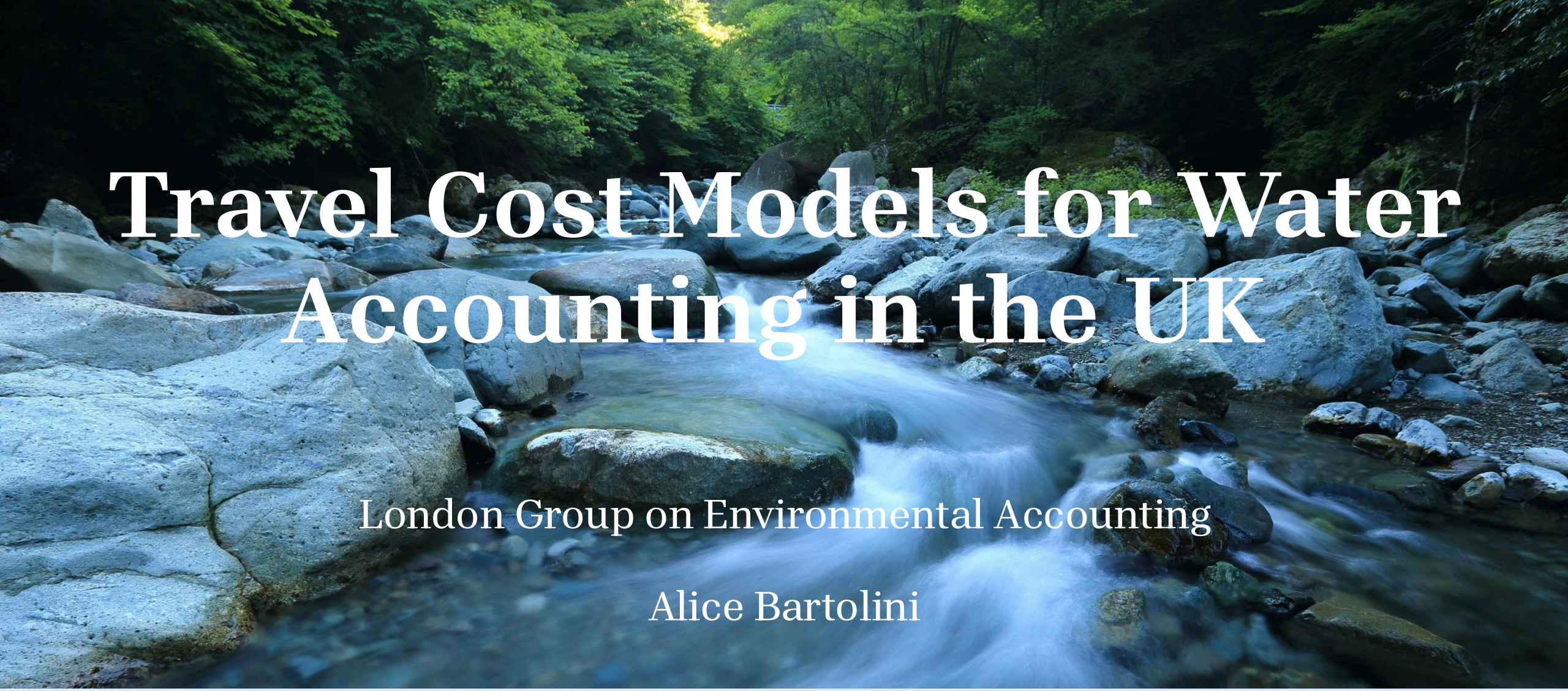


Travel Cost Models for Water Accounting in the UK

London Group on Environmental Accounting

Alice Bartolini

ESCoE project: Measurement of natural capital

Application of the SEEA EA framework to freshwater resources in the UK.

Why water?

