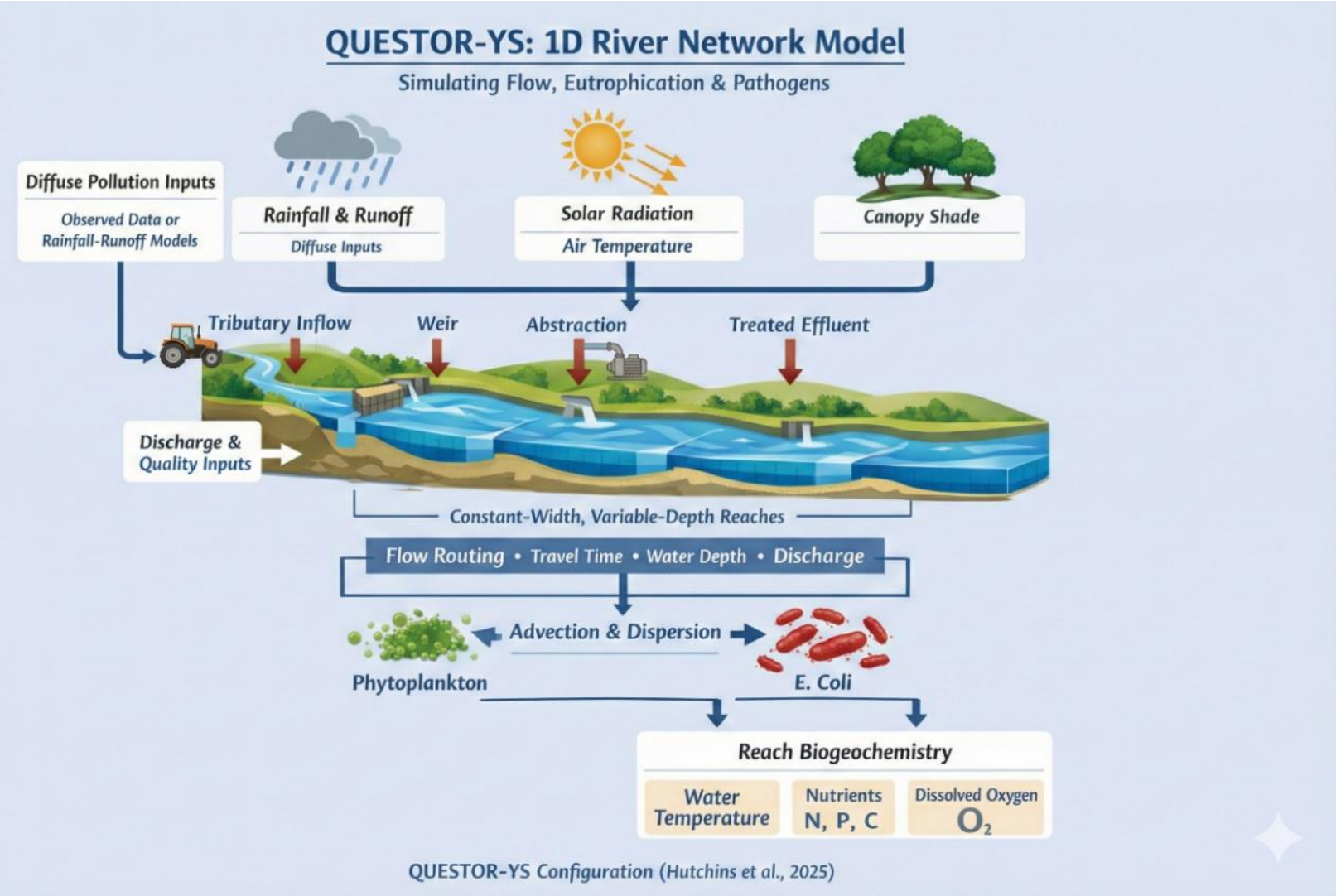
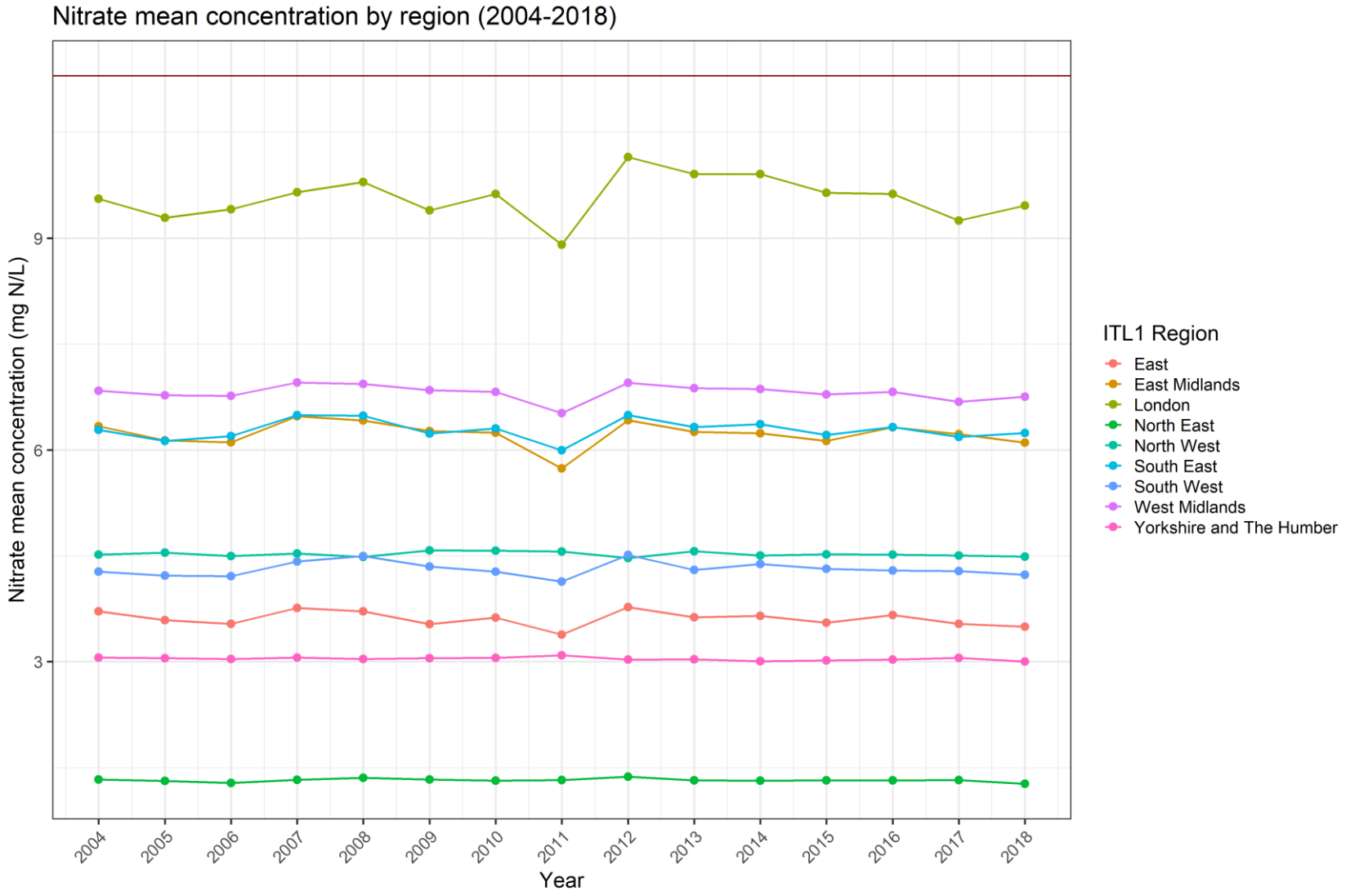
2. Condition account, QUESTOR model (Hutchins et al., 2025)

