

## C1: Recreation

### Ecosystem Service Definition

Provision of green and blue spaces that can be used for any recreational leisure activity e.g. walking, cycling, running, picnicking, camping, boating, games or relaxing.

### Baseline Methods & Rationale

A relational dataset was produced to map the Recreation ecosystem service baseline within Gloucestershire. The rationale for selecting a modification layer for the baseline was in recognition that accessibility of land strongly influences the extent to which the Recreation ecosystem service is captured by people. The methods detailed below were derived from the Natural Capital in Oxfordshire study (Smith, 2020).

Land classed as ‘open’ was identified through land covered under Countryside Rights of Way Act (Natural England, 2020), National Trust open land, and land within the Outdoor Recreation Valuation (ORVal) dataset (Day and Smith, 2018).

Land classed as ‘semi-restricted’ was identified through applying a buffer of 50m to public rights of way within the county. These were identified through a combination of the ORVal path data (Day and Smith, 2018), Sustrans path network data (Sustrans, 2020), and Gloucestershire public right of way data. Community growing spaces and allotments, as well as limited access sports clubs (i.e. bowling greens, tennis courts, and other sport facilities) identified through Ordnance Survey (OS) Open Greenspace data (OS, 2020) and limited access National Trust land were also classed as ‘semi-restricted’. Surface water was also classed as ‘semi-restricted’ access, as it can be used for water-based recreation activities, however, has limitations to access through the requirement for equipment (e.g. for boating) or training (e.g. for swimming).

Land classed as ‘restricted’ was classed as sports clubs where membership is more expensive (e.g. golf clubs) – these were also identified through the Open Greenspace data (OS, 2020).

Table C1.1: Weights assigned for modification of the recreation baseline dataset

Land Access Class	Modifier
Open	1.00
Semi-Restricted	0.75
Restricted	0.50
Other	0.00

**Opportunity Methods & Rationale**

To produce a relational recreation opportunity dataset, the inverse of the baseline dataset was modified by index of multiple deprivation (IMD) data at the lower-layer super output area (LSOA) level. The rationale for using IMD data is that in areas of high deprivation individuals are likely to be less able to travel to access areas where the interaction with nature ecosystem service is provided.

The weighting factor applied to the IMD dataset was calculated by dividing the decile of IMD within a given LSOA by 10 and adding this value to one to produce a range of values from 0.1 to 1.0. Deciles scored 10 for the most deprived LSOAs, and 1 for the least deprived. These deciles were calculated based on data for the whole of England to ensure the outputs are compatible on a national scale, should these methods be applied elsewhere.

Table C1.2: Weights assigned for modification of recreation opportunity dataset (1st decile is least deprived, 10th most)

IMD Decile	Multiplier
1	0.1
2	0.2
3	0.3
4	0.4
5	0.5
6	0.6
7	0.7
8	0.8
9	0.9
10	1.0

Natural England’s Accessible Natural Greenspace Standard (ANGSt) was then used to identify areas that currently do not meet ANGSt requirements, with these areas subsequently being weighted by population density. This data identifies deficits in current access to green space, and thus, when combined with a proxy for ability of people to access local green space allows areas of demand for recreational green space to be identified. Here, areas of high deprivation (as per the index of multiple deprivations (IMD)) were used as a proxy for ability to travel.

ANGSt requirements specify that a given household should have access to one accessible natural greenspace of (i) at least 2ha within 0.3km of home, (ii) at least 20ha within 2km, (iii) at least 100ha within 10km of home, and (iv) at least 500ha within 10km. The standards also specify a minimum of 1ha of statutory Local Nature Reserve per 1000 population, although this is not factored into this analysis.

Table C1.3: Weights assigned for modification of the recreation baseline dataset

ANGSt Criteria Fulfilled	Modifier
0	1.0
1	0.8
2	0.6
3	0.4
4	0.0

### Limitations and Further Development

Gardens included as an additional ‘private’ land access category in the Oxfordshire report (as private land with a weight of 0.25), but not factored in here due to constraints in processing power.

As described in Section 2, cultural ecosystem service scores were clustered using K-nearest neighbour classification. Though this better reflects rural areas where the ability of a given natural capital asset (habitat) to provide a given ecosystem service is impacted by surrounding natural capital assets. A result of this, however, is that existing urban green space – often small parcels surrounded by low habitat service scores urban areas – is not fully represented in the classification.

This limitation applies to all four cultural ecosystem services and may be resolved through creating a composite eco-metric dataset, where rural areas are classified through K-nearest neighbour analysis, and urban areas remain unclassified as per the raw eco-metric dataset.

Future work may also investigate including population data to calculate the amount of Local Nature Reserves available per 1000 population.

### References

Day, B. H., and G. Smith, 2018. Outdoor Recreation Valuation (ORVal) User Guide: Version 2.0.