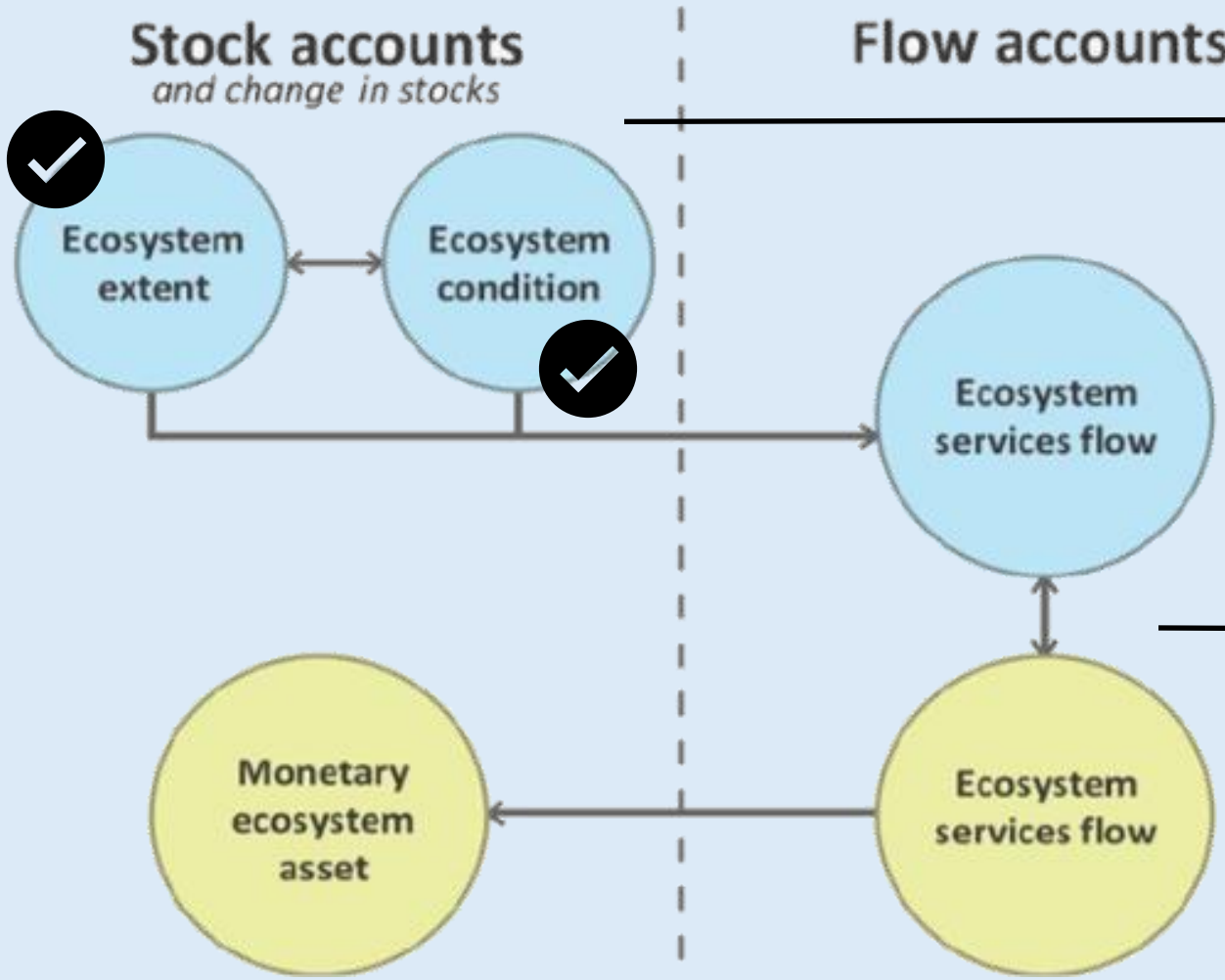
Water is vital and represents a critical input for various sectors.

It is only partially covered by the UK ONS Natural Capital Accounts.

