Department for Environment Food & Rural Affairs

Valuing ecosystem services in the UK urban accounts

MAIA webinar

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Forestry Commission England | NATURAL ENGLAND | Environment Agency

Outline

1. Summarise monetary accounts
2. Highlight municipal accounting initiatives
3. Emerging lessons and knowledge gaps

Disclaimers

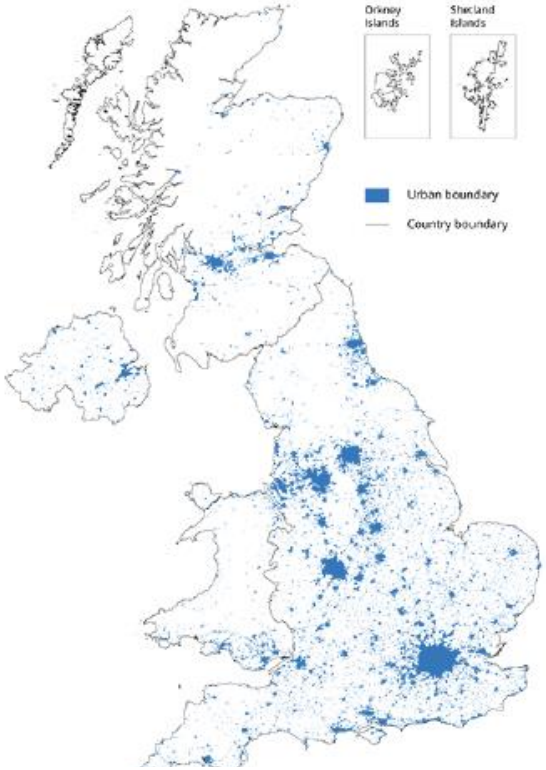
- UK accounts still experimental, yet to be consolidated, some services simplistic
- Office for National Statistics produces the accounts - Defra supports and advises
- Local application yet to be formally evaluated

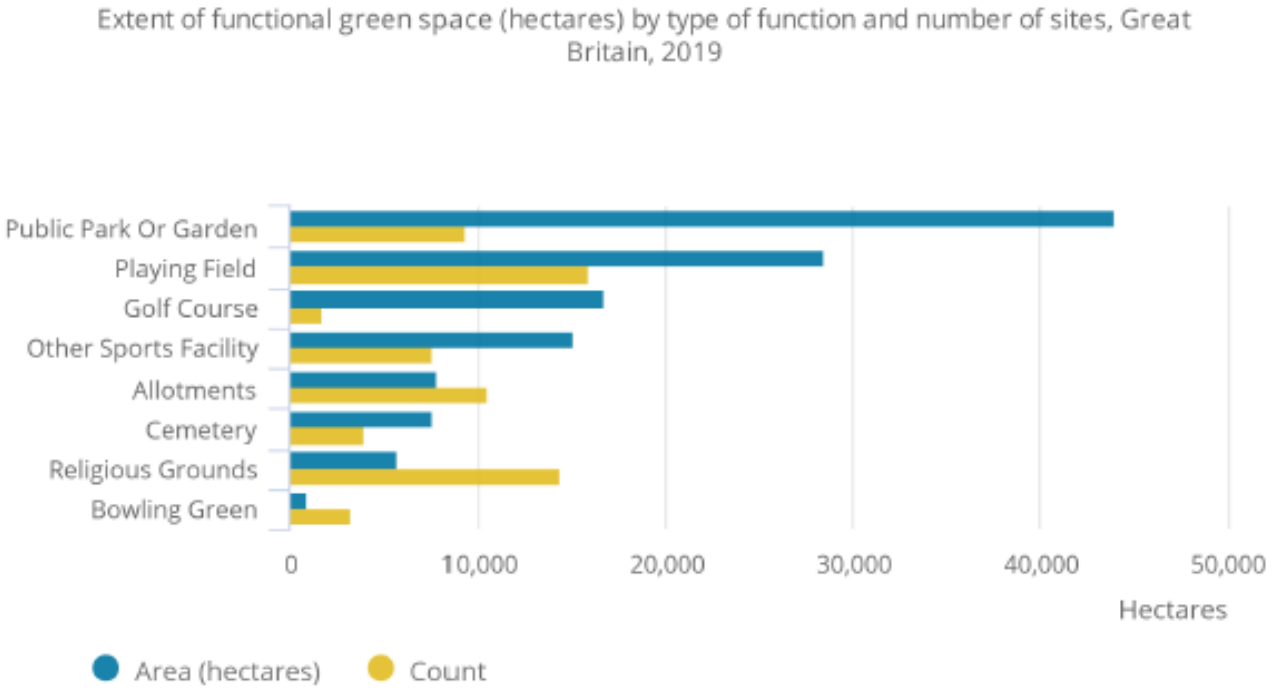
Why are urban thematic accounts a priority?