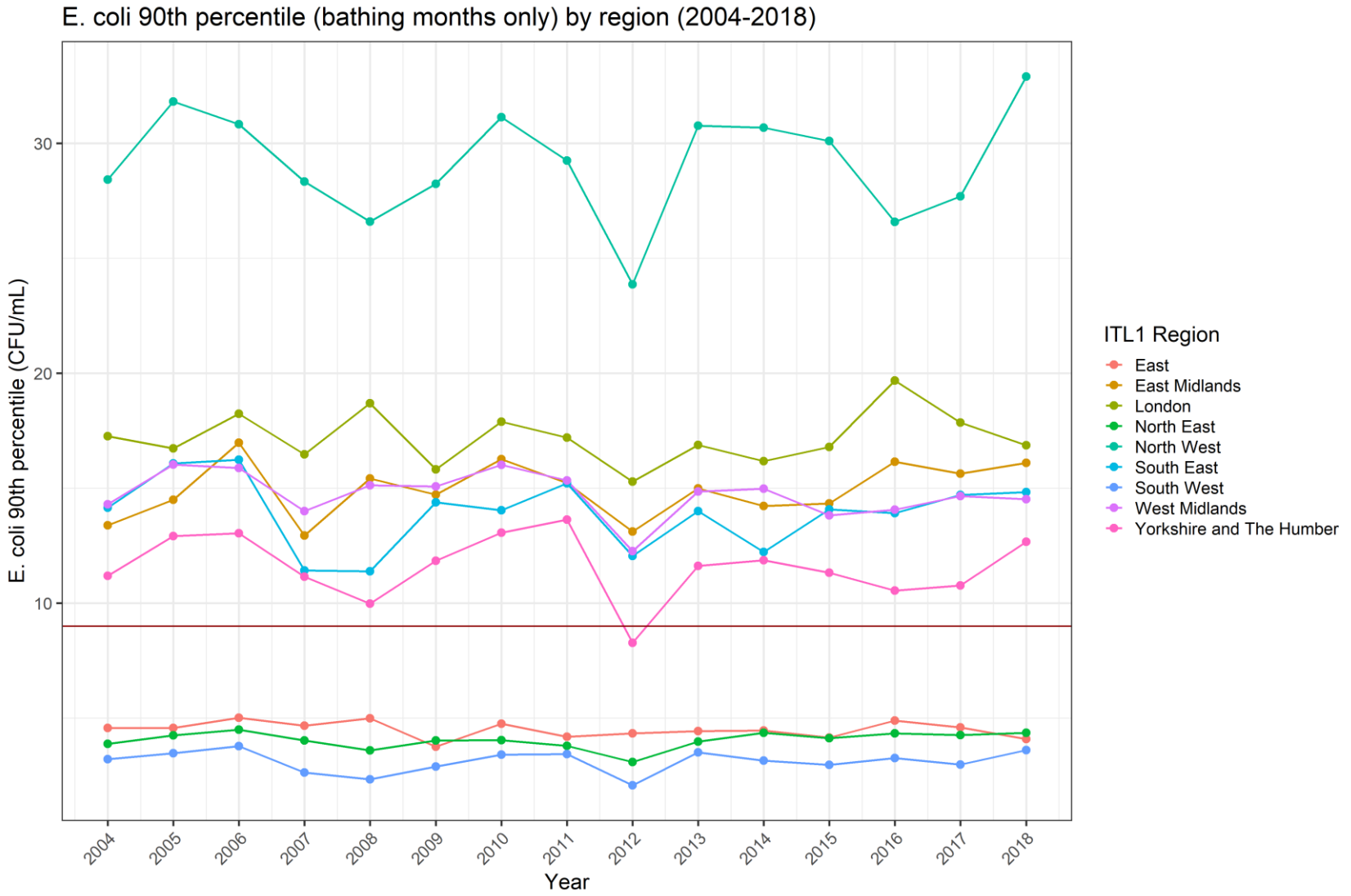


QUESTOR-YS Configuration (Hutchins et al., 2025)