Check out our work

https://www.escoe.ac.uk/projects/measurement-of-natural-capital/

Up-to-date progress



Preliminary accounts for England + regional level (NUTS1)

- Water provisioning
- Water purification
- Water-based recreation
- Scientific interaction with freshwater

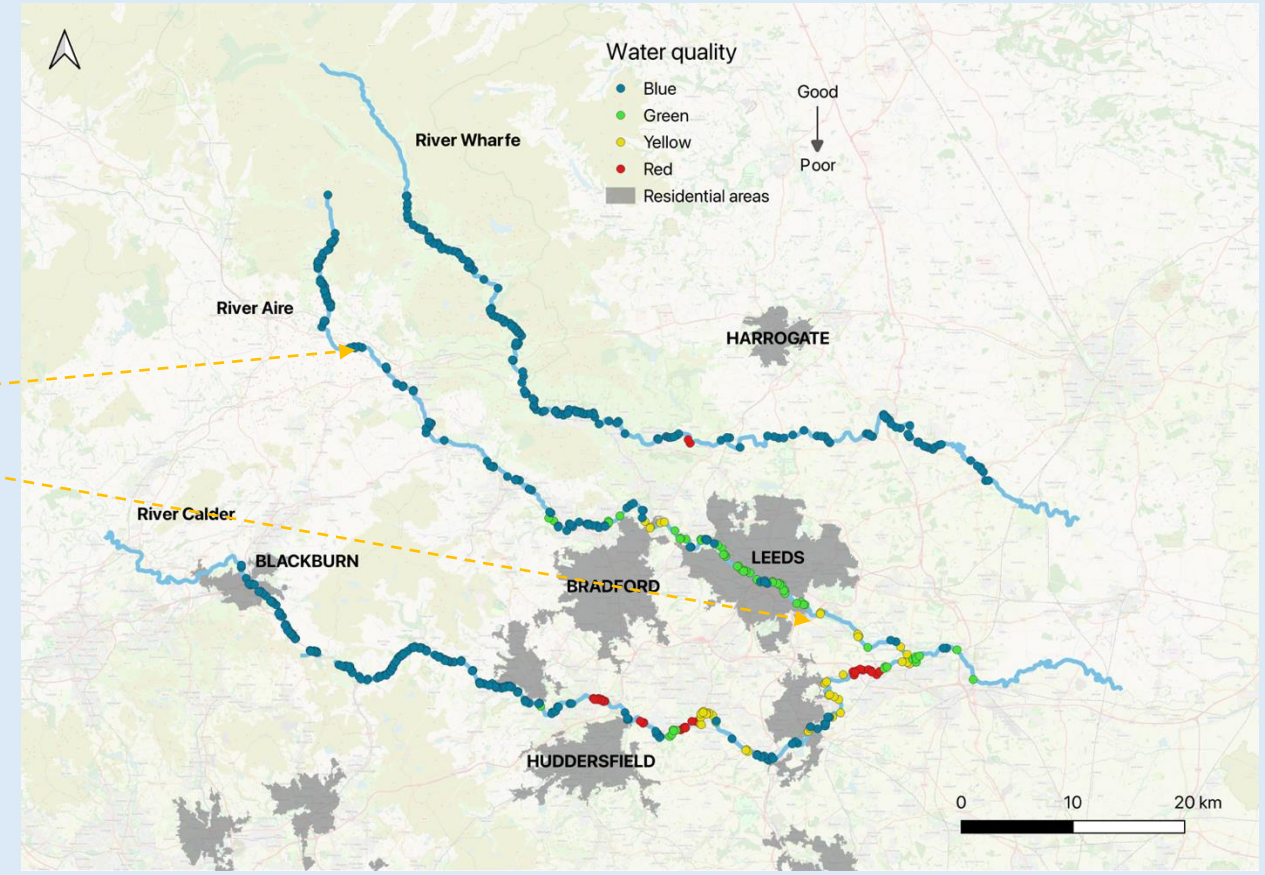
Welfare or Exchange Values? A Multisite Travel Cost Approach for Ecosystem Accounting

Alice Bartolini, Silvia Ferrini, Carlo Fezzi

Multisite travel cost

Random Utility Model (RUM) framework (McFadden, 1974). Modelling the choice of visiting a site as a function of its attributes, estimating the demand for a **set of recreational sites** with varying characteristics (Haab and McConnell, 2002).