Land, Environment, Economics and Policy (LEEP) Institute, Business School, University of Exeter.

Ordnance Survey, 2020. OS Open Greenspace. Available at: <https://www.ordnancesurvey.co.uk/business-government/products/open-map-greenspace>

Natural England, 2020. CRoW Act 2000 - Access Layer. Available at: <https://data.gov.uk/dataset/05fa192a-06ba-4b2b-b98c-5b6bec5ff638/crow-act-2000-access-layer>

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

Sustrans, 2020. Sustrans’ Open Data. Available at: <https://data-sustrans-uk.opendata.arcgis.com/>

Figure C1.1: Recreation Baseline (relational)

## C1: Recreation (baseline, relational)

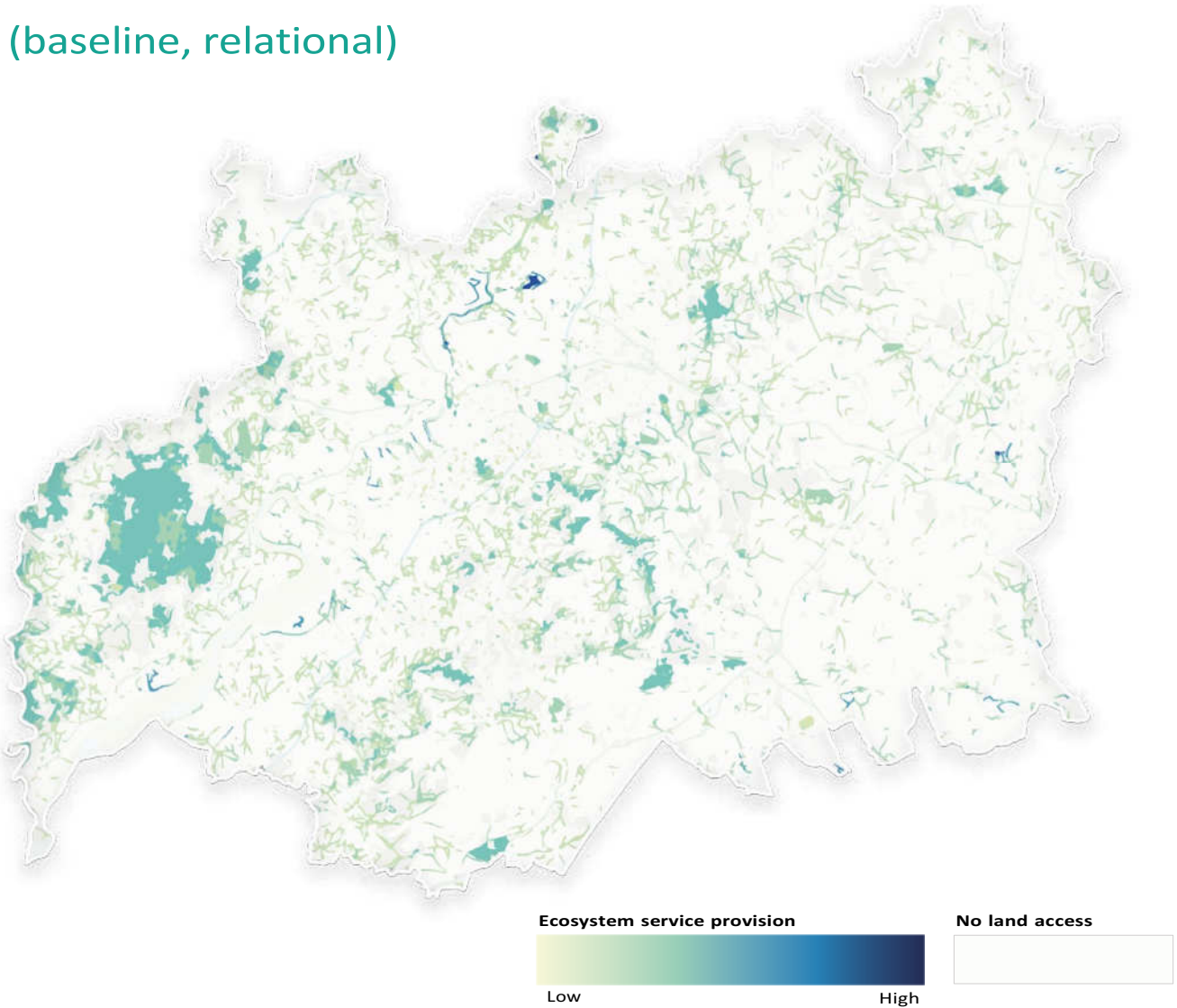


Figure C1.2: Recreation Opportunity (relational)

## C1: Recreation (opportunity)

