R3: Local Climate Regulation

Ecosystem Service Definition

Cooling effects of vegetation and water, in particular in urban areas where these can reduce heating and cooling costs and provide areas of shade.

Baseline Methods & Rationale

A non-relational dataset was produced to map the Local Climate Regulation ecosystem service baseline within Gloucestershire. The rationale for not selecting a modification layer for the Local Climate Regulation baseline was (i) the absence of an available dataset that could be used as a spatial modifier for the ecosystem service and (ii) the complexity of interaction between a habitat's spatial configuration and its ability to regulate climate on a local scale.

Opportunity Methods & Rationale

A relational dataset was also produced to map the Local Climate Regulation ecosystem service opportunity. The opportunity output was produced by subtracting each value from the maximum value in the dataset, so the lowest scoring baseline cells are the highest scoring for opportunity. Cells which fell outside of 250 m of an urban area were multiplied by zero (Table R2.1). Urban and non-urban areas were identified using Ordnance Survey (2020) Open Zoomstack data.

Table R3.1: Multiplier values applied for intersecting and non-intersecting habitats

Class	Multiplier
Urban or within 0.25 km of urban areas	1
Non-Urban	0

Limitations and Further Development

Urban trees (and green roofs and green walls) are not well-represented in the natural capital maps and their current impact on local climate regulation may be underrepresented in the outputs. Datasets mapping these features could be a valuable inclusion into future work. Traffic data could also be used in conjunction with urban tree locations to further account for variations of localised heating within the urban environment.

In addition, the baseline ability of a habitat to deliver the local climate regulation ecosystem service is likely to be enhanced where the habitat is in proximity to surfaces that radiate heat (i.e. urban sealed surface). Consequently, proximity of a habitat to urban areas may form the basis of a meaningful baseline modifier dataset. Demand for air pollutant removal is greatest in residential areas (Smith, 2020). In recognition of this, future work should consider classifying urban areas to general categories (e.g. commercial, industrial, residential) to recognise different levels of demand for the ecosystem service within urban areas. Population density may also be used as a proxy for approaching ecosystem service demand in urban areas.

References

Ordnance Survey, 2020. OS Open Zoomstack. Available at: https://www.ordnancesurvey.co.uk/ business-government/products/open-zoomstack

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R3: Local Climate Regulation baseline, unmodified

