Health and the Urban Environment

Mapping Community Health in Relation to Urban Greenspace

Pete Dixon - TEP

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Two studies:

- **Spatial associations between greenspace and community health in two areas of the Northwest**
- **Assessing functionality of greenspace in areas of the East Midlands**

Implications for policy and planning

Looking to the future - greenspace, health and climate change

Environment Agency report 'Environmental Quality and Social Deprivation'

- deprived communities suffer worst air quality
- IPC sites and emissions are disproportionately located in deprived areas in England
- tidal floodplain populations in England are strongly biased towards deprived communities

Forestry Commission DUN land survey

- correlation between Derelict Underused and Neglected (DUN) land and Index of Multiple Deprivation (IMD)

Scotland and Northern Ireland Forum for Environmental Research (SNIFFER) Report 'Investigating Environmental Justice in Scotland'

- environmental quality is generally worse in deprived areas

Aims:

1. Can Environmental Deficit be measured, and mapped?
2. Is there a correlation between areas of Environmental Deficit and areas of social inequality – in particular health inequity
3. Where there is a correlation, what implications might this have for policy and intervention?

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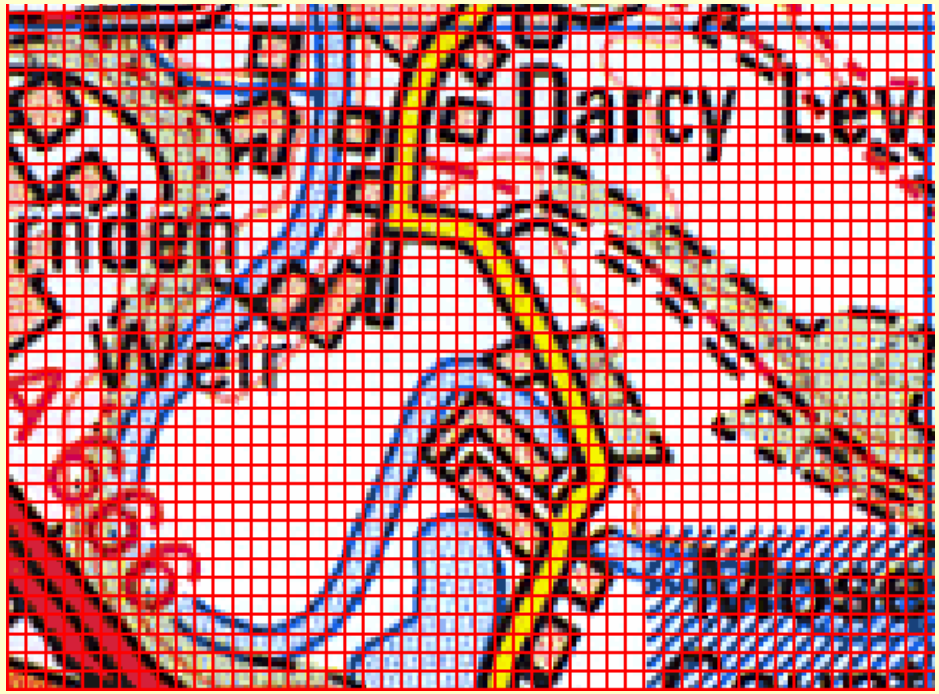
Bolton

Copeland

Study areas were split in to 20m rasters in a GIS, i.e. 20m by 20m grid squares covered the entire study area



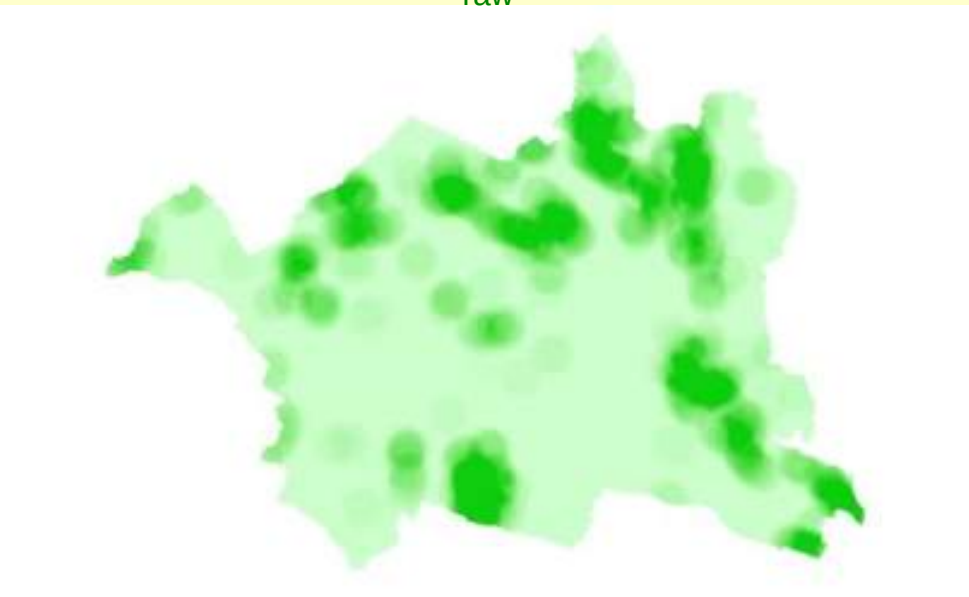
The density of environmental indicators could be calculated within a given distance of each 20m grid square

A large number of datasets used – Environment Agency, Forestry Commission, Bolton MBC, Copeland BC, Northwest Public Health Observatory, English Nature

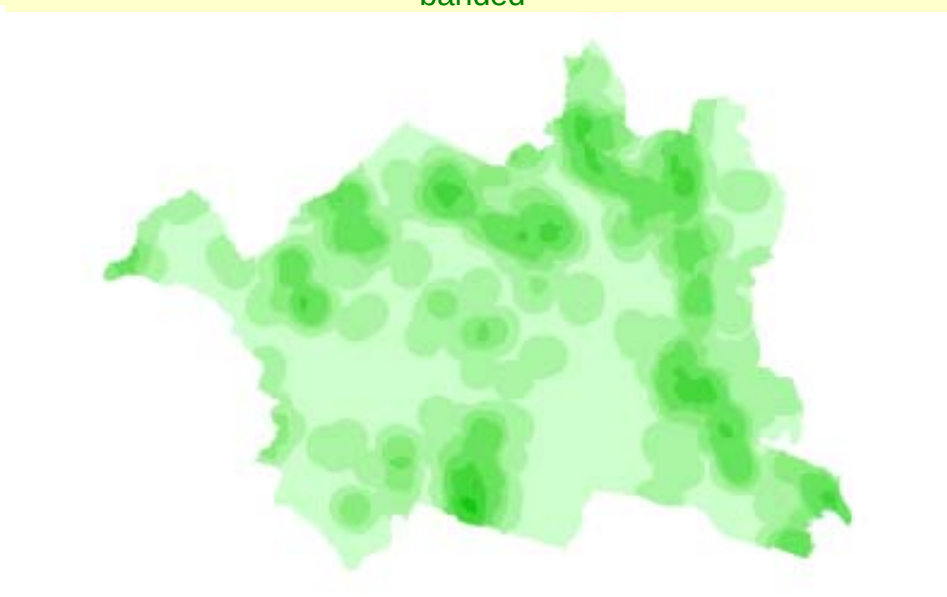
By using the 20m raster base, datasets can be combined

Raw data was ‘banded’ on a local authority basis to allow datasets to be combined

raw



banded



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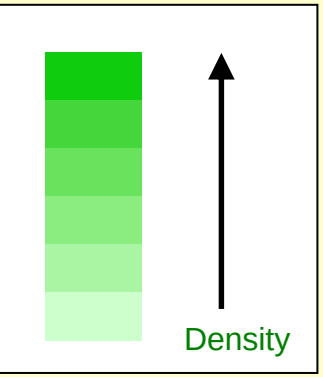
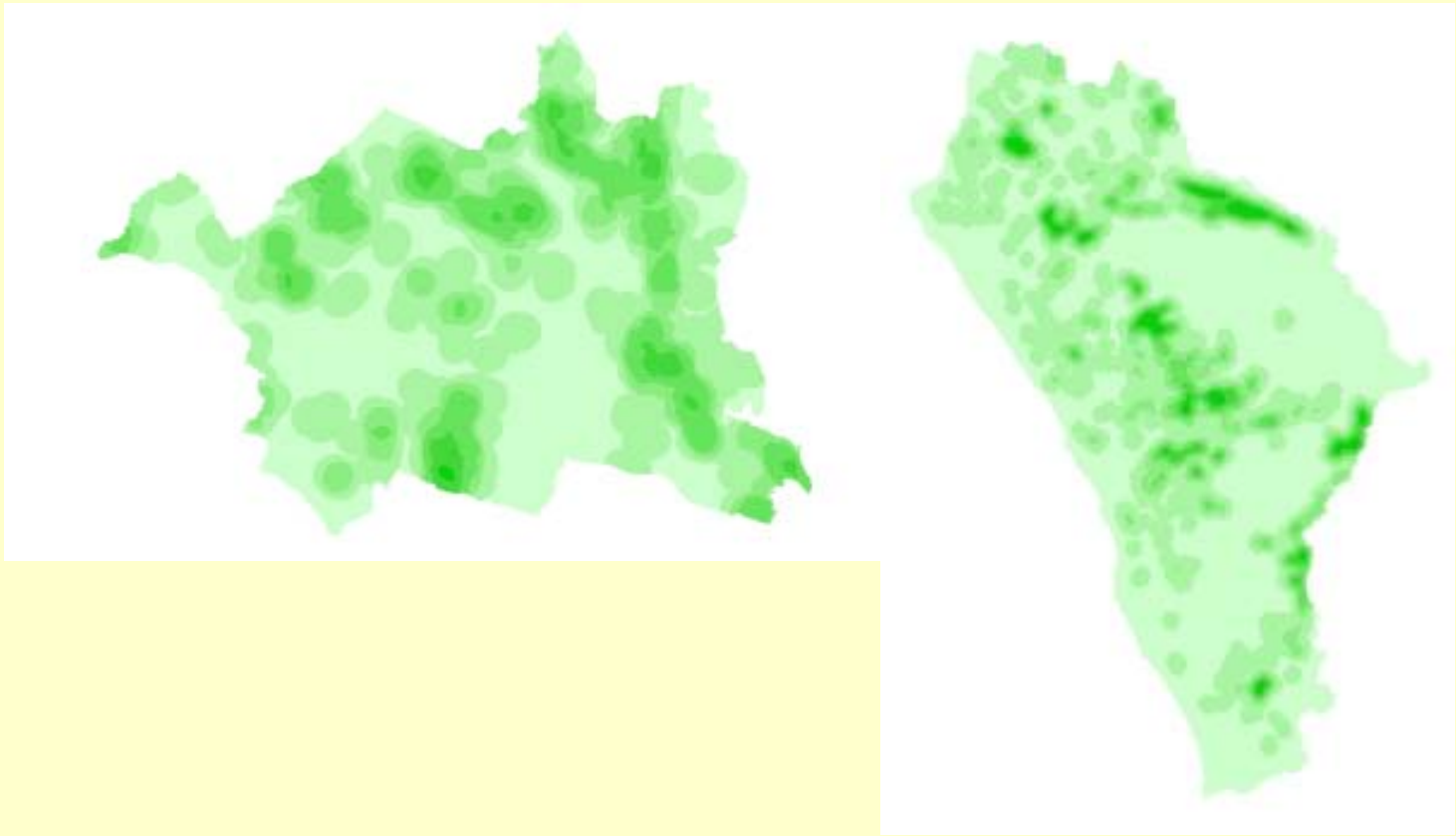
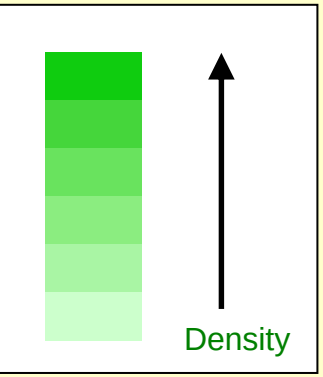
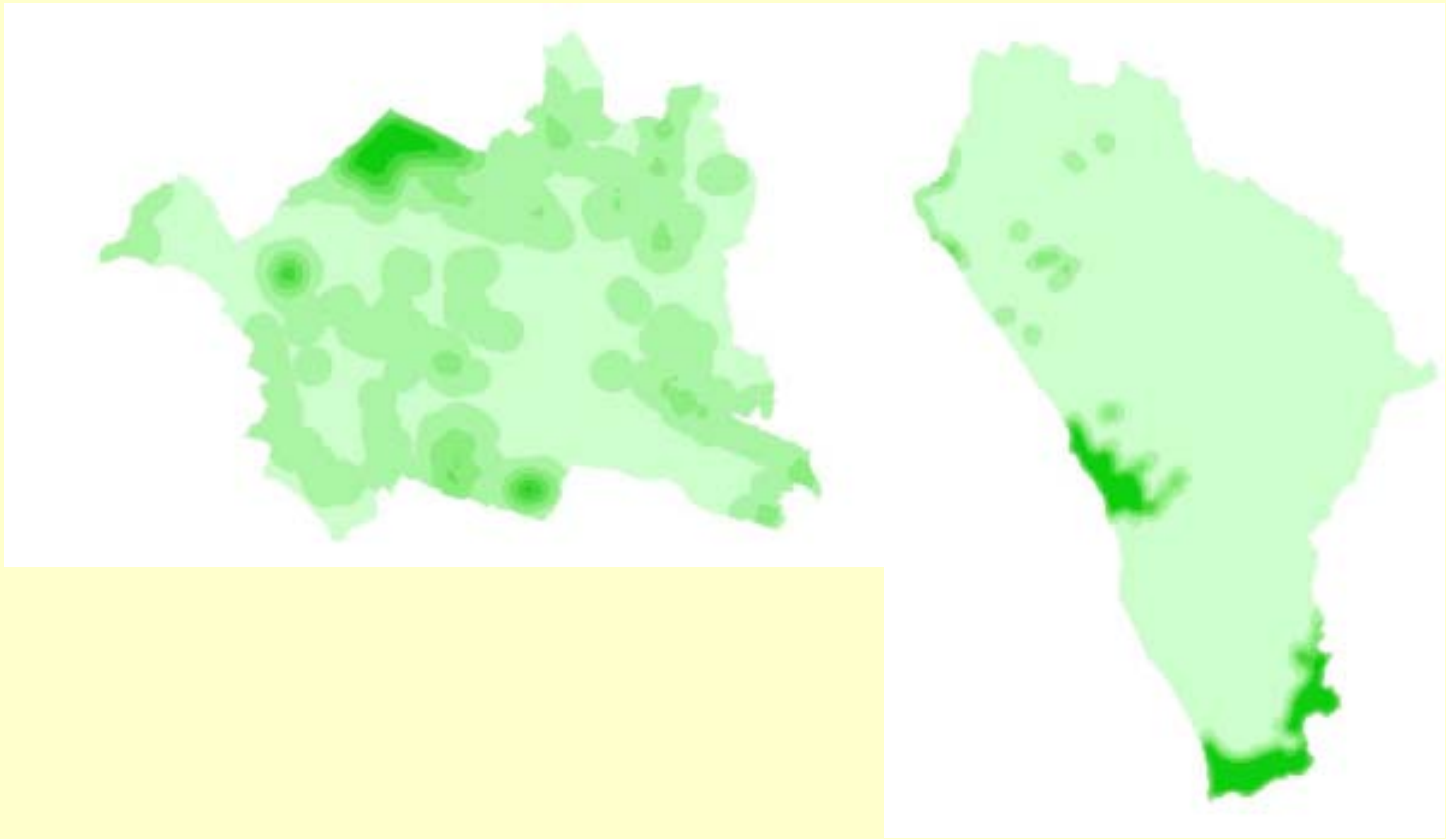
Woodland density





