R4: Air Pollutant Removal

Ecosystem Service Definition

Effect of vegetation on concentrations of air pollutants through mechanisms including deposition, absorption, and chemical breakdown.

Baseline Methods & Rationale

A non-relational dataset was produced to map the Air Pollutant ecosystem service baseline within Gloucestershire. During the habitat service scoring process, each habitat classification was scored on its ability to remove general air pollutants, rather than focusing on individual pollutants. The rationale for not selecting a modification layer for the Air Pollutant baseline was the absence of an available dataset that could be used as a spatial modifier for the ecosystem service, although it is recognised that the ability of a natural capital asset to provide the service is influenced by spatial factors.

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 300m (Natural England, 2016) of an urban or regional or national road were multiplied by zero (Table R4.1). Urban areas and roads were identified using Ordnance Survey (2020) Open Zoomstack data.

Table R4.1: Multiplier values applied for intersecting and non-intersecting habitats

Class	Multiplier
Urban or within 0.3km of regional and national roads and urban areas	1
Non-Urban	0

Limitations and Further Development

It has been assumed that national and regional roads and urban areas are the major sources of air pollution within Gloucestershire. However, there are likely to other sources – both point and diffuse – that have not been accounted for in this analysis. These may include nitrogen emissions from arable land and point source emissions from industrial sources. These could be included in future analysis, should suitable data be available.

The value used to determine the buffer distance from roads and urban areas is based on values from nitrogen oxide (NOx) emissions, the behaviours of other atmospheric pollutants (e.g. carbon dioxide) is likely to vary. Future work could account for this by allocating pollutants to each source and producing a buffer value from these sources based on the specific pollutants. As discussed under 'R3: Local Climate Regulation', demand for air pollutant removal is greatest in residential areas (Smith, 2020) with opportunities for future work consider classifying urban areas to broad classes (e.g. commercial, industrial, residential) to recognise variations in demand for the air pollutant removal within urban areas. Population density may also be used as a proxy for this.