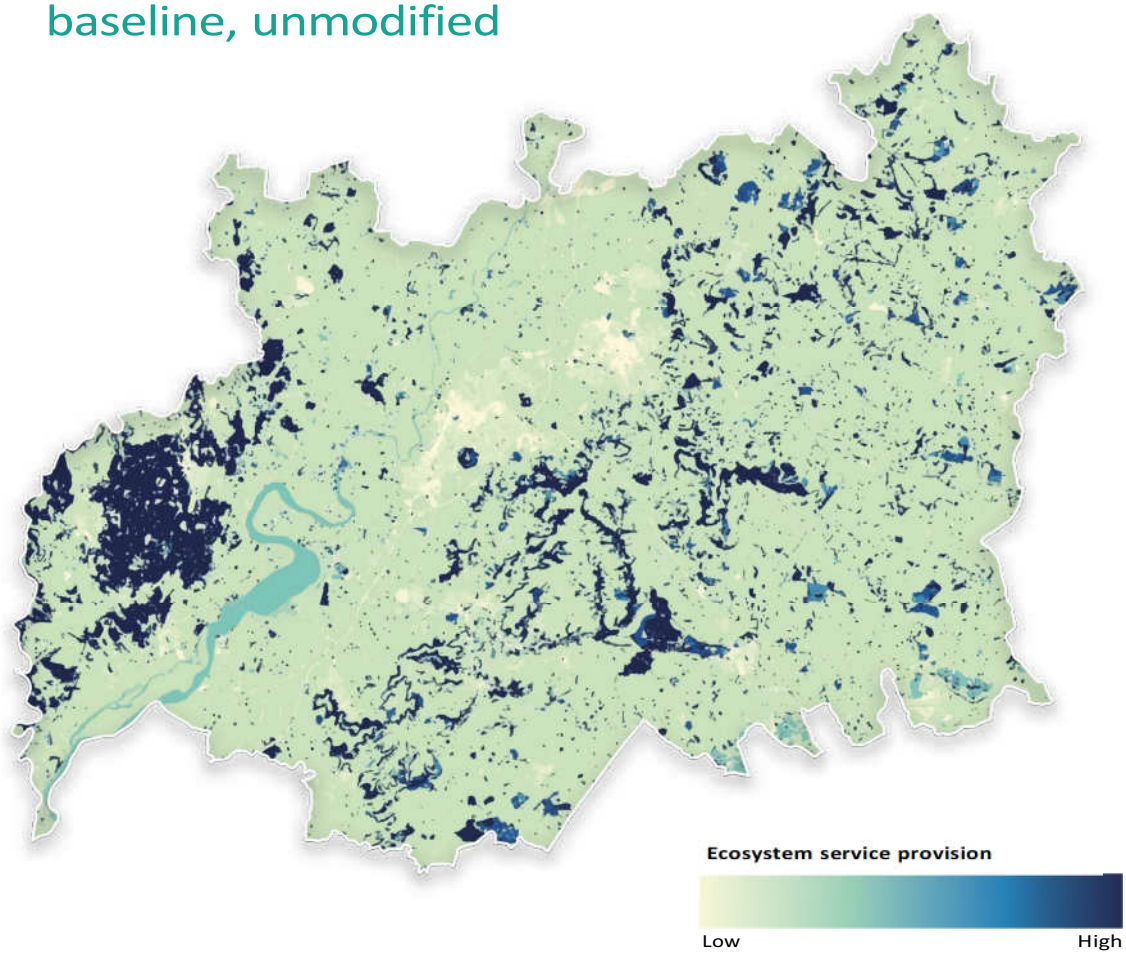

Figure R3.1: Local Climate Regulation Baseline (non-relational)

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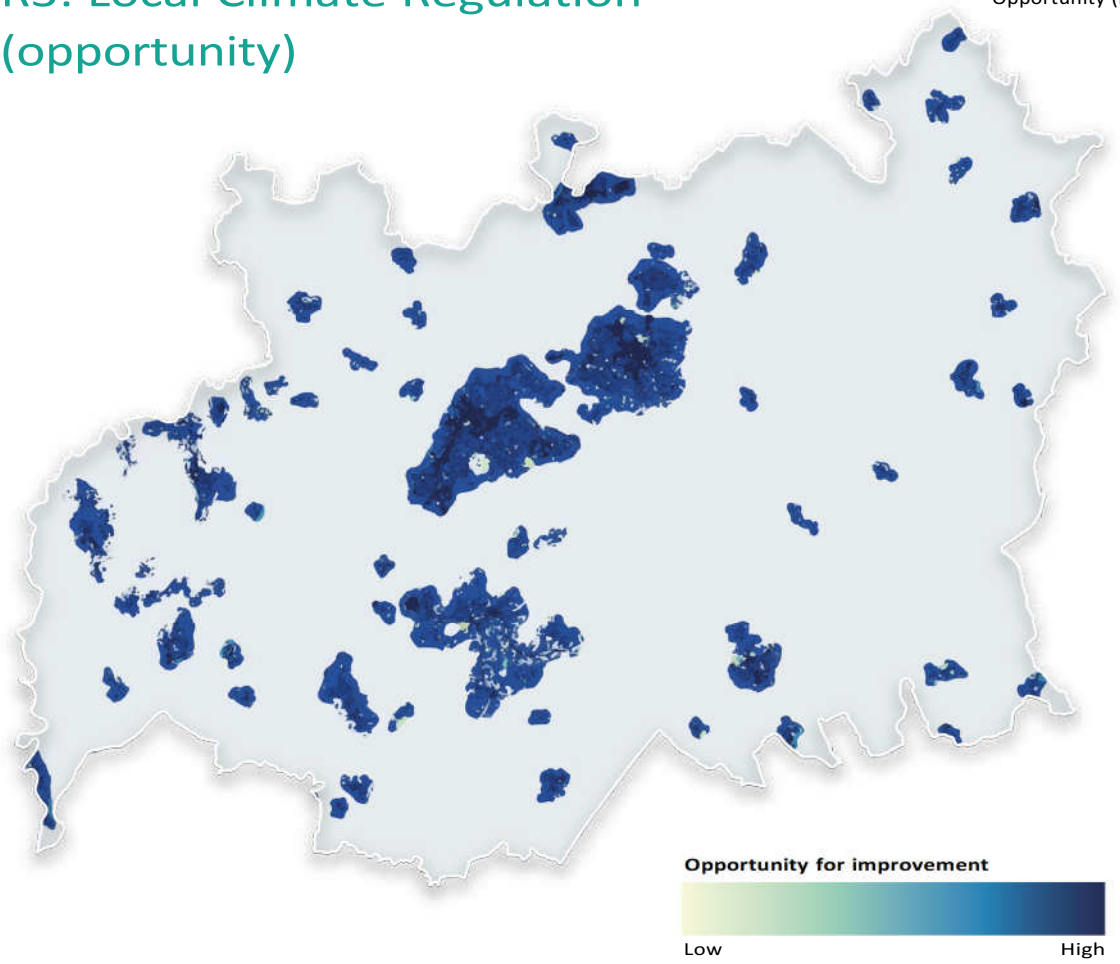
R3: Local Climate Regulation (opportunity)

Figure R3.2: Local Climate Regulation Opportunity (relational)



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