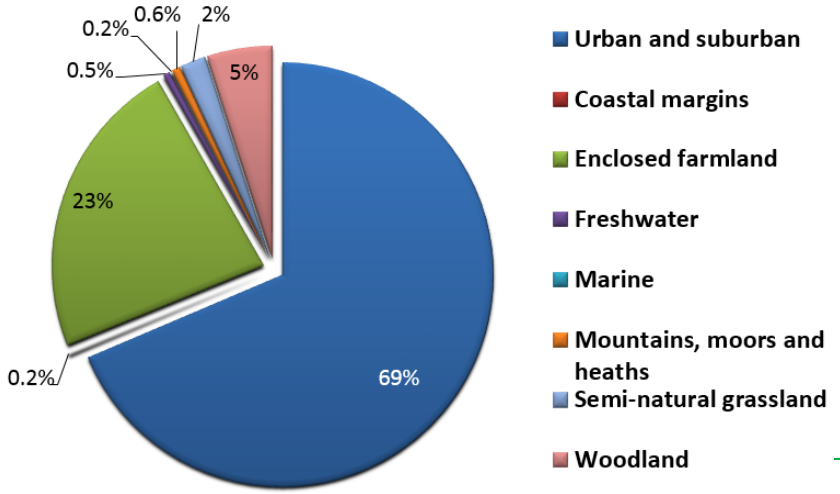
- 2020 ONS Roadmap – broad habitat approach
- Felt as a major gap – 80% of population live there
- But information fractured, disconnected and partial
- Policy touches upon urban contexts - health, development, green infrastructure, education

Extent - Defining urban is not straightforward

- UK account uses adjusted Built-Up areas layer with buffer complemented by OS layers for greenspace detail
- Covers a range of land cover types
- 8% of UK land; of which:
  - 30% is natural / green space; 7% is “functional” green space