Designated sites density





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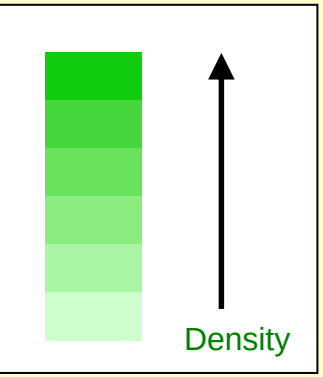
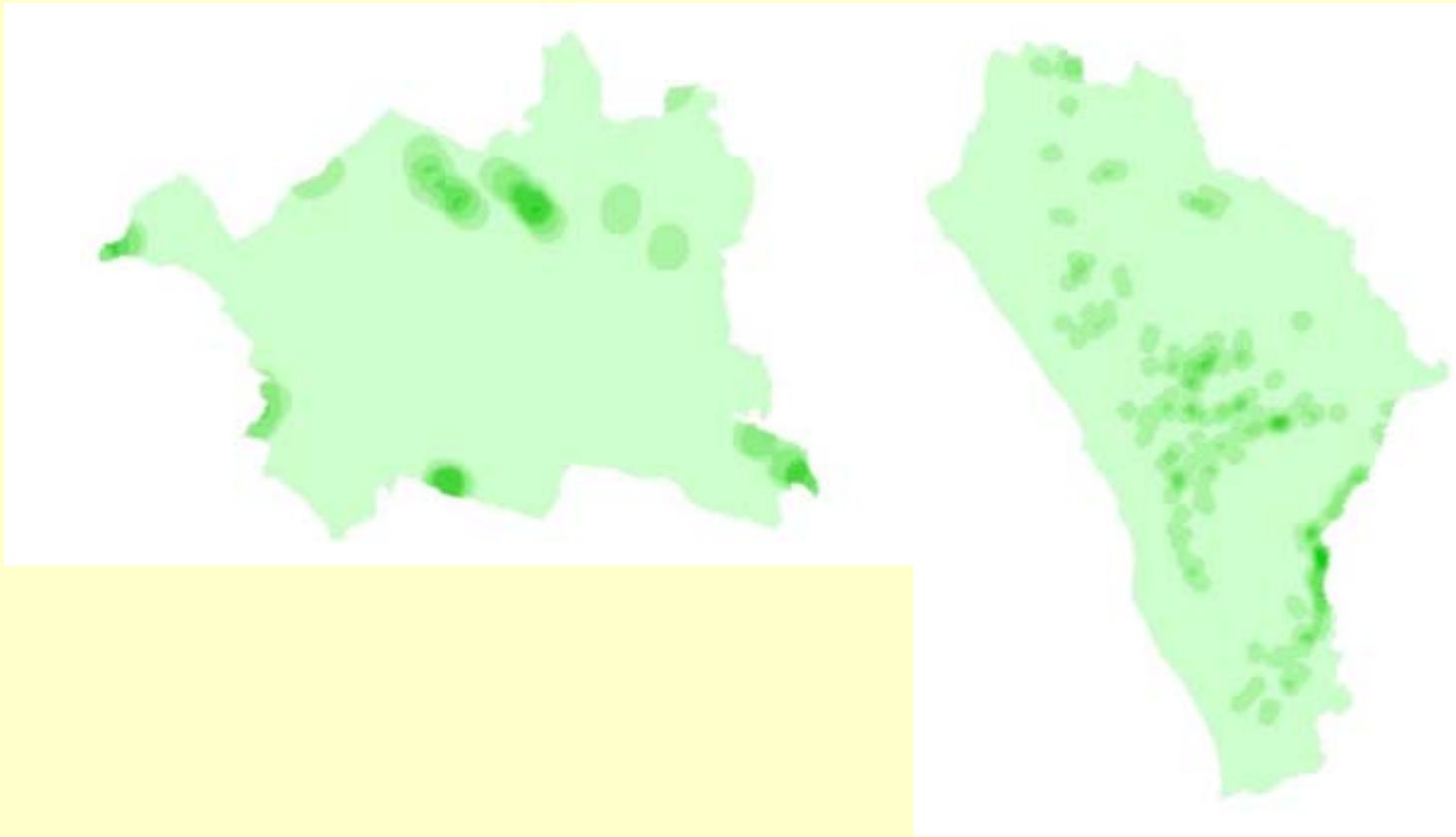
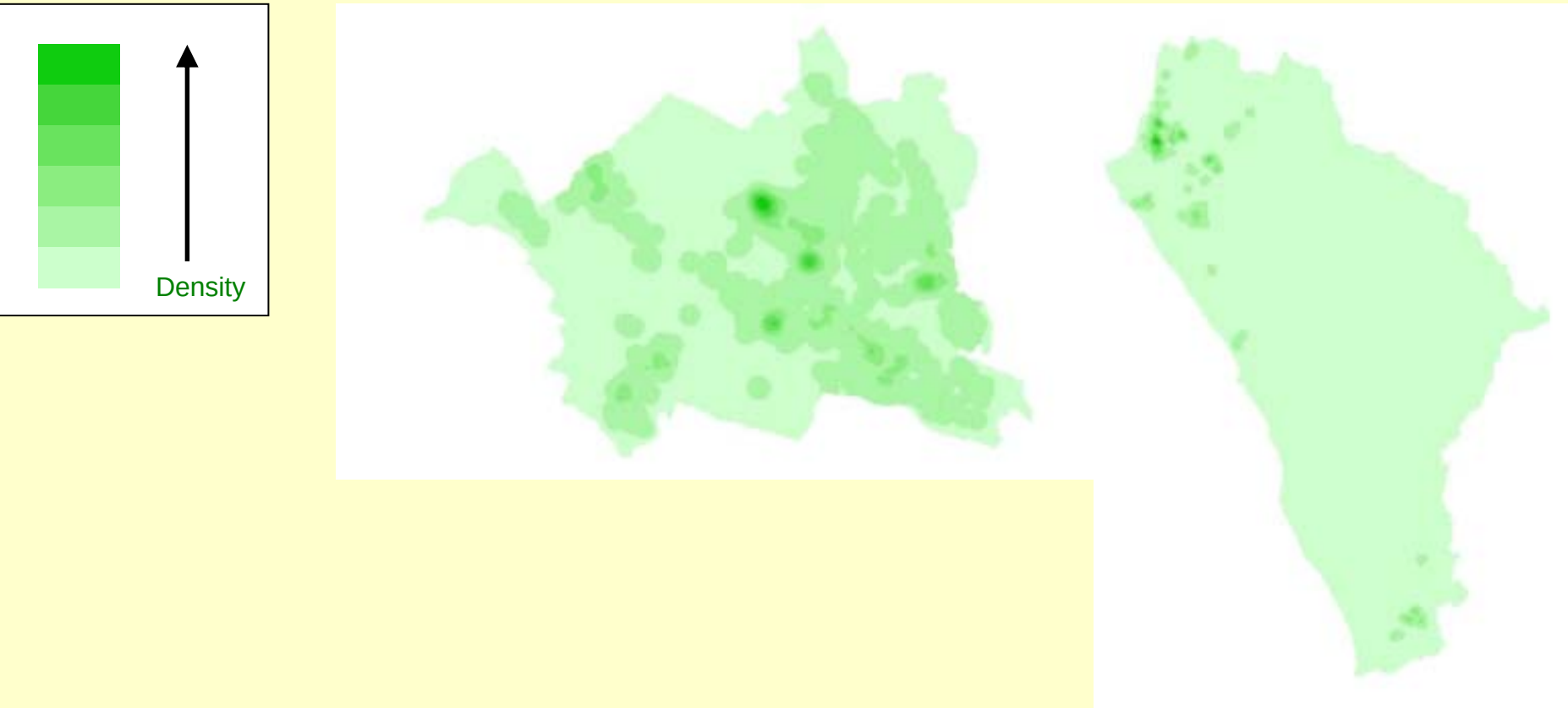
Ancient woodland density