Main report DOI: 10.32071/ES.TD.011120

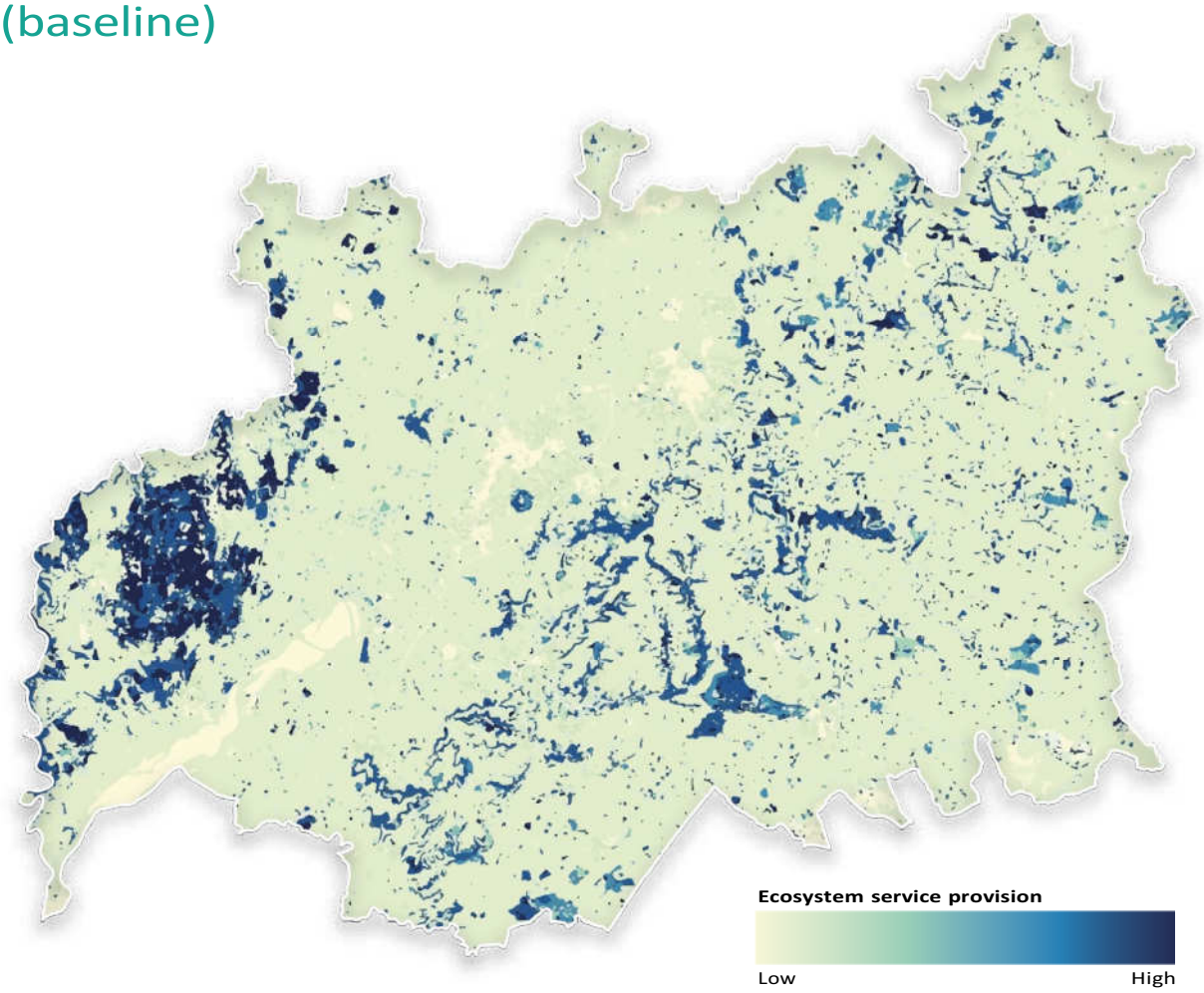
References

Natural England, 2016. The ecological effects of air pollution from road transport: an updated review. Ricardo AEA, Harwell, Didcot.

Smith, A., 2020. Natural capital in Oxfordshire: Short report. Environmental Change Institute, University of Oxford.

Figure R4.1: Air Pollutant Removal Baseline (non-relational)

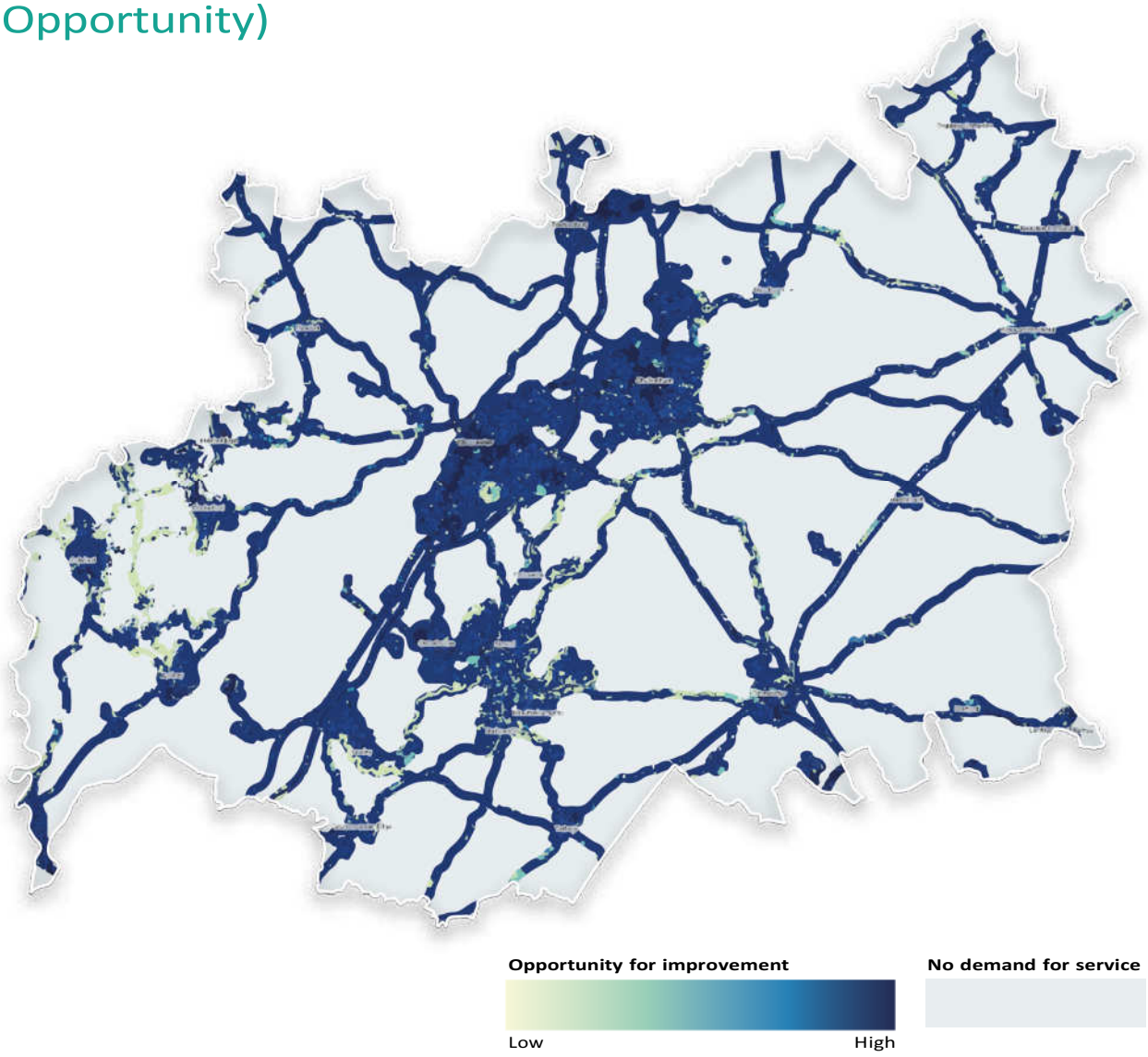
R4: Air Pollutant Removal (baseline)



Main report DOI: 10.32071/ES.TD.011120

Figure R4.2: Air Pollutant Removal Opportunity

R4: Air Pollutant Removal (Opportunity)



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