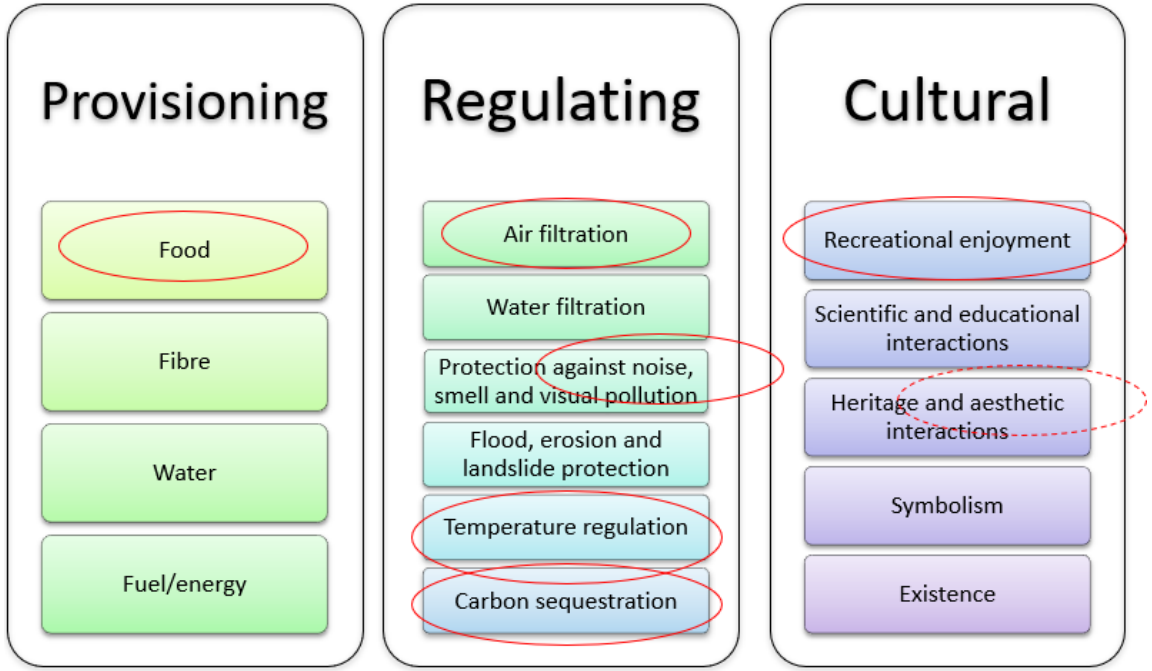






Coverage of ecosystem services

- Identifying key services for each habitat
- But what is feasible to develop at national scale?
- Other relevant services developed separately e.g. water supply, agriculture, abiotic - could be cut to urban?
- Regulating services important but challenging – may be different between urban / wider contexts e.g. flood regulation, water filtration, waste mediation
  - What is optimal / appropriate granularity of biophysical modelling?
- Range of valuation methods – aim for exchange value, but some grey areas e.g. damage costs.

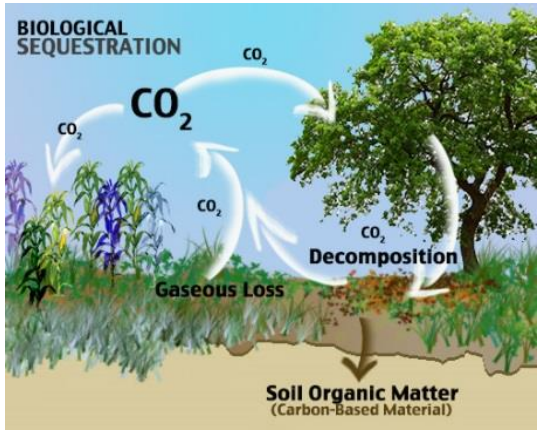


Provisioning services – urban food production

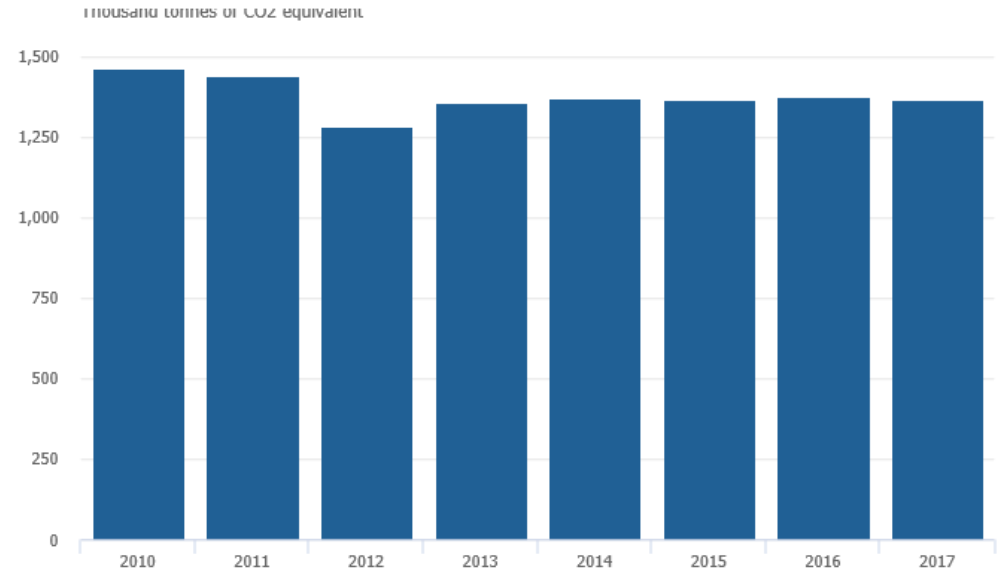
- Enabling food production - allotments and community gardens
- Urban farmland excluded – would identify land-use trade-offs
- Survey data poor
- Using satellite data, estimated 317,000 plots in UK urban areas
- Apply average size plot - crude
- Currently output-based valuation – rentals may be better, though likely to be low
- Value = £294m in 2017.
- Output-RR ratio for UK agriculture implies RR of £30m.
  - Allotments v different from large-scale agriculture - significant input costs, such as labour, could be considered a recreational benefit from allotments.