Condition account, nitrate concentration



2. Condition account, E. coli concentration



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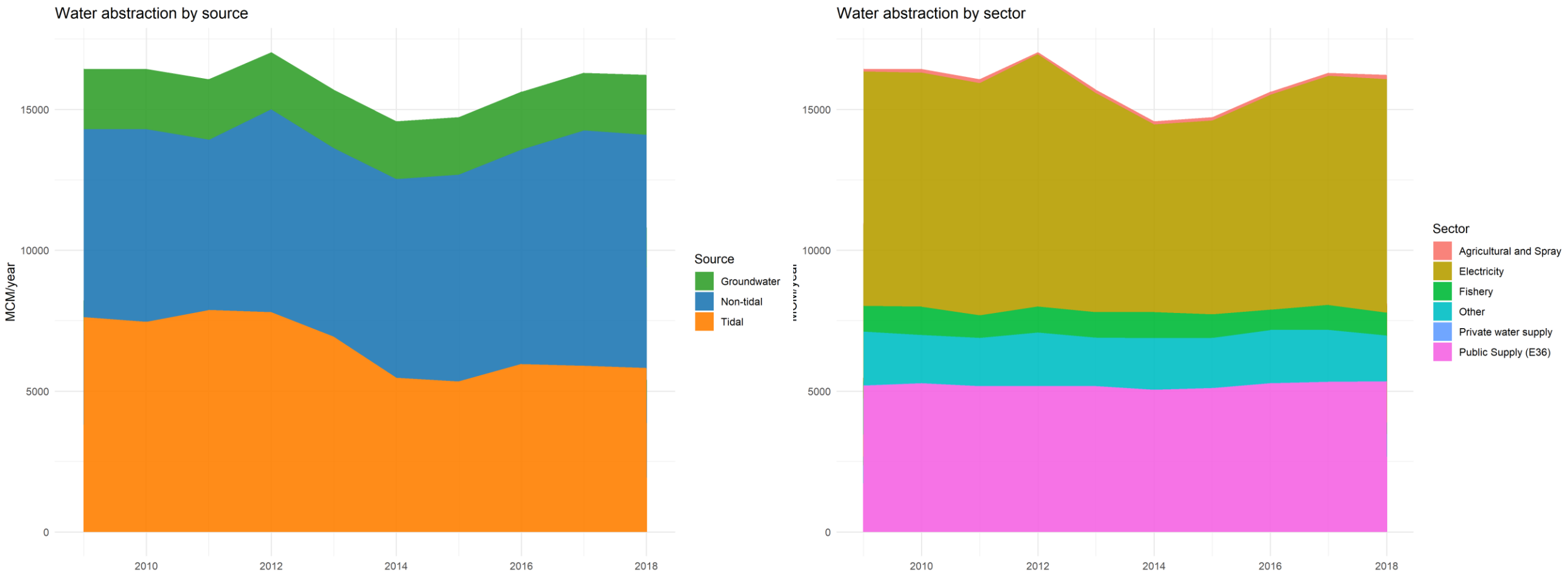
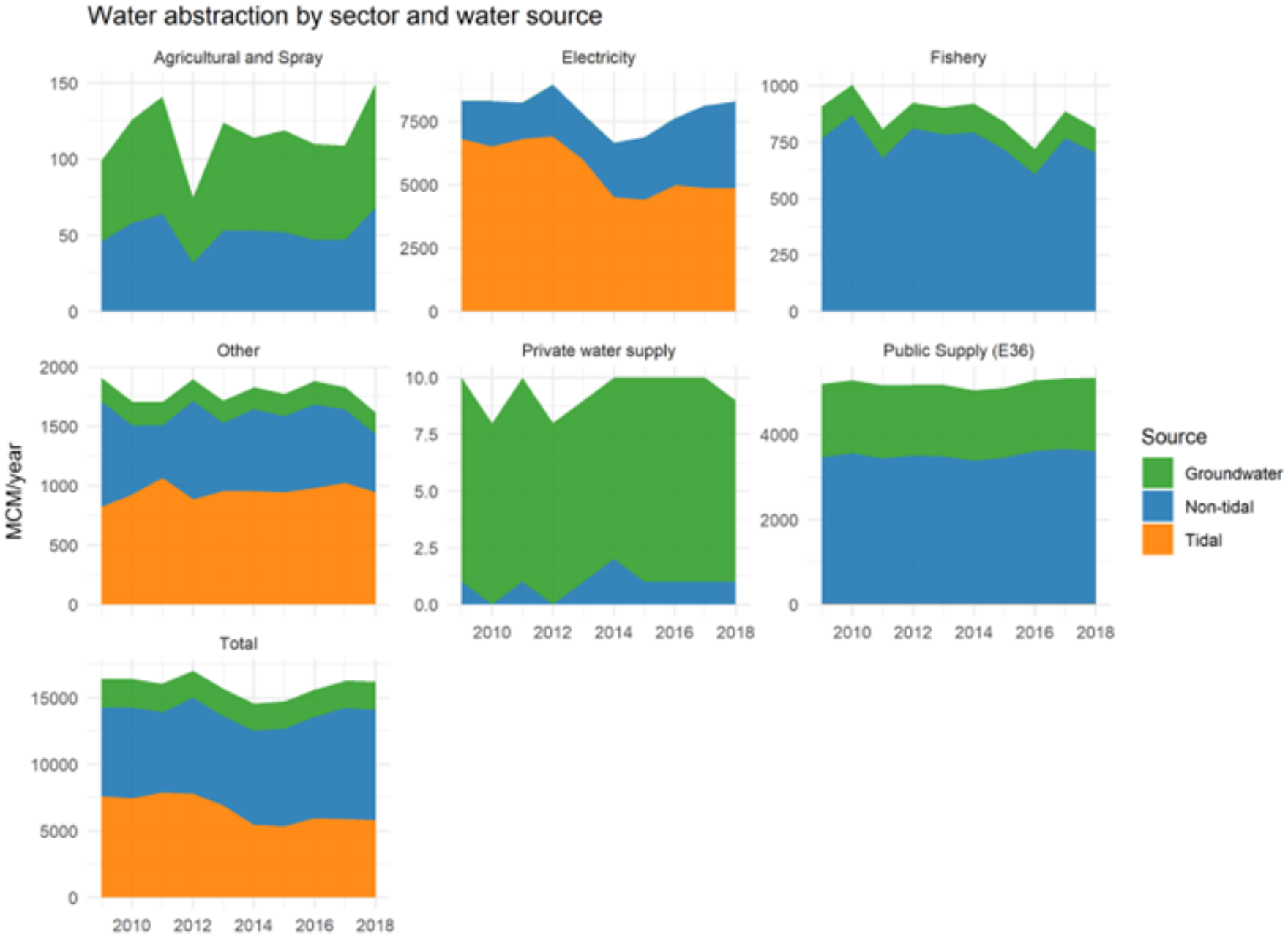
3. Water provisioning ecosystem service (1)