Pub, church, parking, **ecosystem quality**



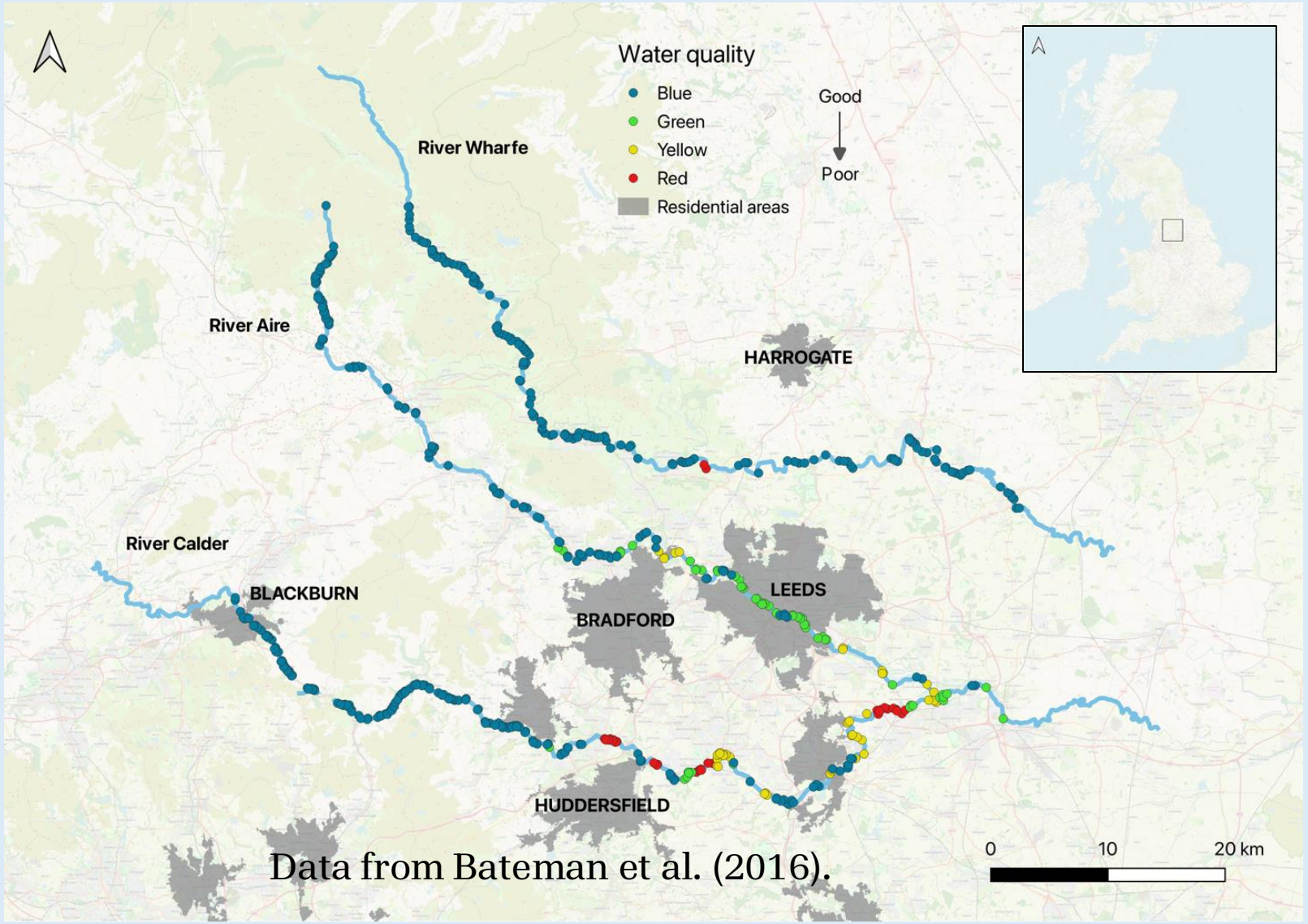
Methodology

1. Identify the role of site characteristics in determining the current probabilities of visiting target sites by estimating a multisite RUM, selecting the appropriate specification;