Regulating services – carbon sequestration

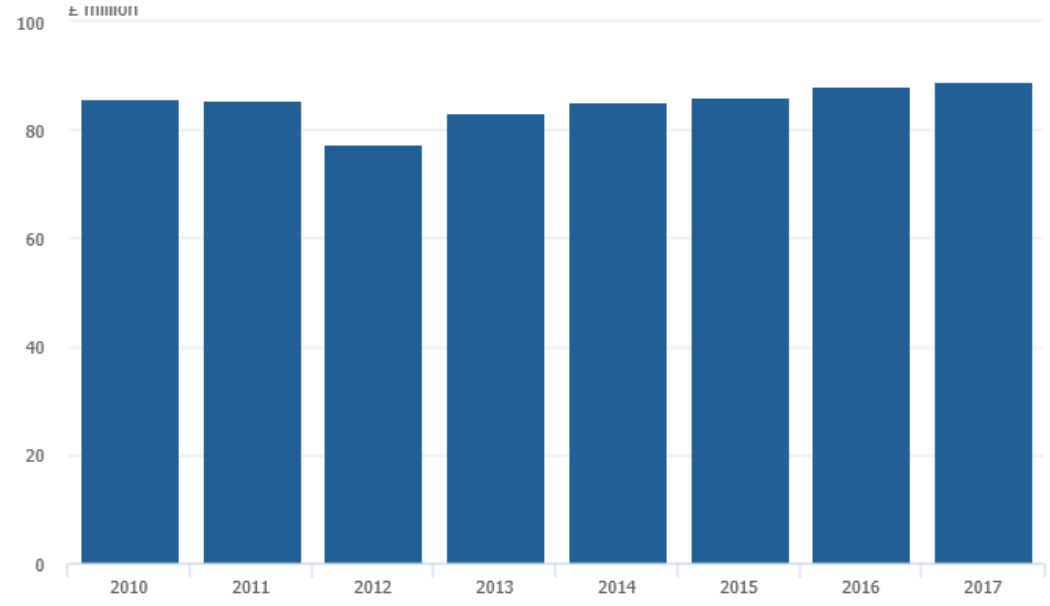
- **Carbon sequestration** of urban woodland
- Urban woodland 7.5% (0.29 m hectares) of total woodland in GB – pro-rata calculation of national estimate
- Use of national target-consistent carbon price – effectively a replacement cost for Government



Carbon sequestration for woodland in UK urban areas, 2010 to 2017



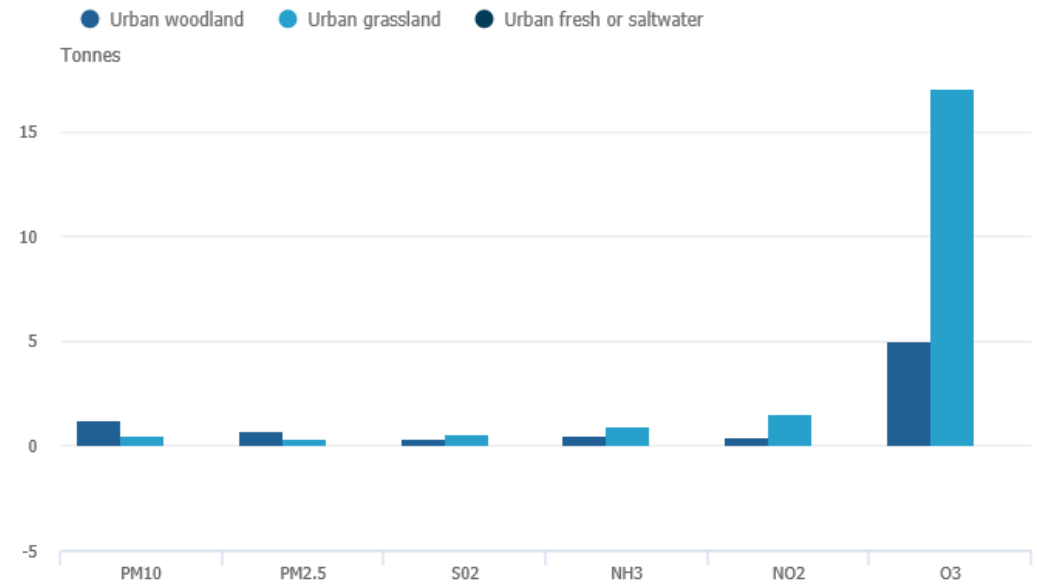
Annual value of regulating services, UK urban woodland, 2010 to 2017