Source: Defra abstraction statistics (available up to 2018).

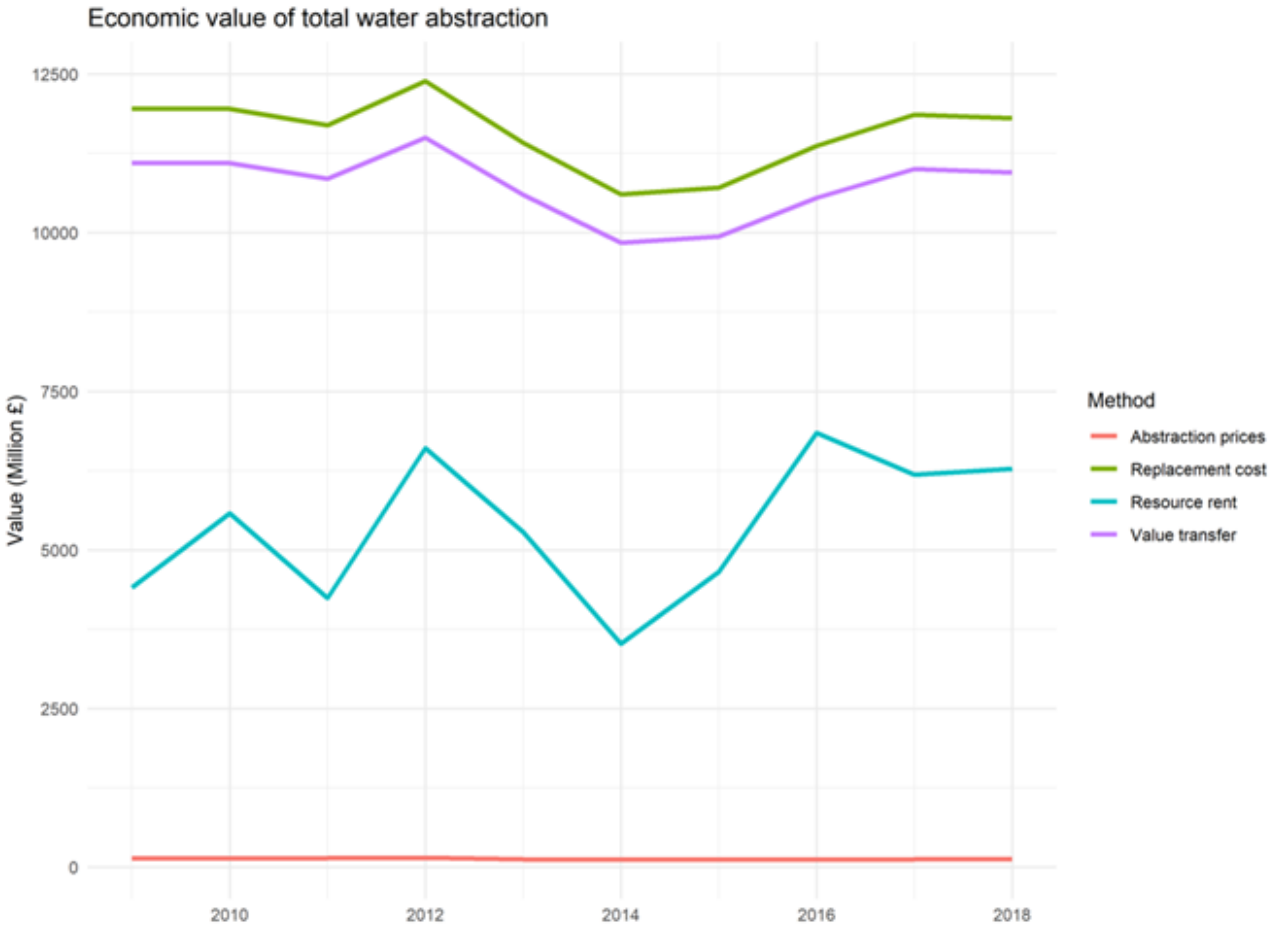
3. Water provisioning ecosystem service (2)



Source: Defra abstraction statistics (available up to 2018).

4. Water provisioning ecosystem service, valuation

Monetary value of the water provisioning service according to the four alternative valuation methods by year (£2025).



The value of water

- Sector specific
- Spatial specific
- Source specific
- SEEA EA preferred methods might not be appropriate

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Summary of results

UK

- Implementation of SEEA EA water accounts is still in its infancy (UK work at frontier)
- Data fragmented across different agencies (including companies) with inconsistent time series and scope.
- Water extent: available quantities of water stable since 2007; total abstraction stable over 2010-2018, but reduced from tidal and increased from surface water sources;
- UK water use reduced by 15% over 2002-2023.
- Challenges ahead for both supply (reservoirs) and demand (more efficient use).
- Water condition: nitrates below relevant water standard; E. coli mainly above relevant standard. Challenge for (new) Bathing Waters designations.
- Water condition not much change – or improvement. Need to identify sources of pollution – emissions accounts
- Water ecosystem service valuation: different methods give fundamentally different results.
- Consistent time-series data are fundamental.
- Work so far is very much a first effort.

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Rationale and promise of water accounting, conclusions

UK

- SEEA EA water accounts as repository of information over time to formulate better regulatory frameworks and policy decisions
- Quantitative measurement about progress towards targets by computing a 'distance-to-target' measure, informing, for instance, the Office for Environmental Protection (OEP). Ongoing PhD work to calculate monetary value of closing 'distance-to-target' for water provisioning and condition
- Need harmonisation and cooperation between different agencies
- Consistent and timely time-series data are fundamental – needs extensive monitoring
- Call for valuing water across UK economic sectors as a fundamental task for the future

Worldwide

- SNA 2025 more oriented to natural capital
- Include the value of water in macroeconomic models
- UN SEEA CF updates forthcoming
- SEEA Water Valuation Guidance Note forthcoming

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Thank you.

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