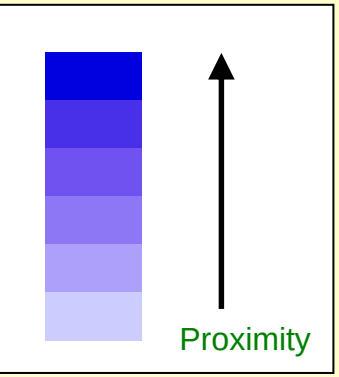


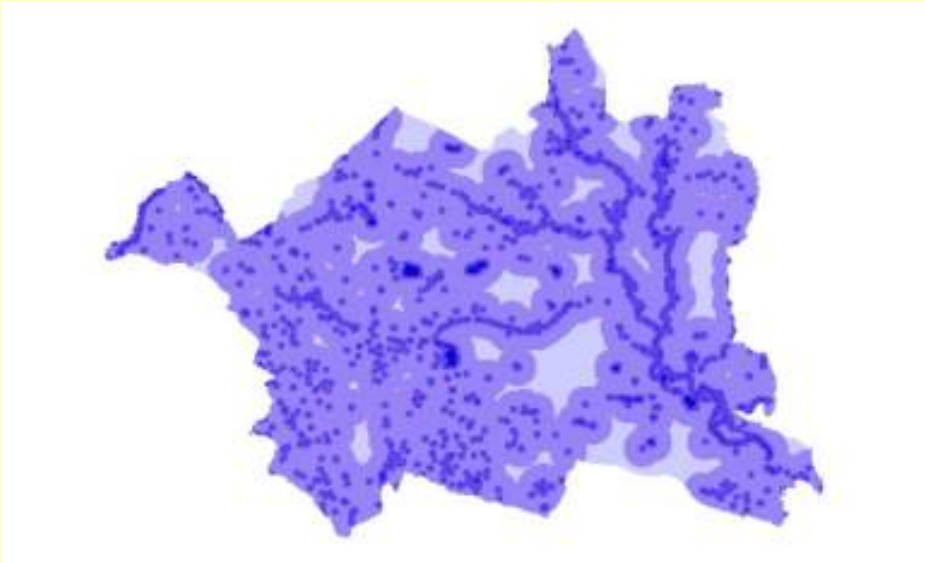


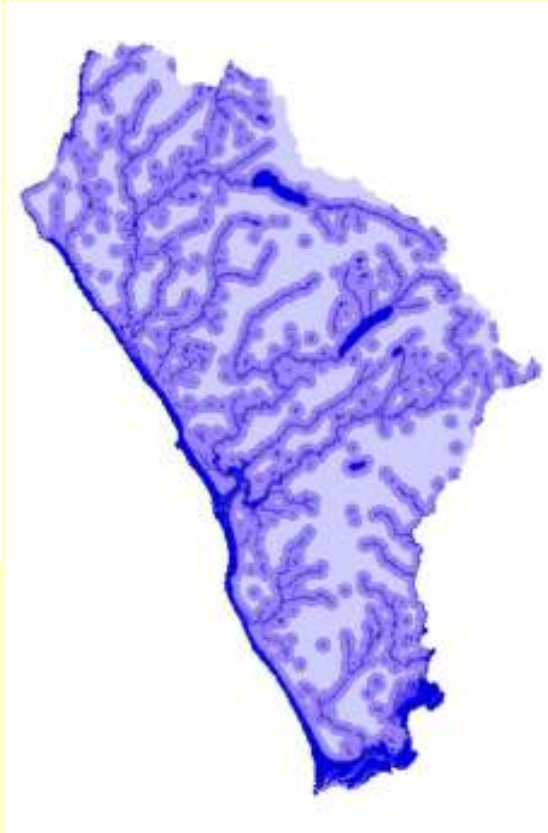
Recreation sites density



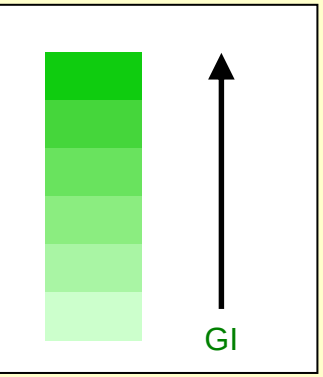
Proximity to water

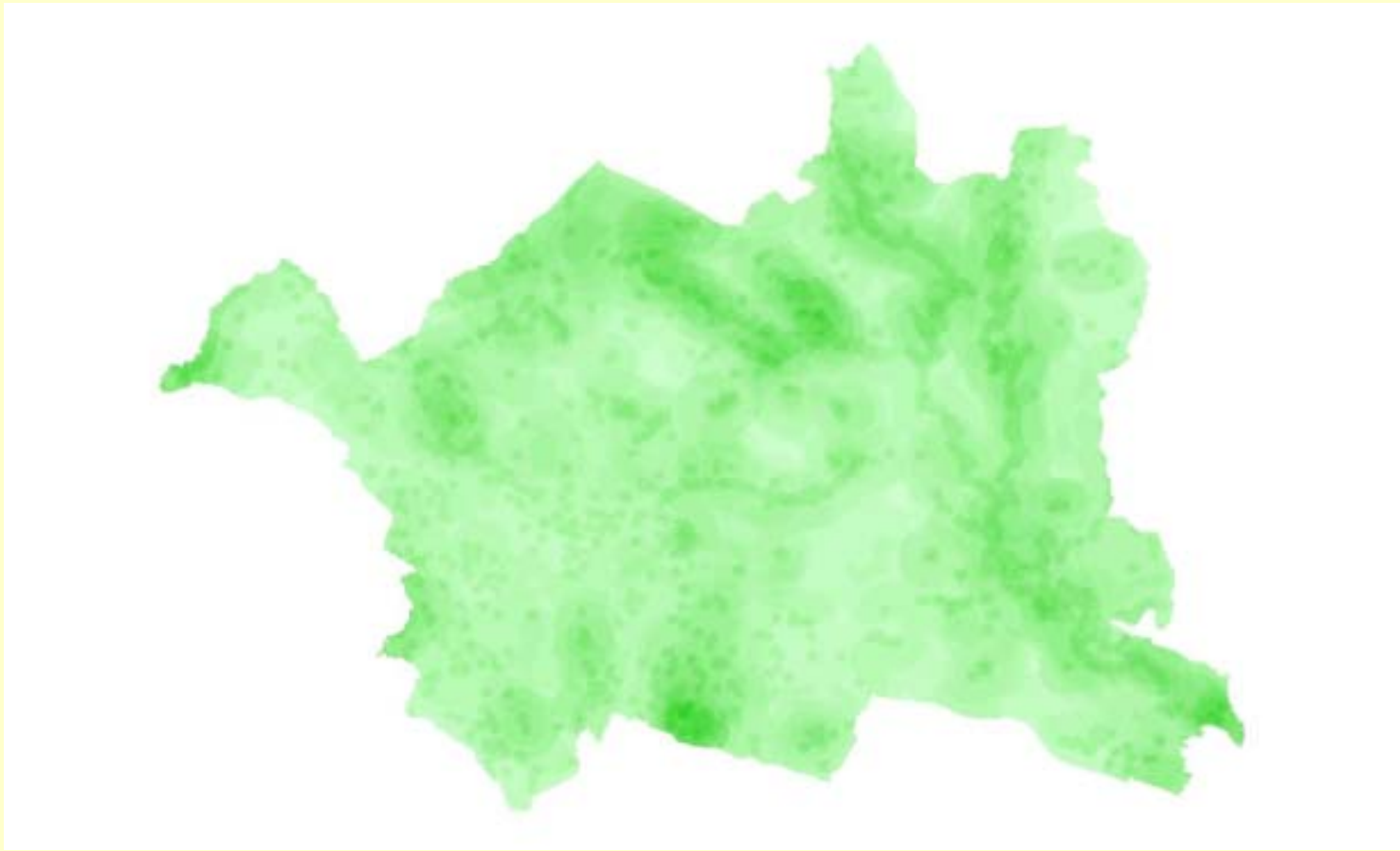




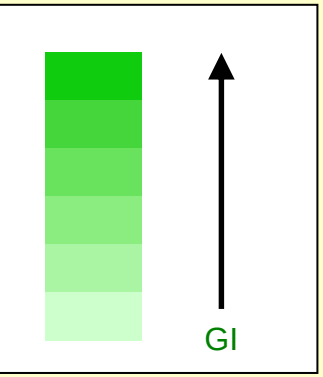


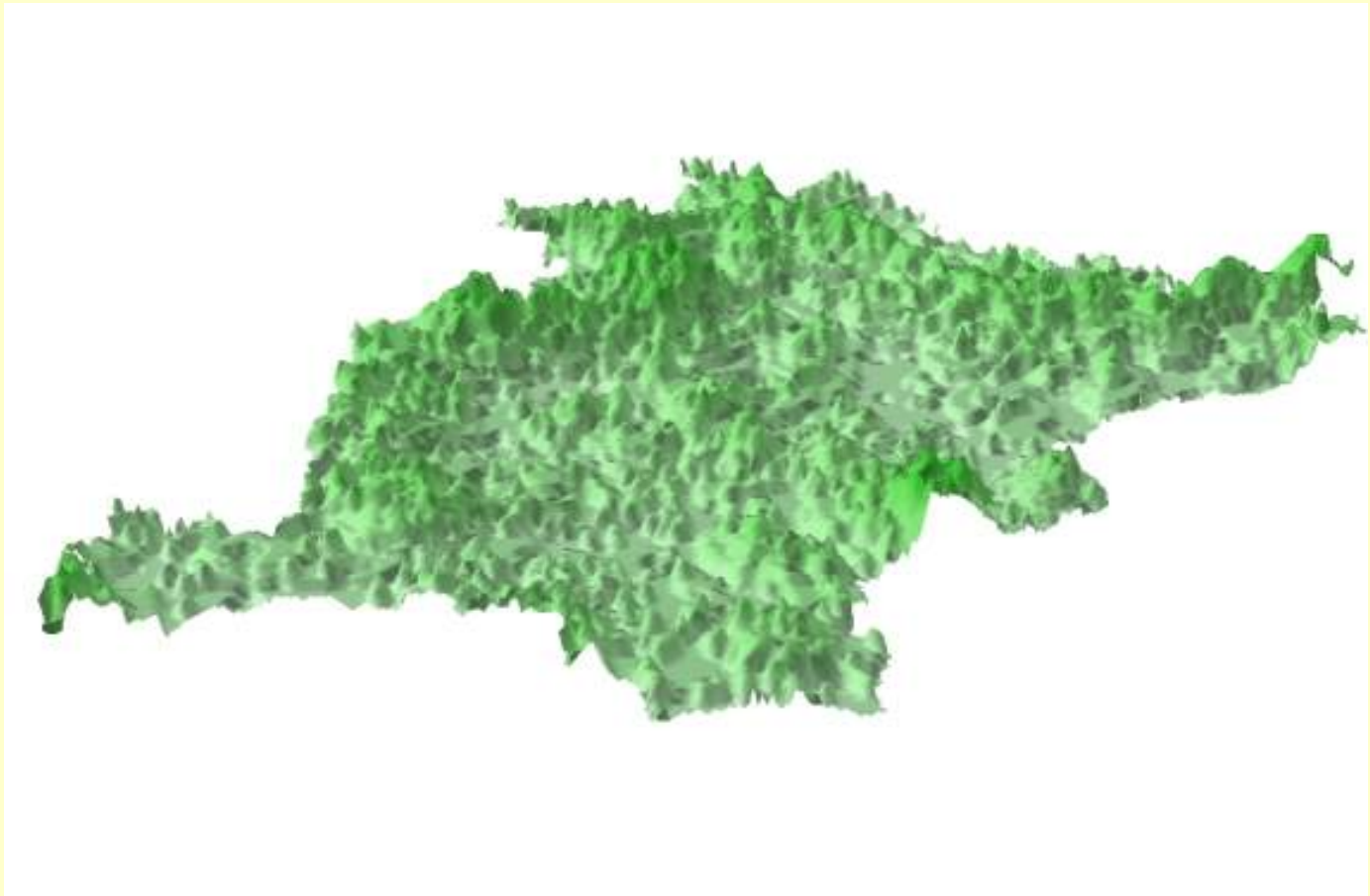
Green Infrastructure



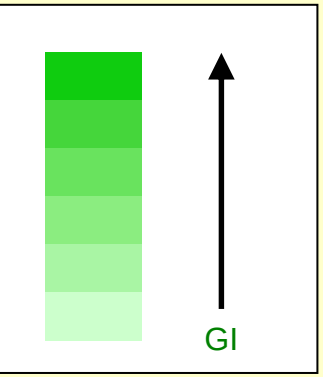


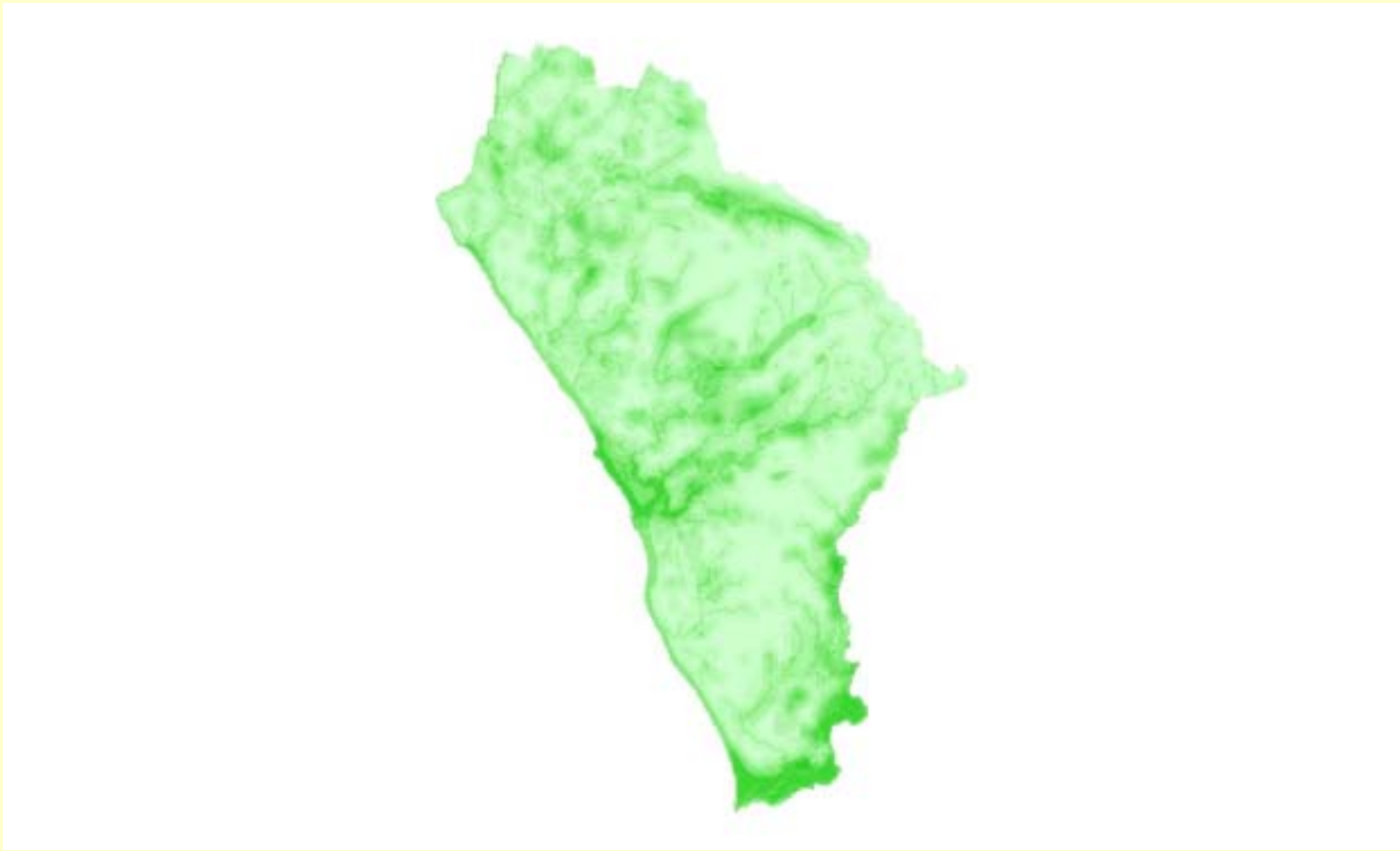
Green Infrastructure





Green Infrastructure





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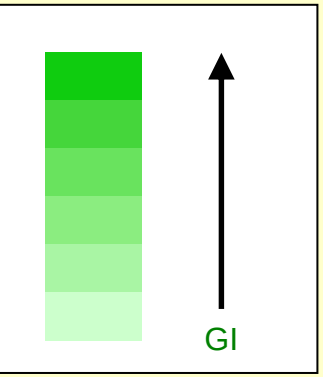