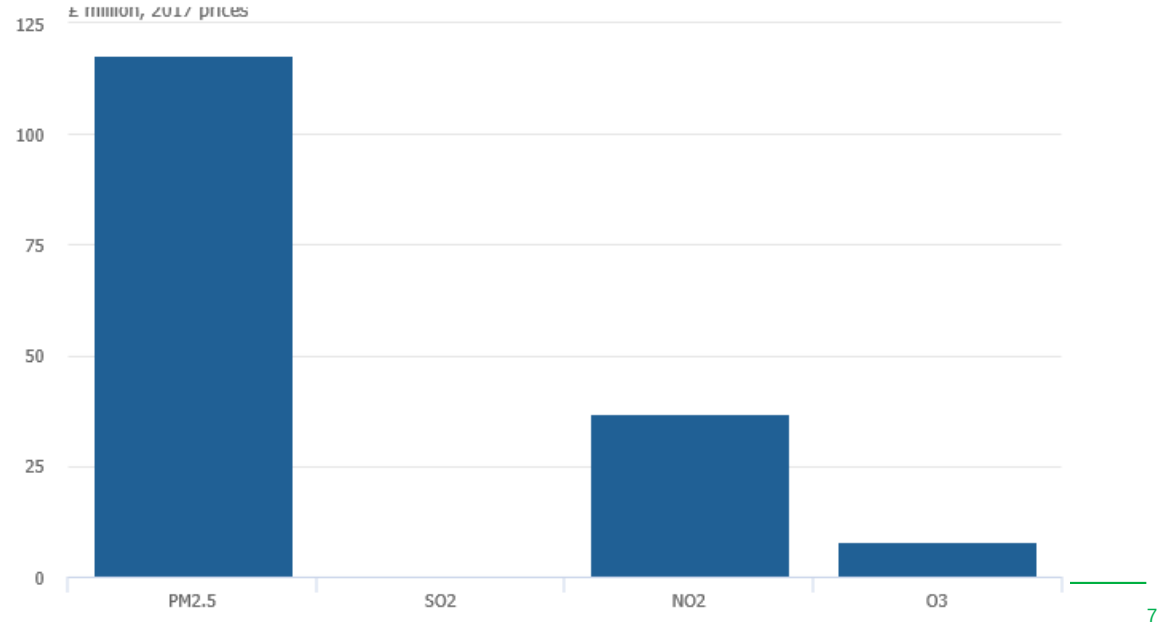
Regulating services – Air pollution removal

- Split out from national account – dynamic transport model of air pollution with and without vegetation
- Different pollutants give very different results
- % reductions are very small in urban areas (<1% for PM2.5 and NO2);
- But urban has disproportionate value - 14% of UK value
  - PM2.5 concentrations are higher in urban areas – greater removal
  - Higher concentration of beneficiaries
- In need of updating