2. Build a scenario in which environmental conditions of these sites are degraded, and they do not provide any RES;

3. Determine the reduction in target sites' access price required to offset the impact of the ecosystem degradation.

Empirical analysis: Wharfe, Aire and Calder rivers



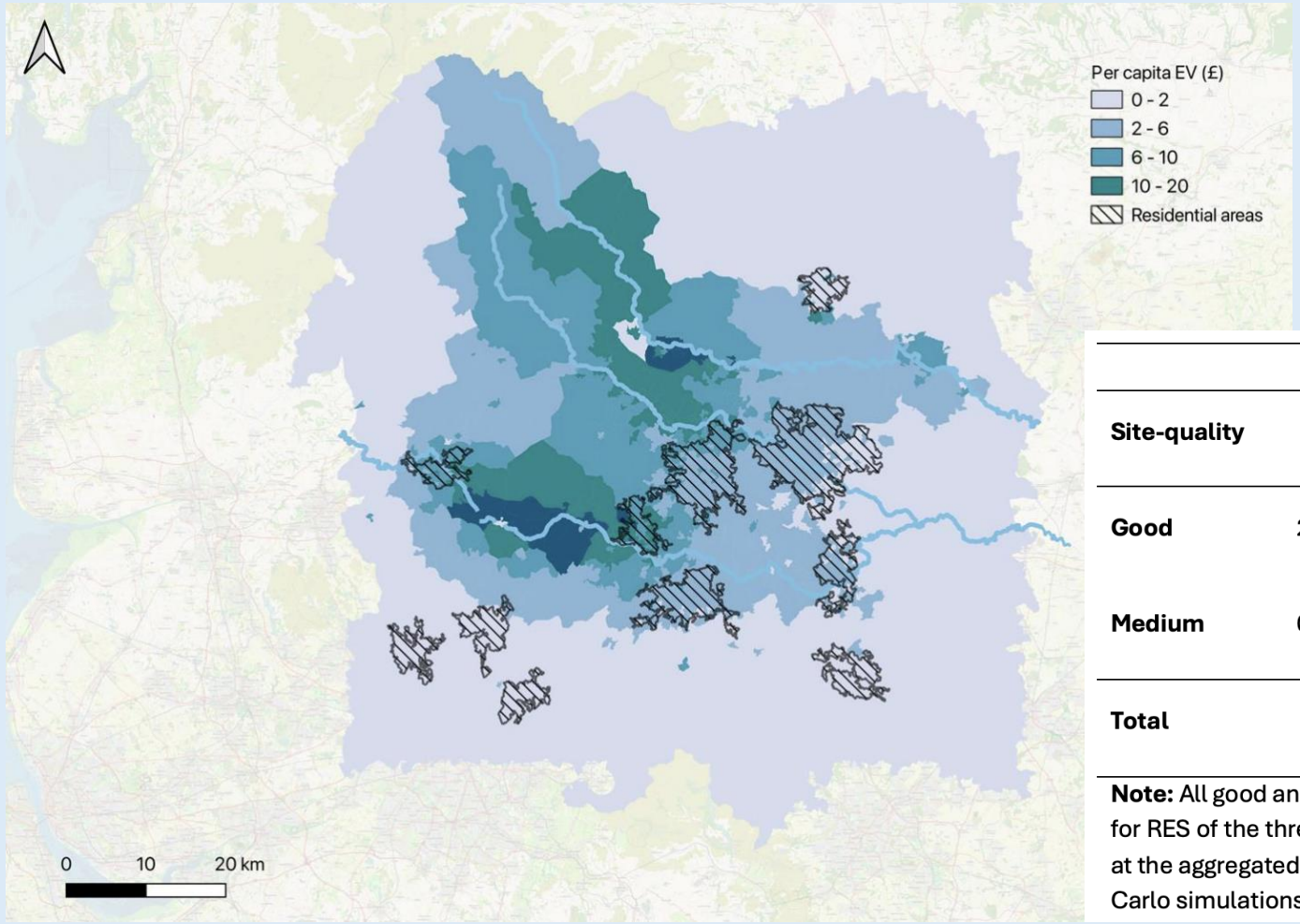
Data from Bateman et al. (2016).