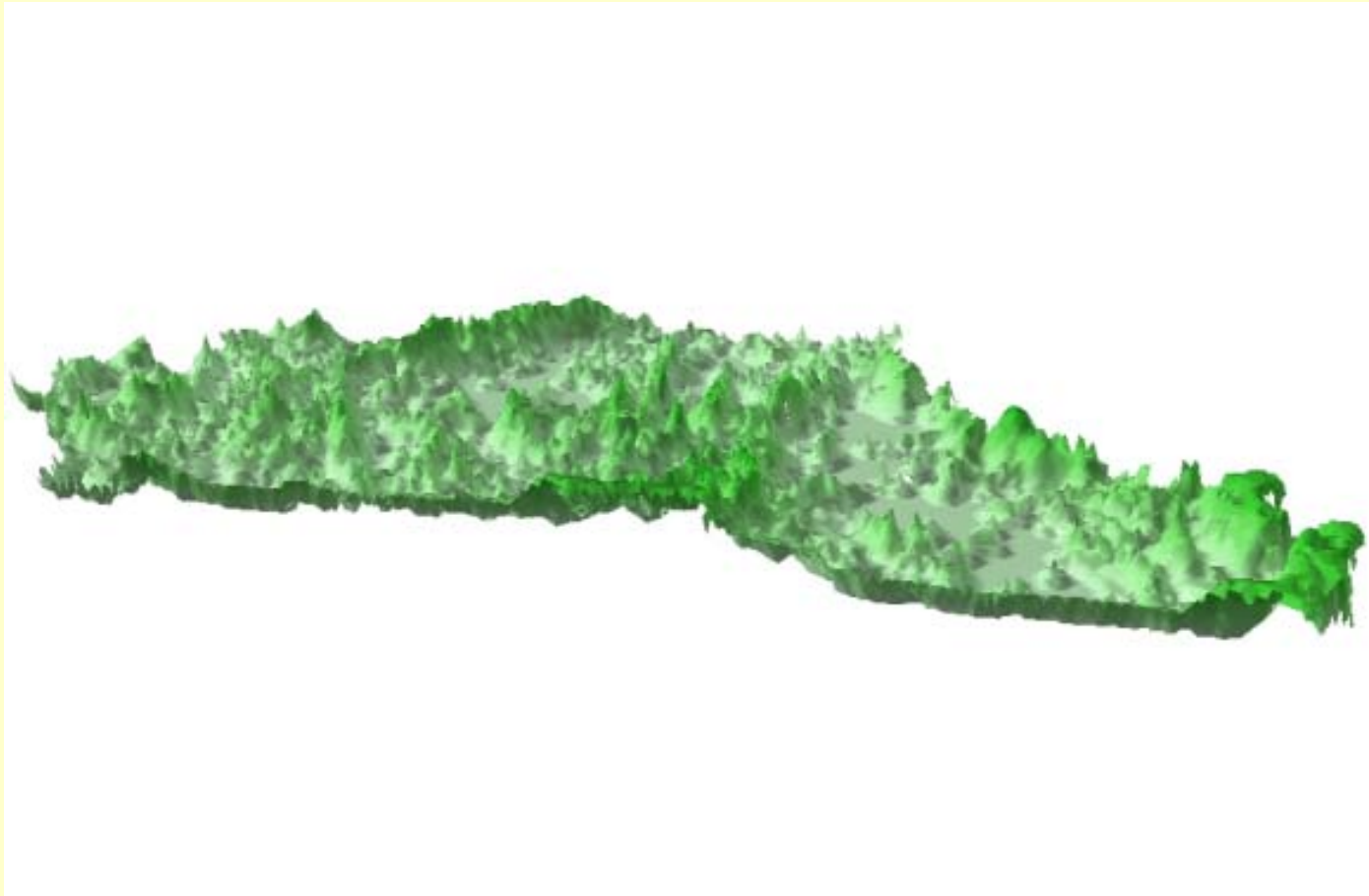
Green Infrastructure



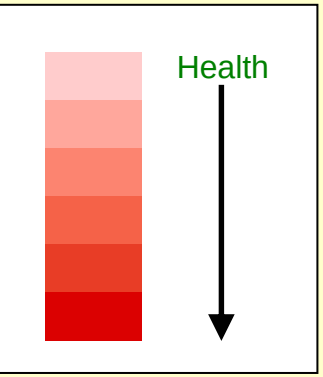


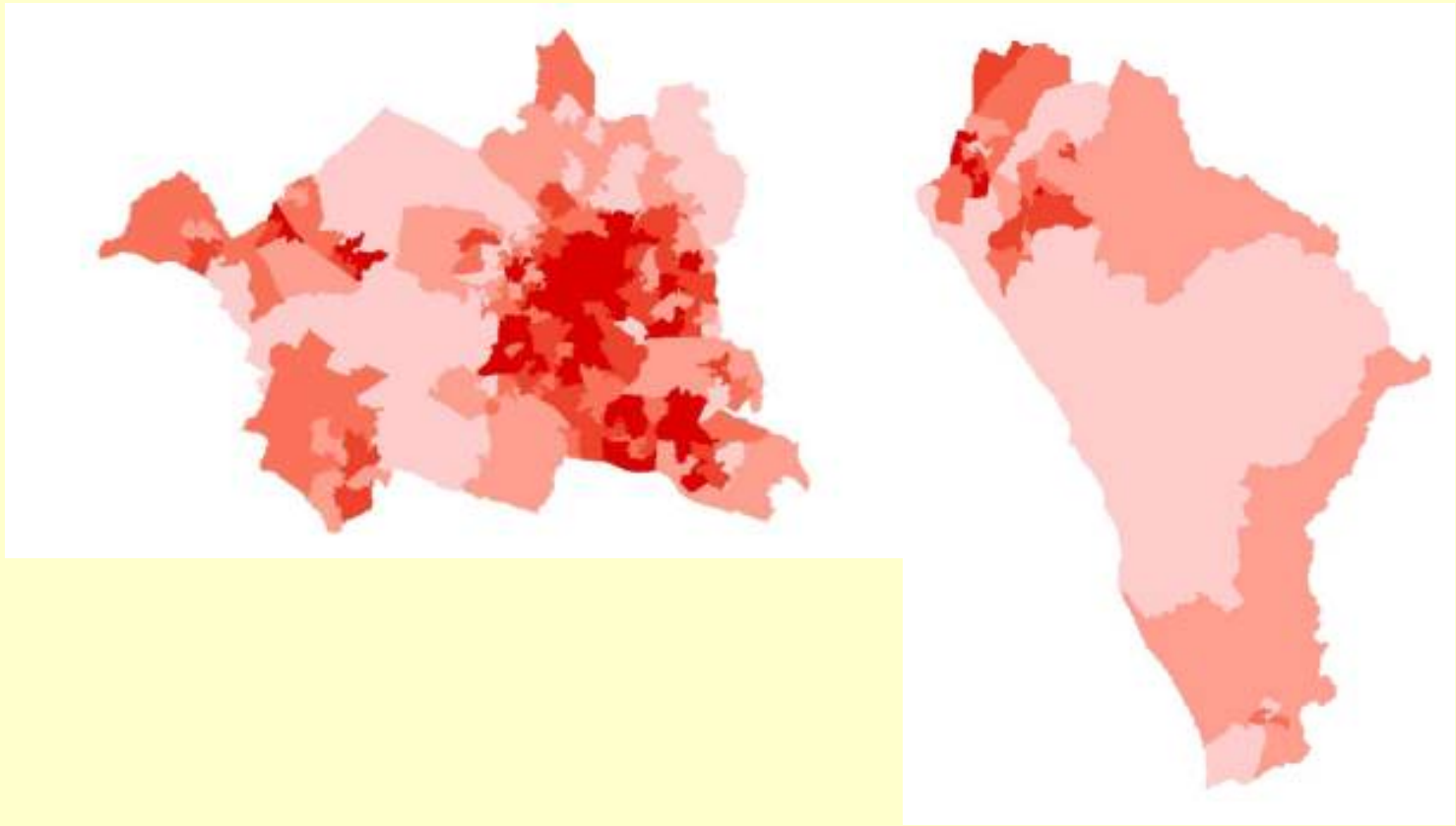
These maps show the state of the environment. But what does that mean for the community?

This study set out to examine

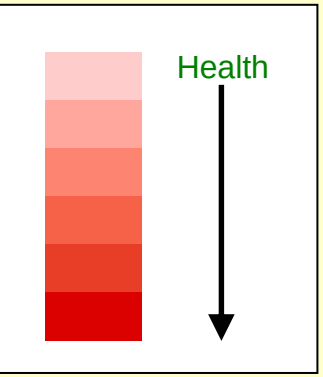
- **how many people are affected by poor environmental quality or poor green infrastructure; and**
- **to see if these same people are affected by other aspects of deprivation, especially health.**
- **If so, is there an imperative for combined intervention to tackle environmental and health inequity?**

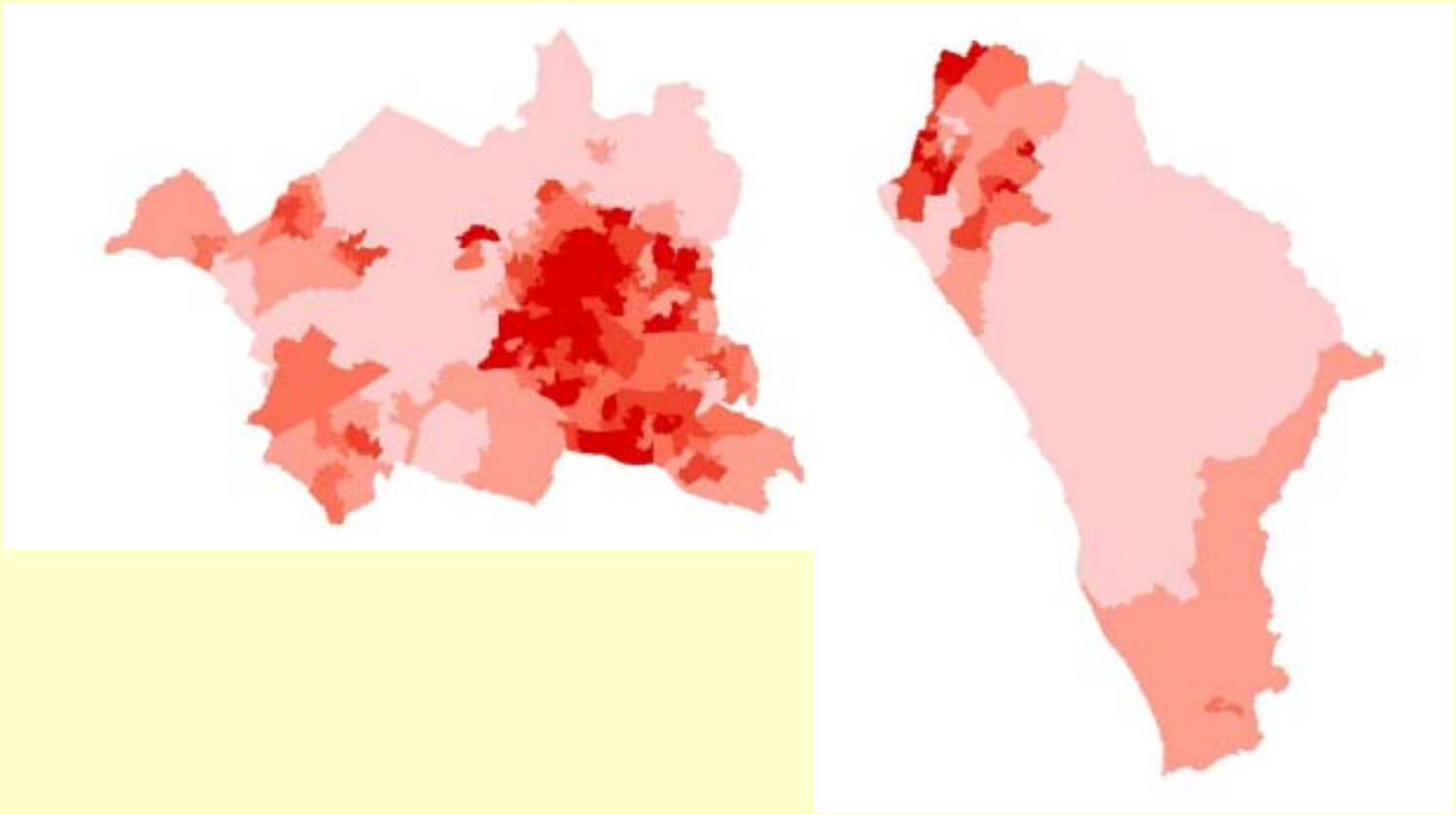
Mortality



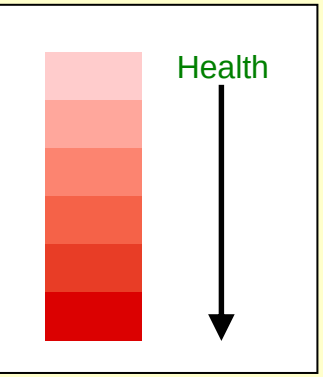


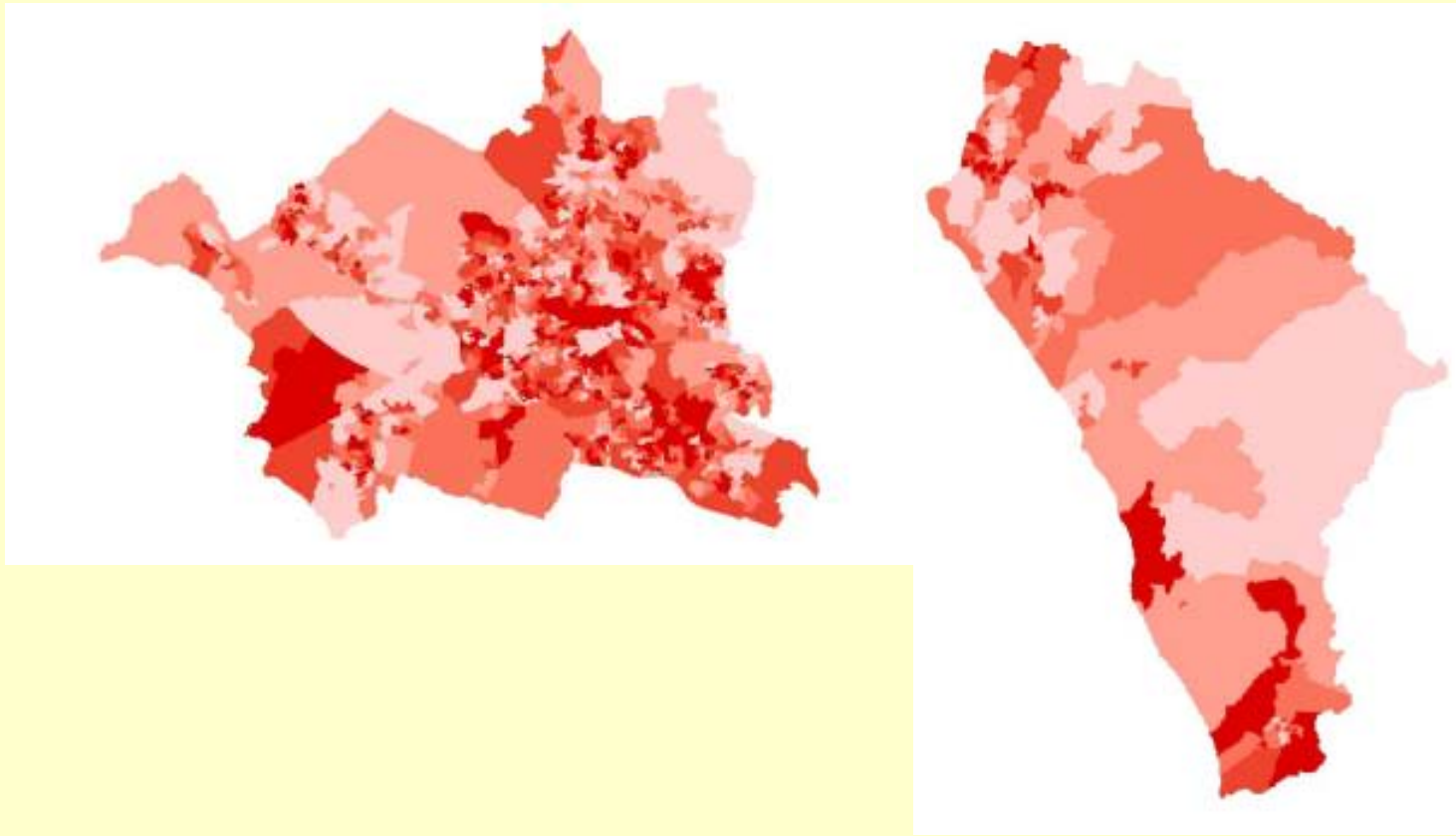
IMD health domain





Census ‘not good health’





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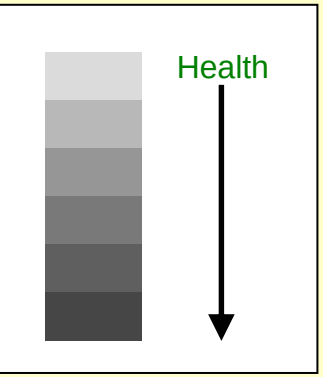
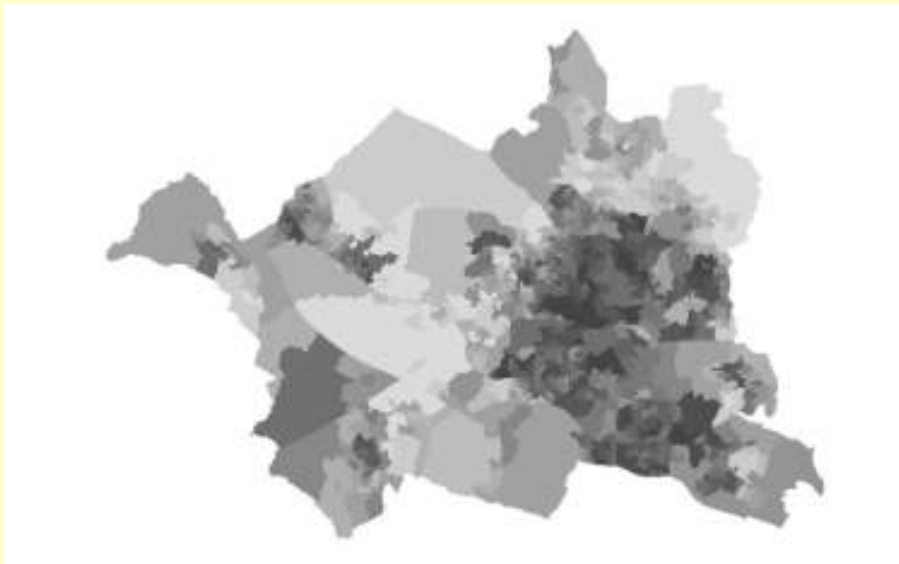
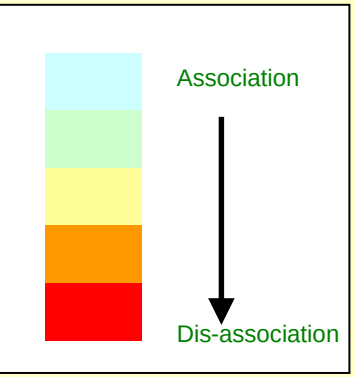
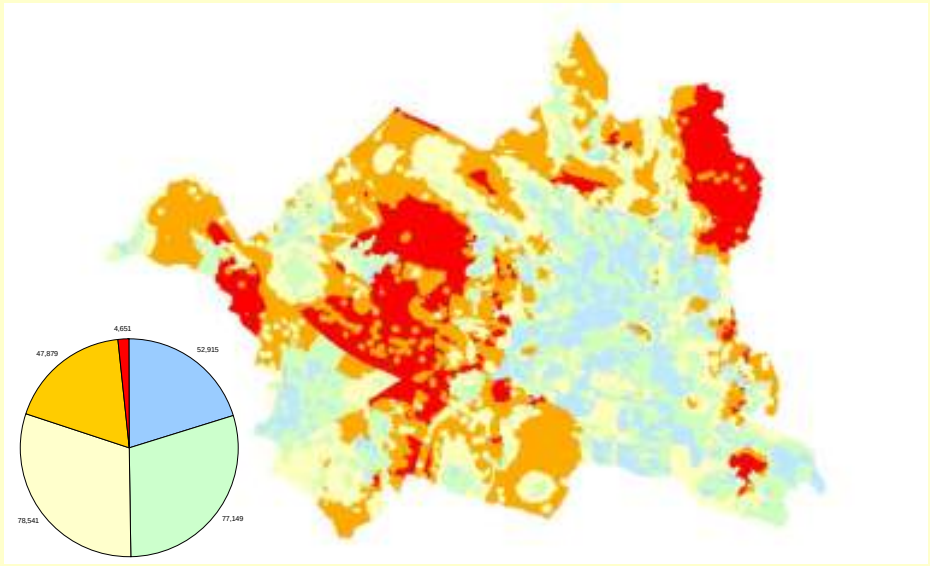
Combined health maps

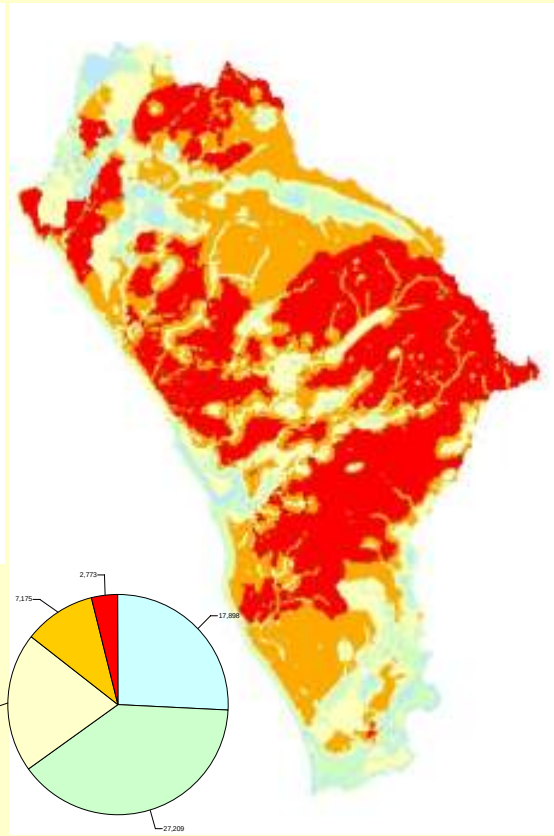




Association between health and green infrastructure







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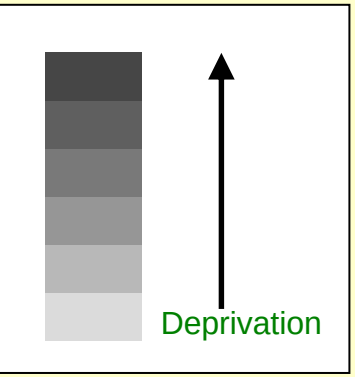
- **An association between Green Infrastructure and health (and also between environmental quality and health)**
- **No areas with the greatest GI resource have relatively poor levels of health**
- **Some areas with poor GI or poor EQ have good health. In urban areas these anomalies are localised and can often be explained by income.**
- **In rural areas there seems less correlation between poor GI and health. Perhaps this is due to the proximity of other "greenspace" such as private farmland not included in Green Infrastructure dataset?**

Multiple Deprivation



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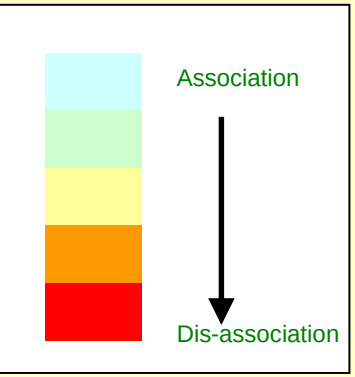
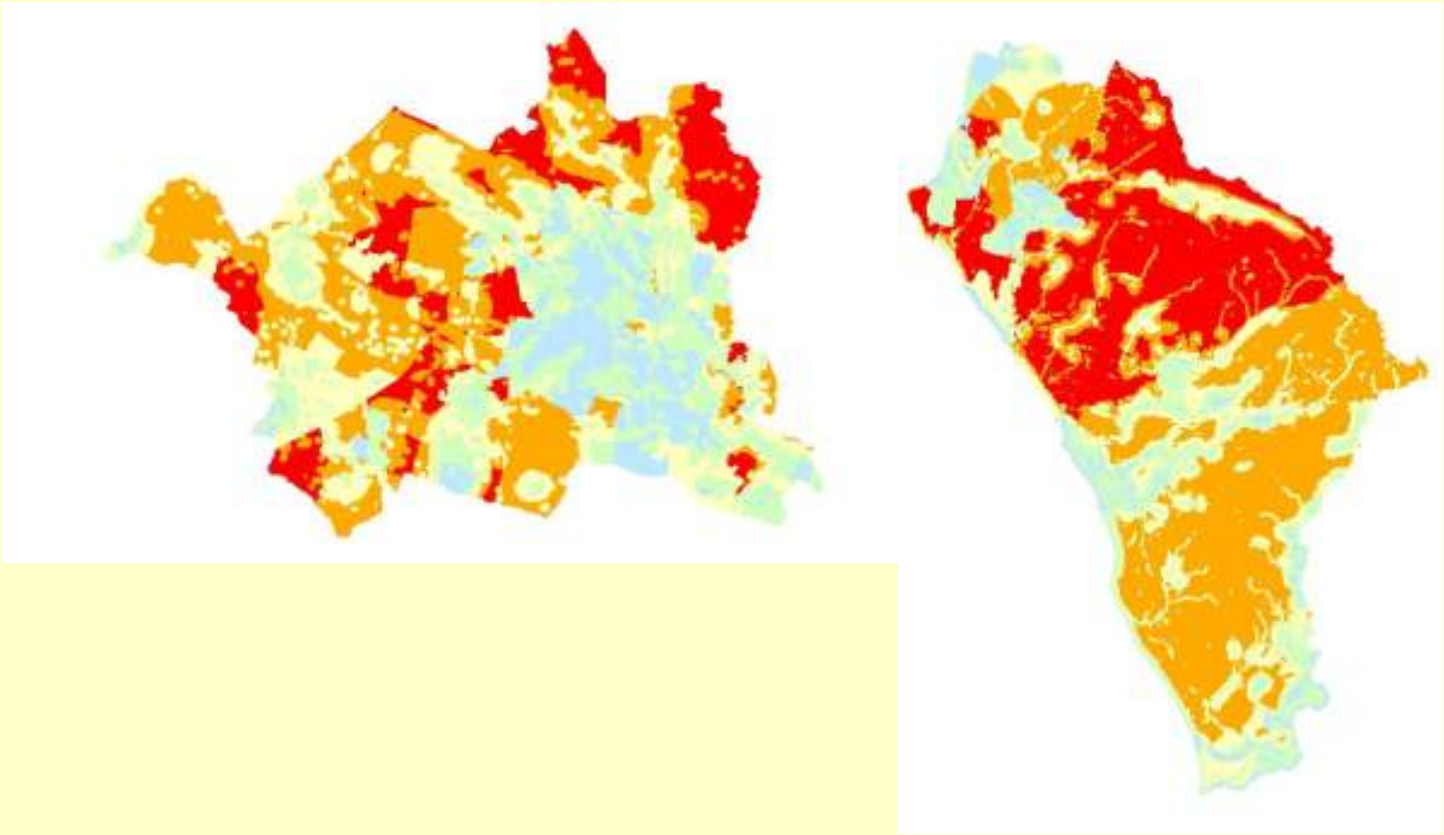
Association between deprivation and green infrastructure





Are there policy implications?:

- **environmental deficit can be described in terms of environmental quality and / or green infrastructure deficit**
- **environmental datasets can be used individually or in combination to model environmental deficit across a large area**
- **environmental deficit associates with social inequity, especially health inequity**
- **a need for environmental / health programmes to integrate better**
- **an imperative for environmental programmes to target public health where appropriate**
- **an imperative for green infrastructure and environmental quality to be considered in economic growth strategies;**
  - **a) for enhancement where there is a combined environmental and health deficit**
  - **b) for protection where levels are good – but vulnerable**

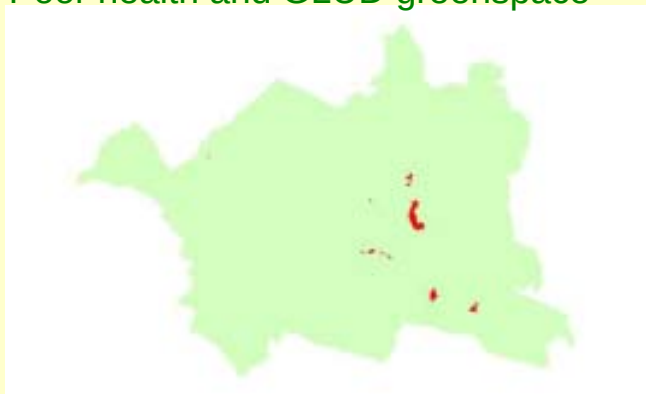
Can this method be used to define ‘Environmental Action Areas’?