531 recreational access sites
1781 respondents

Model estimates

	Model 1		Model 2	
Variable	Coeff.	SE	Coeff.	SE
Access price (Travel expenditures to reach the recreational site, £)	-0.373***	0.003	-0.376***	0.003
Sample Site (ASC = 1 if the site is included in the sampled access sites)	-7.370***	0.013	-7.508***	0.016
Other River (ASC = 1 if the site is not included in the sampled access sites)	-4.417***	0.012	-4.417***	0.012
Canal (ASC for canals)	-3.816***	0.009	-3.816***	0.009
Lake (ASC for lakes)	-4.128***	0.010	-4.128***	0.010
Other Recreational Sites (ASC for other outdoor recreational sites)	-2.805***	0.005	-2.805***	0.006
Medium WQ (=1 if the site is medium quality)			-0.862***	0.028
Poor WQ (=1 if the site is poor quality)			-1.010***	0.027
Urban (=1 if surrounding area is prevalently urban)			0.453***	0.015
Waterfall (=1 if waterfall nearby)			1.015***	0.132
Camping (=1 if camping nearby)			0.966***	0.072
Arch (=1 if archaeological site)			0.259***	0.034
Parking (=1 if car parking available nearby)			-0.478***	0.045
Golf (Number of golf club nearby)			0.683***	0.040
Pub (=1 if pub nearby)			0.255***	0.031
Sewage (=1 if sewage works nearby)			-1.950***	0.120
Church (Number of churches nearby)			0.372***	0.010
LogLik	-488948		-485429.4	
Pseudo R^2	0.880		0.881	

Empirical analysis: results



		In-sample		Population	
Site-quality	**ΔP (£)**	**Visits ('000)**	**Exchange Value ('000 £)**	**Visits (million)**	**EV (million £)**
Good	2.68 [2.54; 2.82]	18.07	48.48 [43.9; 49.5]	7.71	20.70 [19.6;21.8]
Medium	0.39 [0.19; 0.60]	1.42	0.55 [0.3; 0.8]	1.24	0.48 [0.2;0.7]
Total	-	19.49	49.03 [46.2; 51.9]	8.96	21.18 [19.8;22.5]

Note: All good and medium-quality sites of the study area are degraded to poor to estimate the exchange value for RES of the three rivers. Number of visits and exchange values are reported both at the on-sample level and at the aggregated level. In the square brackets, we report 95% confidence intervals computed via 10000 Monte Carlo simulations.

Concluding remarks

- Extend Multisite TC framework as a pricing tool for EA.
- Account for ecosystem condition in ES assessment (La Notte et al., 2022, Pisani et al., 2024).
- The approach depends on data availability. What if recreation data are collected according to single-site frameworks?

Comparative travel expenditure method

- Builds on the single site travel-cost method to estimate the travel expenditures directly attributable to RES.

- By comparing the recreation demand of two sites with different ecosystem conditions, we estimate the difference in price driven by the differences in ecosystem conditions, isolating the exchange value of RES.

- The methodological paper is under review, and we are testing the approach on large UK recreational datasets (e.g., EA bathing water on coastal recreation, People and Nature survey).

Thank you!

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