We looked at the areas of Bolton where population stats suggested poorest health (worst 10%), and where Environmental Deficit was greatest

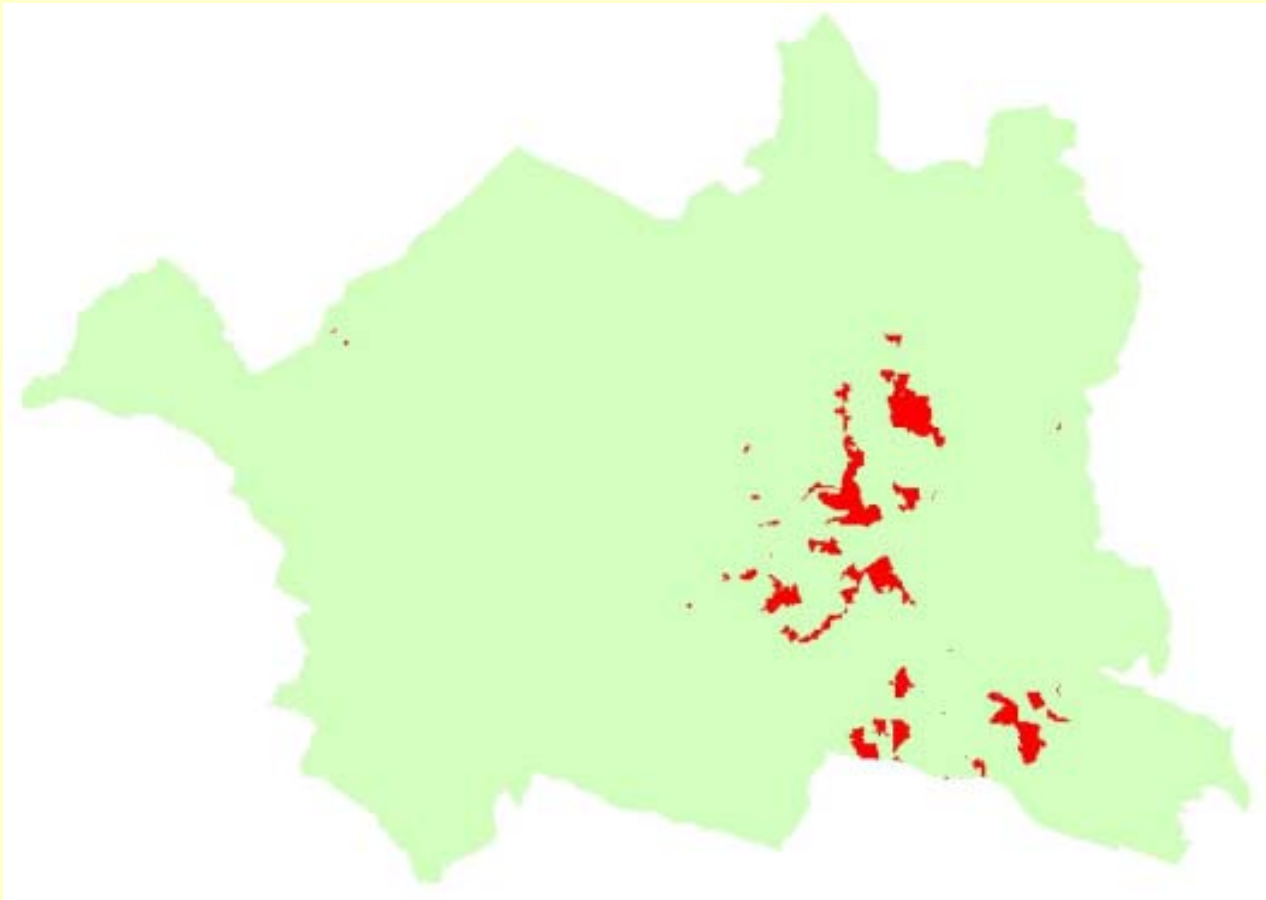
Poor health and environmental quality

Poor health and green infrastructure

Poor health and GLUD greenspace

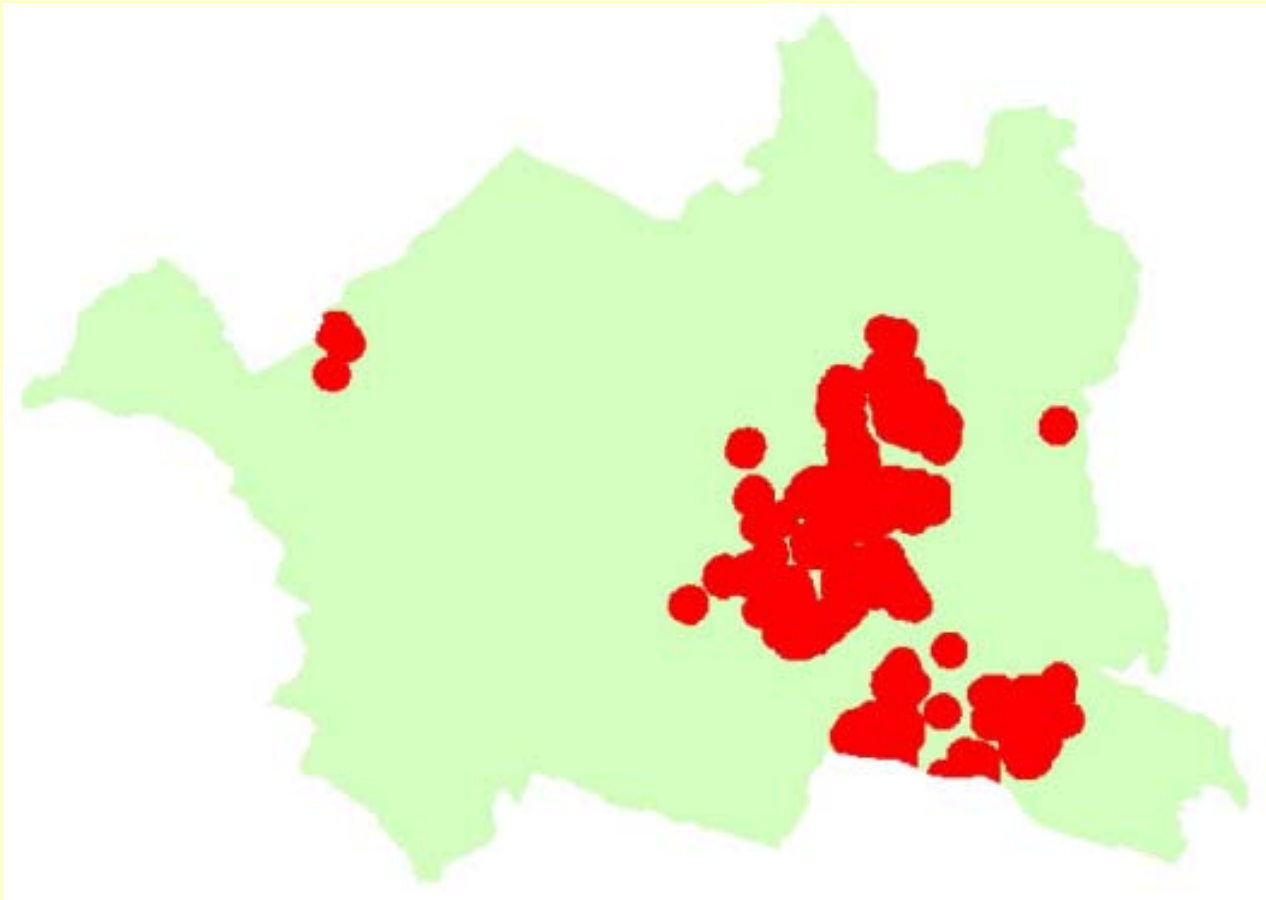


Environmental Action Areas

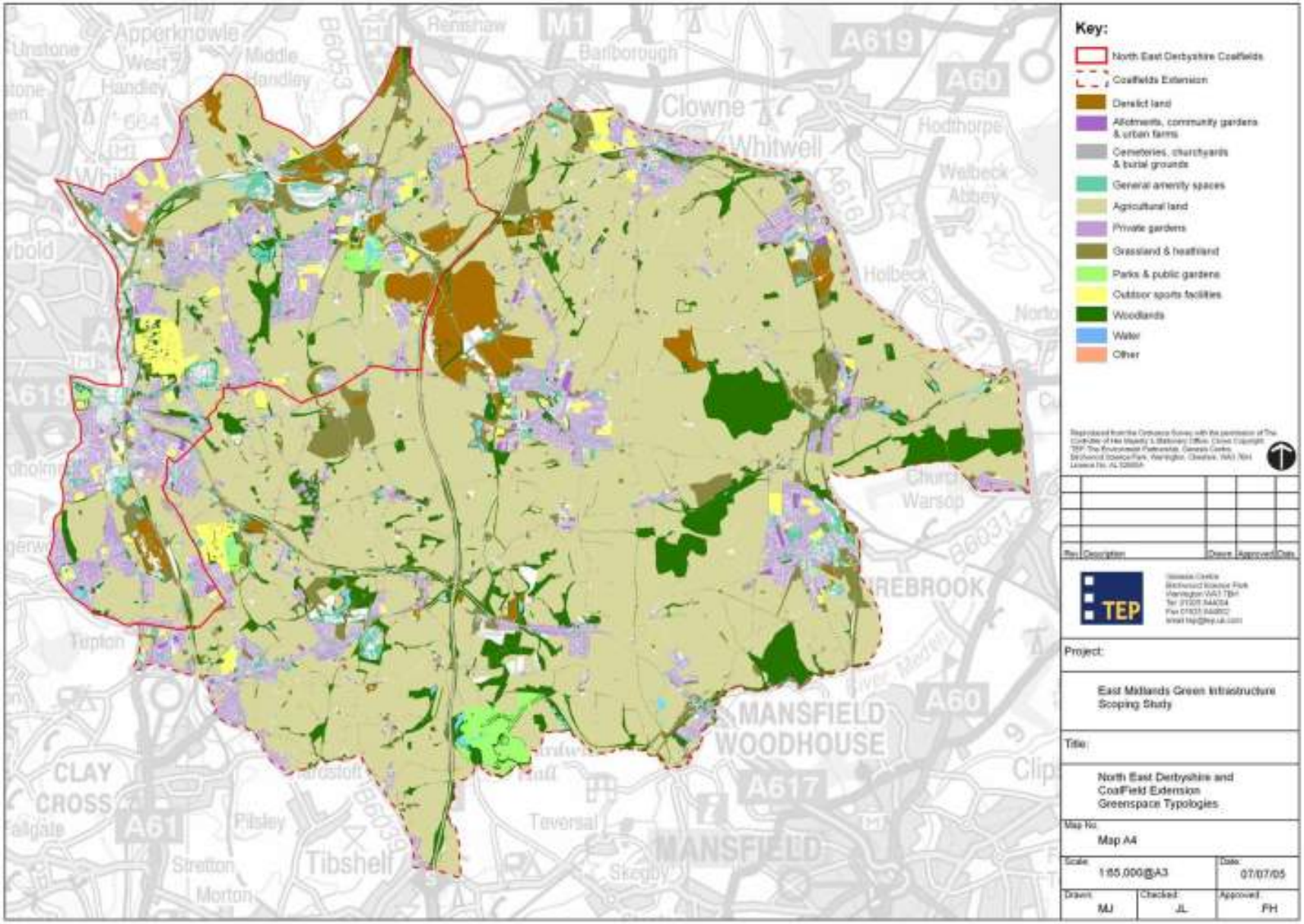


9,836 people (3.8% of Bolton's population) are covered by the areas

Environmental Action Areas with 280m walking buffer



79,554 people (44% of Bolton's population) are covered by the areas



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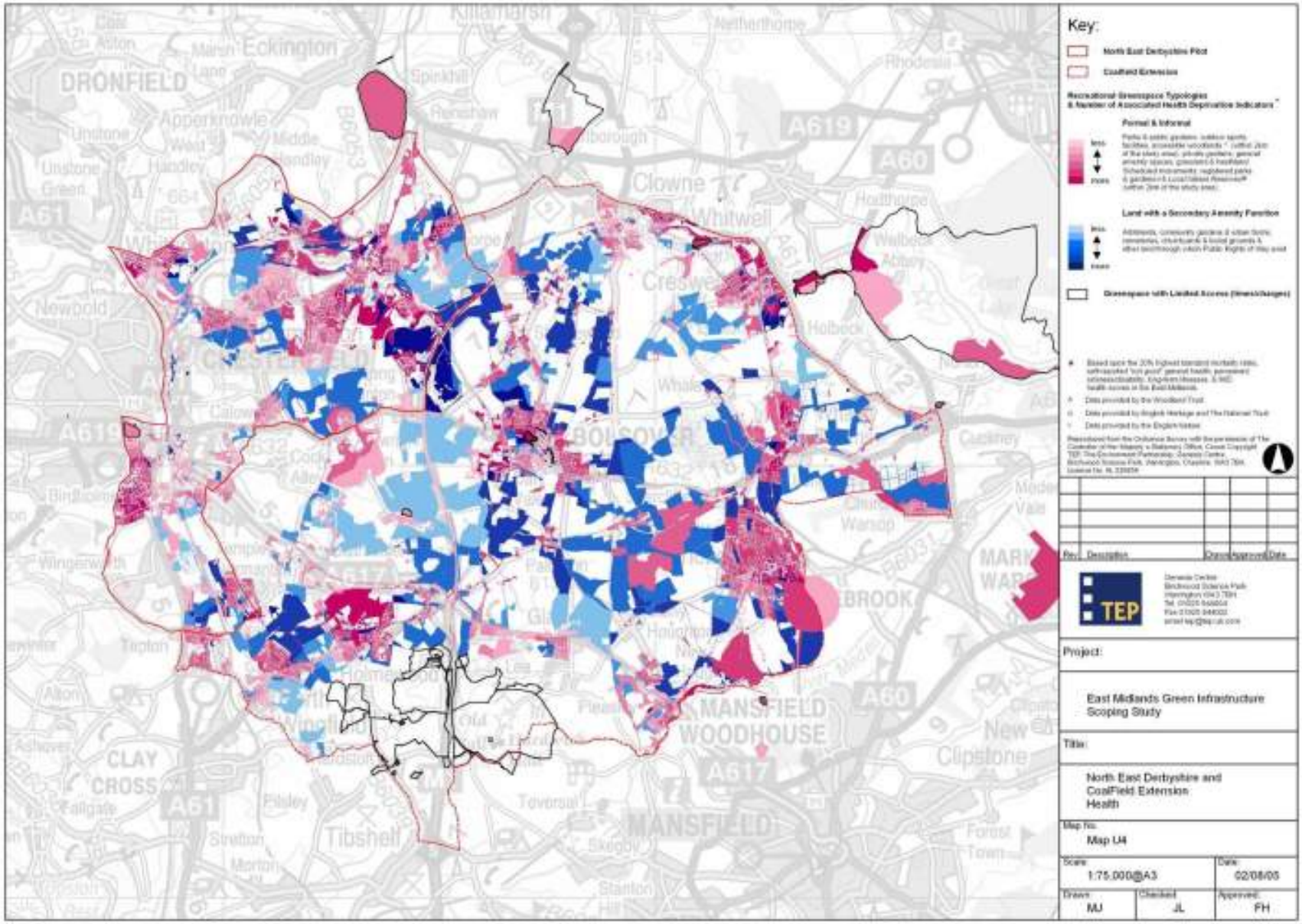
Functionality of Green Infrastructure:

Economic, education, recreation, biodiversity, food production etc.

Assessment of health indicators:

- **IMD Health Domain**
- **Limiting long-term illness**
- **Permanent sickness and disability**
- **Self-reported general health**
- **SMR (under 75)**



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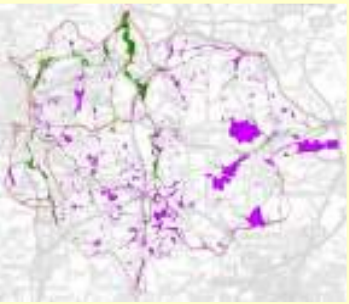

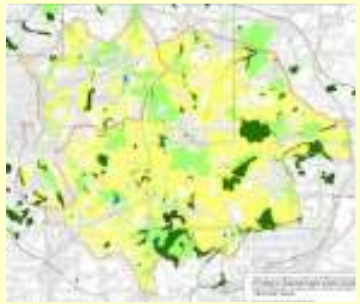

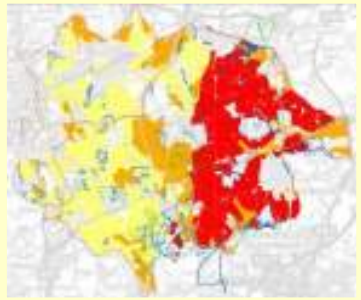



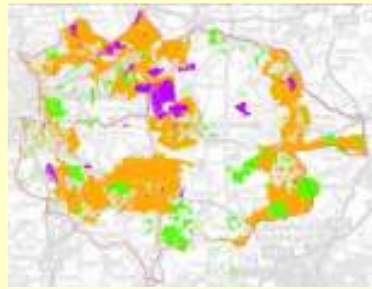


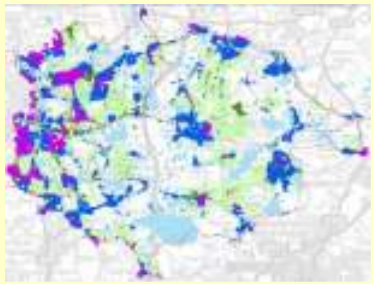
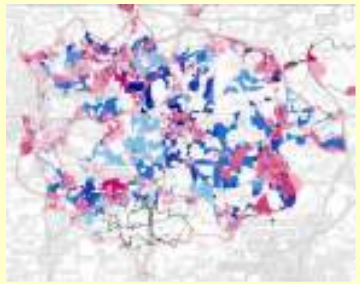

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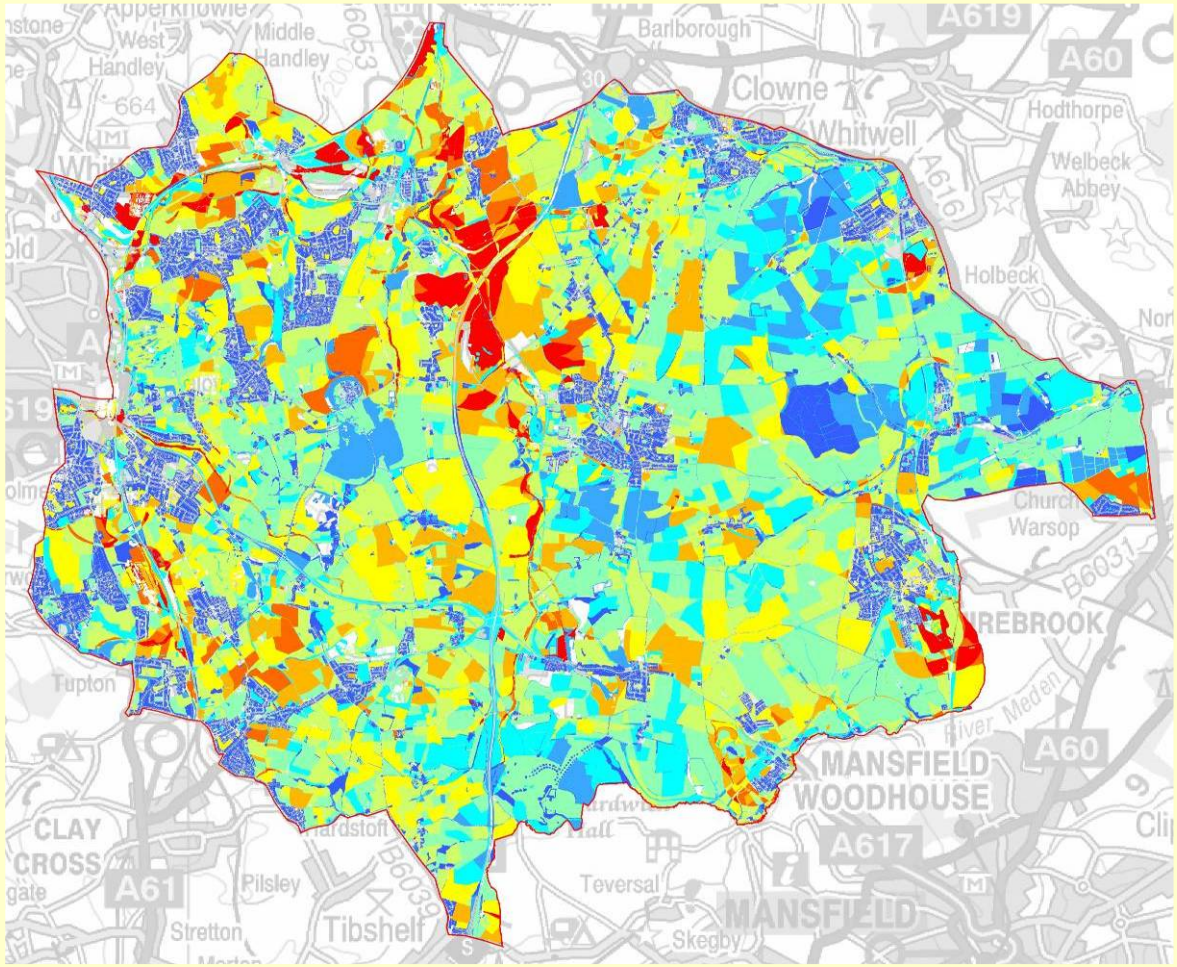
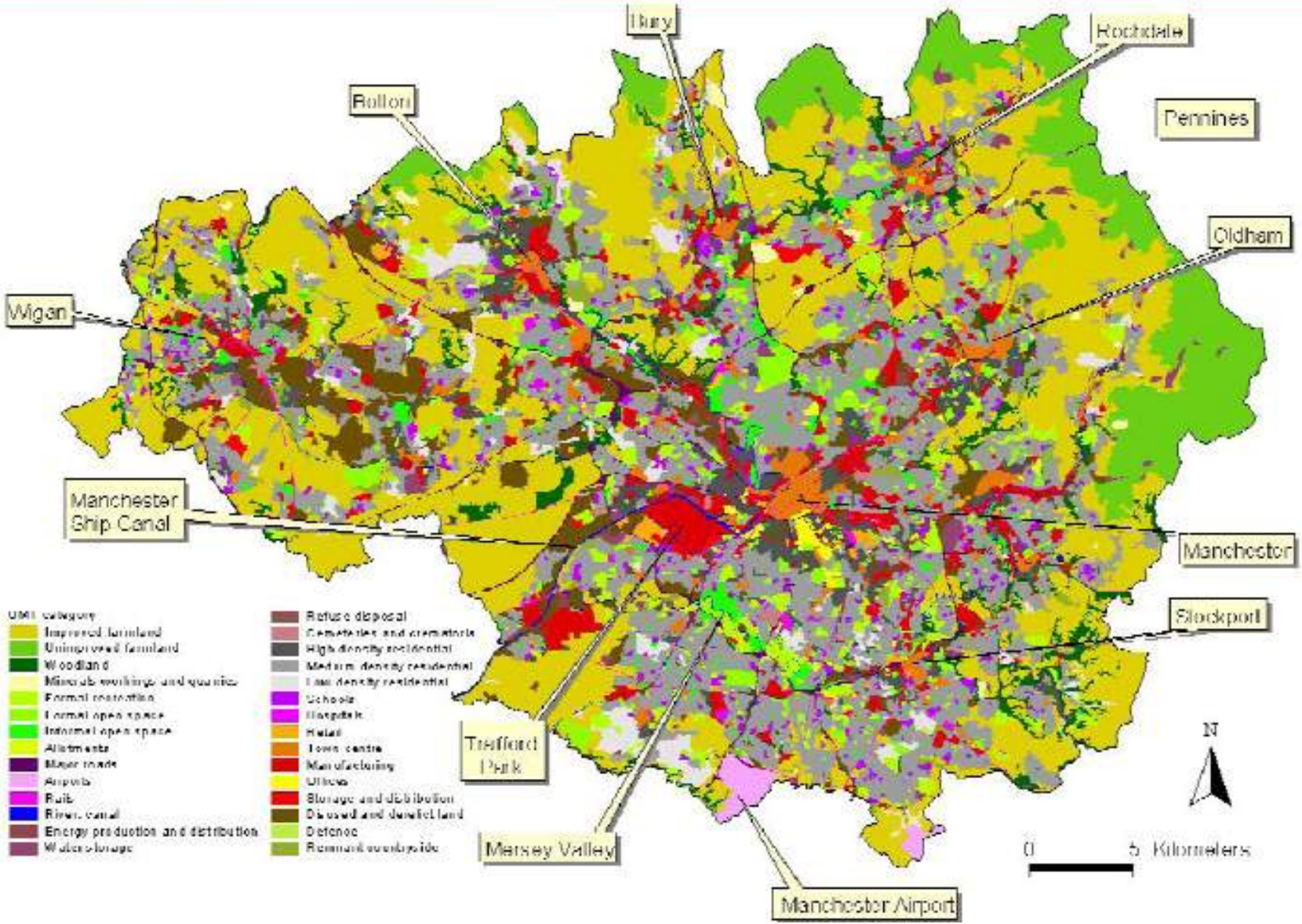
Potential additional multi-functionality through intervention



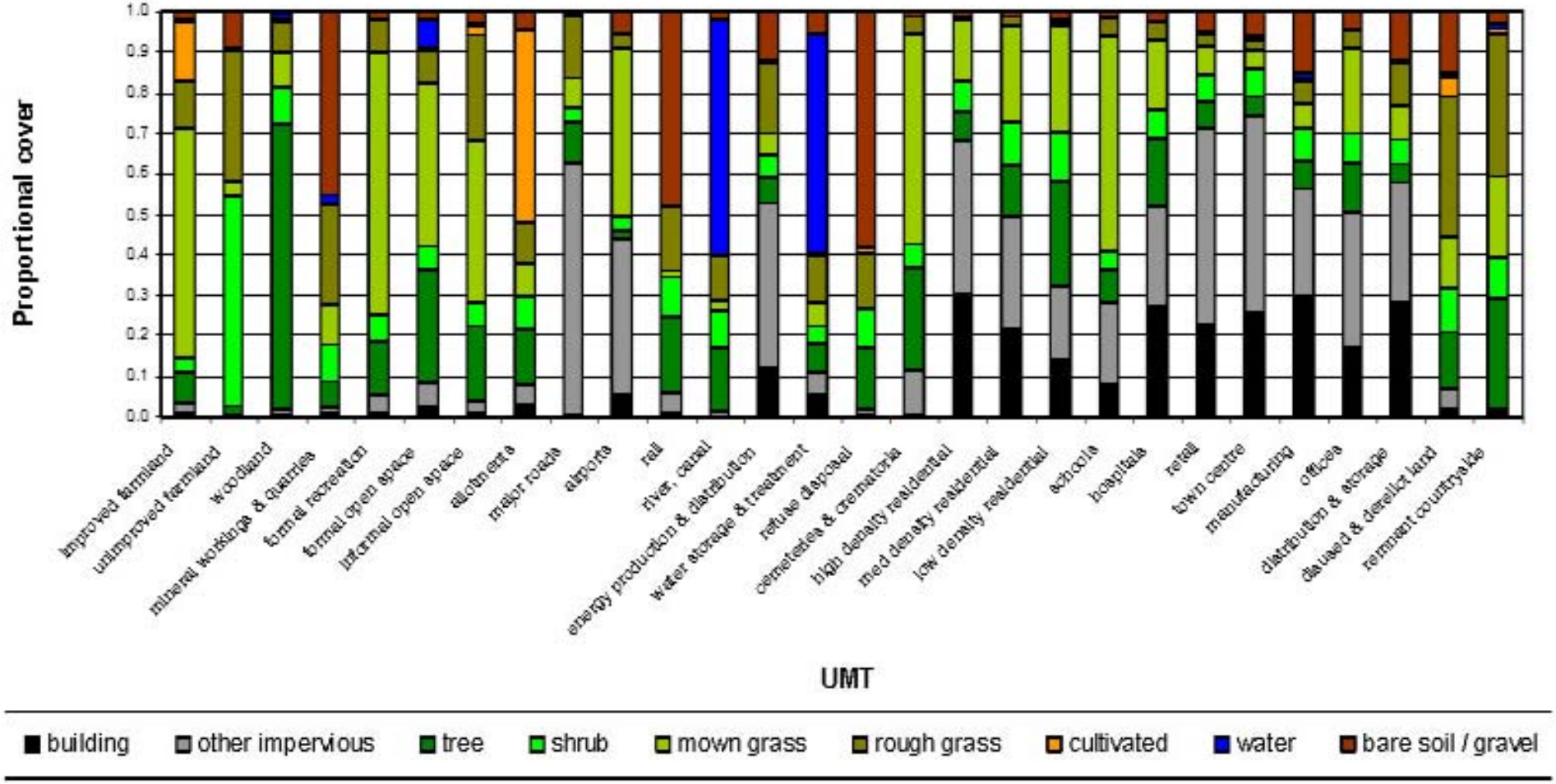
Greater multi-functionality

Lesser multi-functionality

UMT Conurbation Map

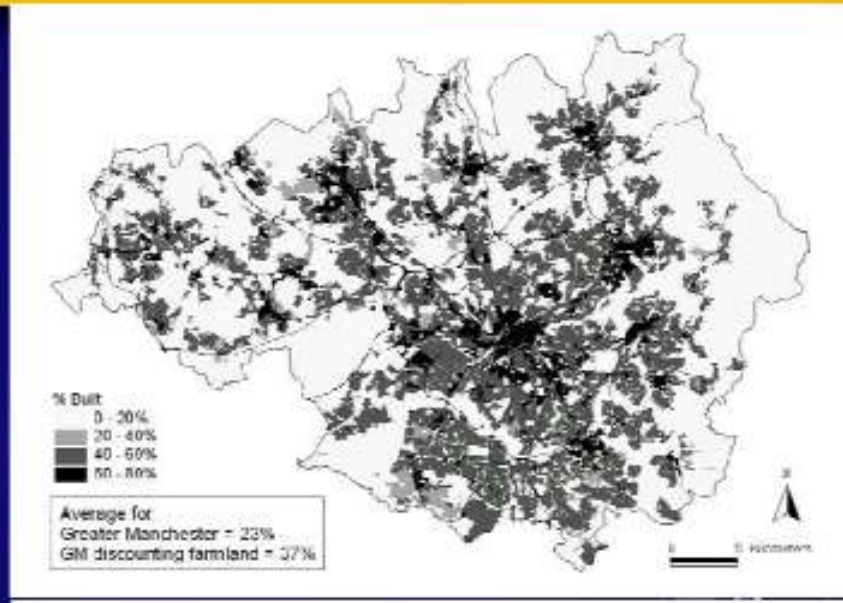


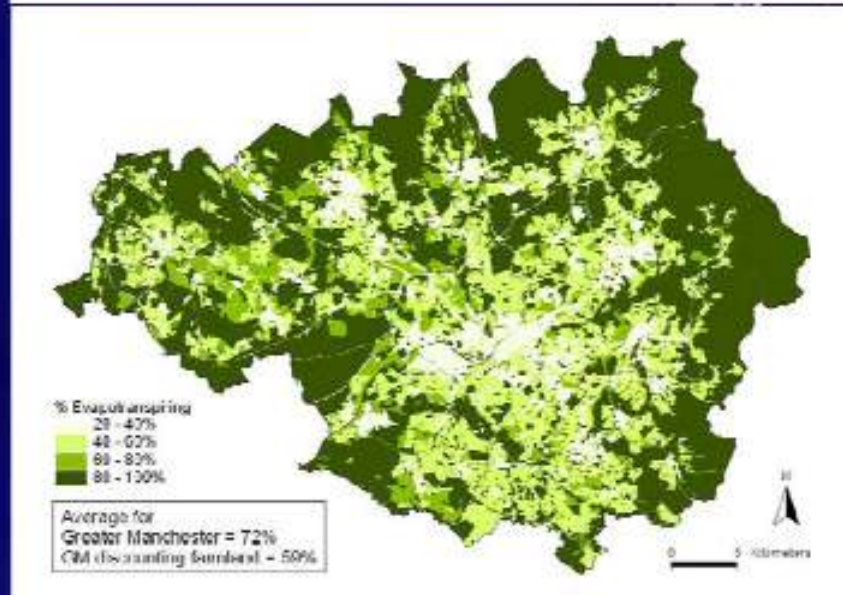
UMT Surface Cover



Surface Temperature Model

- Energy balance
- Input requirements
  - Meteorological data
  - Building mass
  - Surface cover

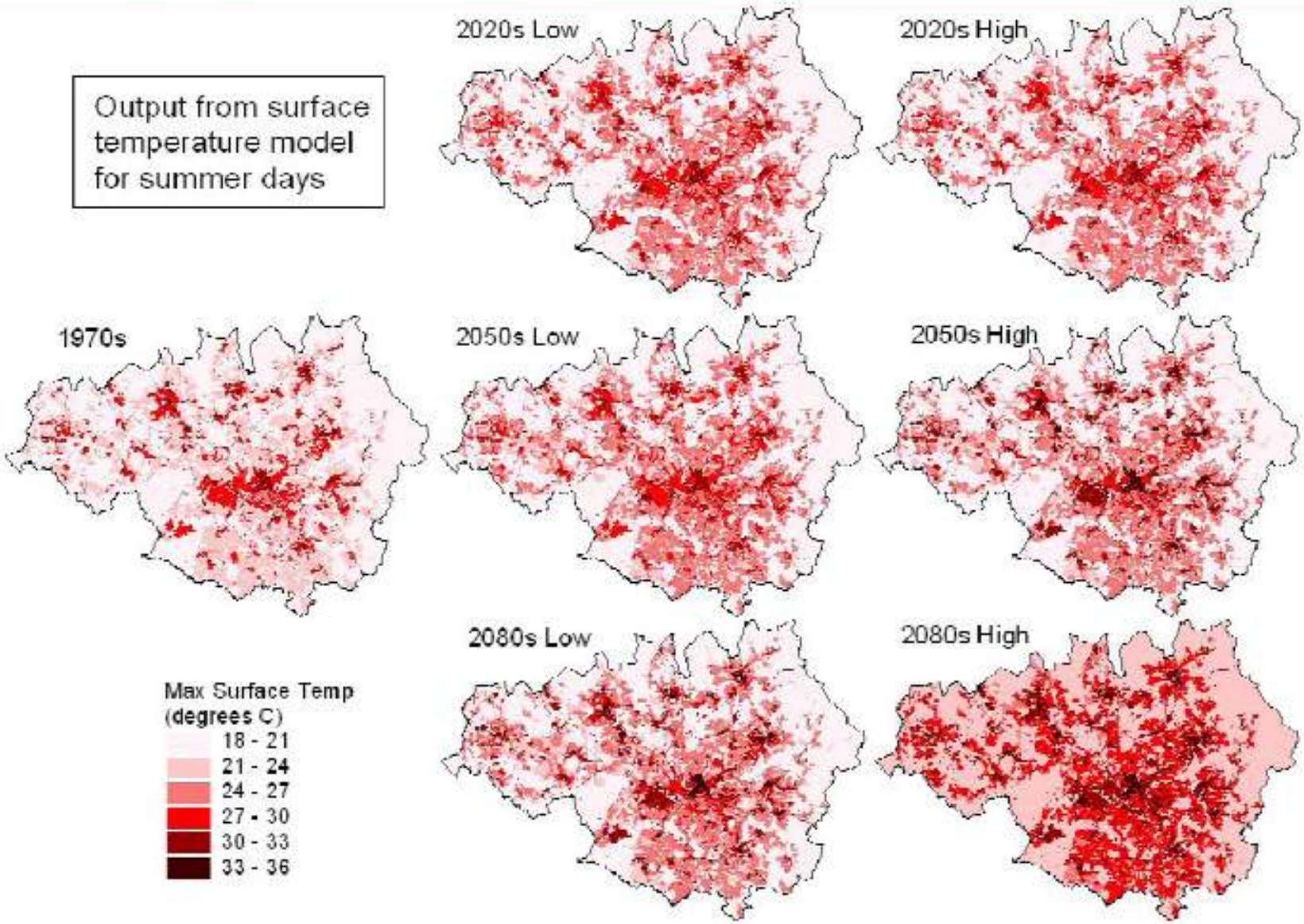




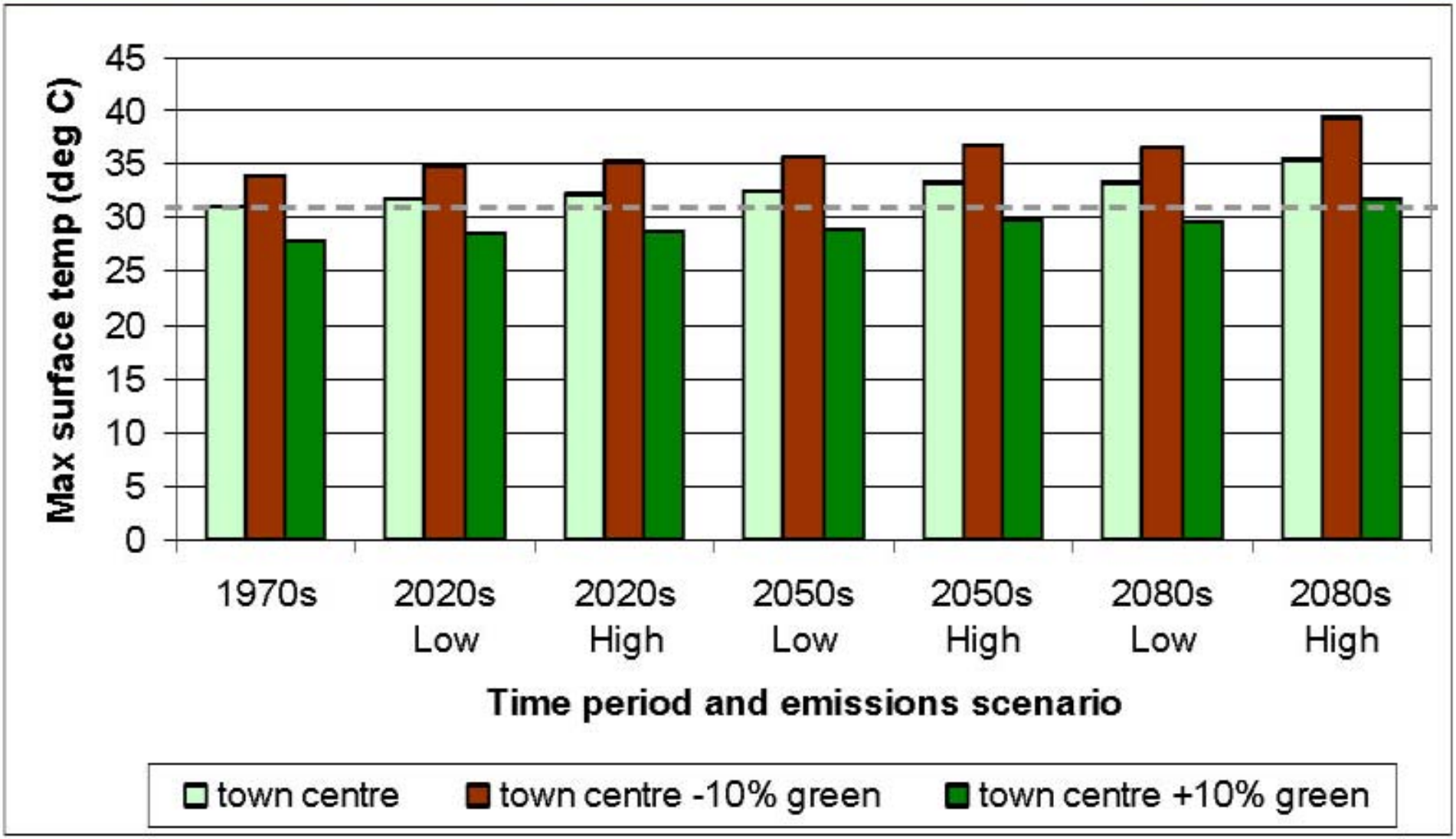
UK Climate Impacts Programme

Maximum Surface Temperature

Output from surface temperature model for summer days



Town centre ± 10% green cover



Further Information:

Study 1: www.pbrs.org.uk

Study 2: www.emra.gov.uk/a4e/publications/documents/GreenInfraPartA.pdf

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