Pollutant removed by habitat, urban green and blue space in Great Britain, 2017

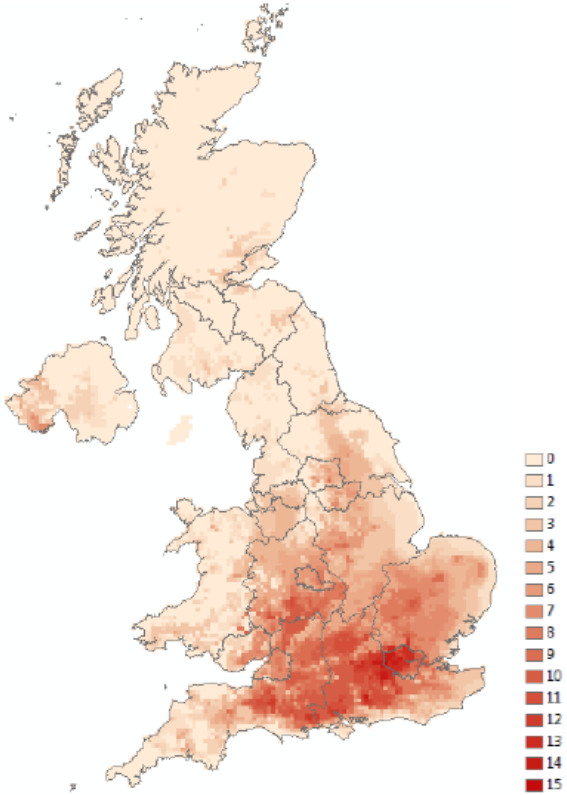


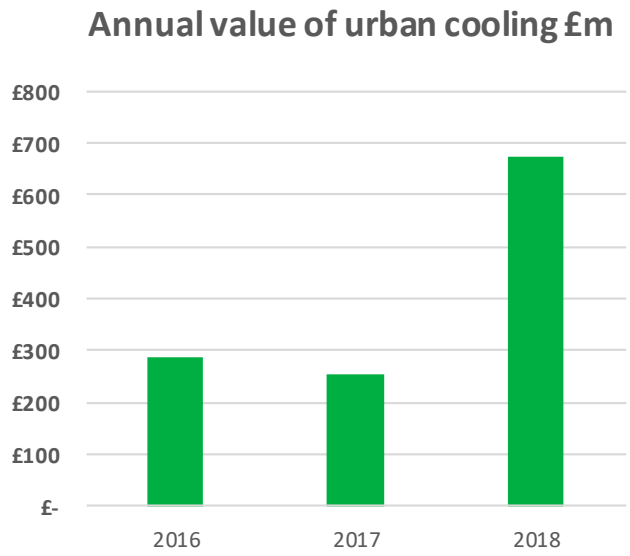
Avoided health costs from the removal of pollutants in 2017, (£ million, 2017 prices)



Regulating services – temperature regulation

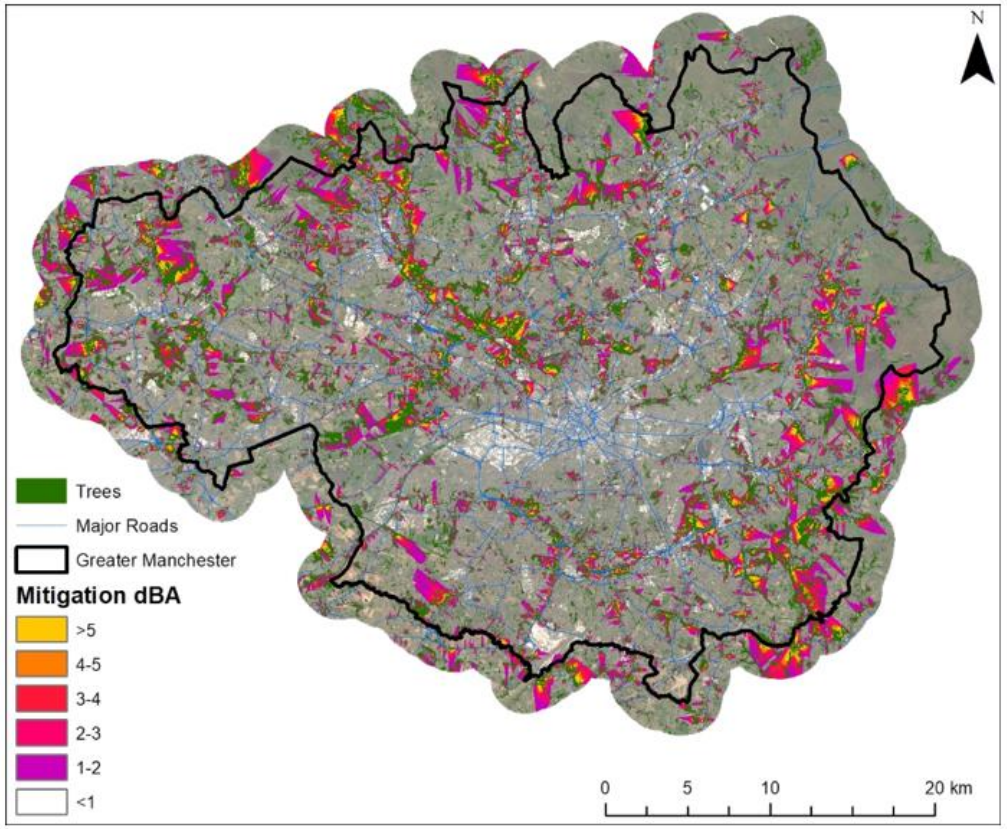
- Green and blue space (rivers, lakes, canals) benefits the economy by mitigating labour productivity loss and reducing air conditioning.
- Aim to develop a nationally consistent method
- 11 City Regions – cooling effect for each land cover type aggregated – assume to be averaged across urban area (very simplistic). Street trees excluded.
- Cooling effect varies 0.63 – 0.88 degrees
- Assume service only activated for days >28 degrees (see map)
- Benefit measured as:
  - Reduction in heat-stress productivity (GVA) losses depending upon sector
  - Reduction in air conditioning costs
- Key drivers of the service value are:
  - Hot days
  - GVA at stake
  - Area of blue / green space as % of urban area
- Very simplistic modelling. Longer term it is desirable to use remote sensing temperature data to ground truth estimates of cooling, ideally spatial modelling of the service.





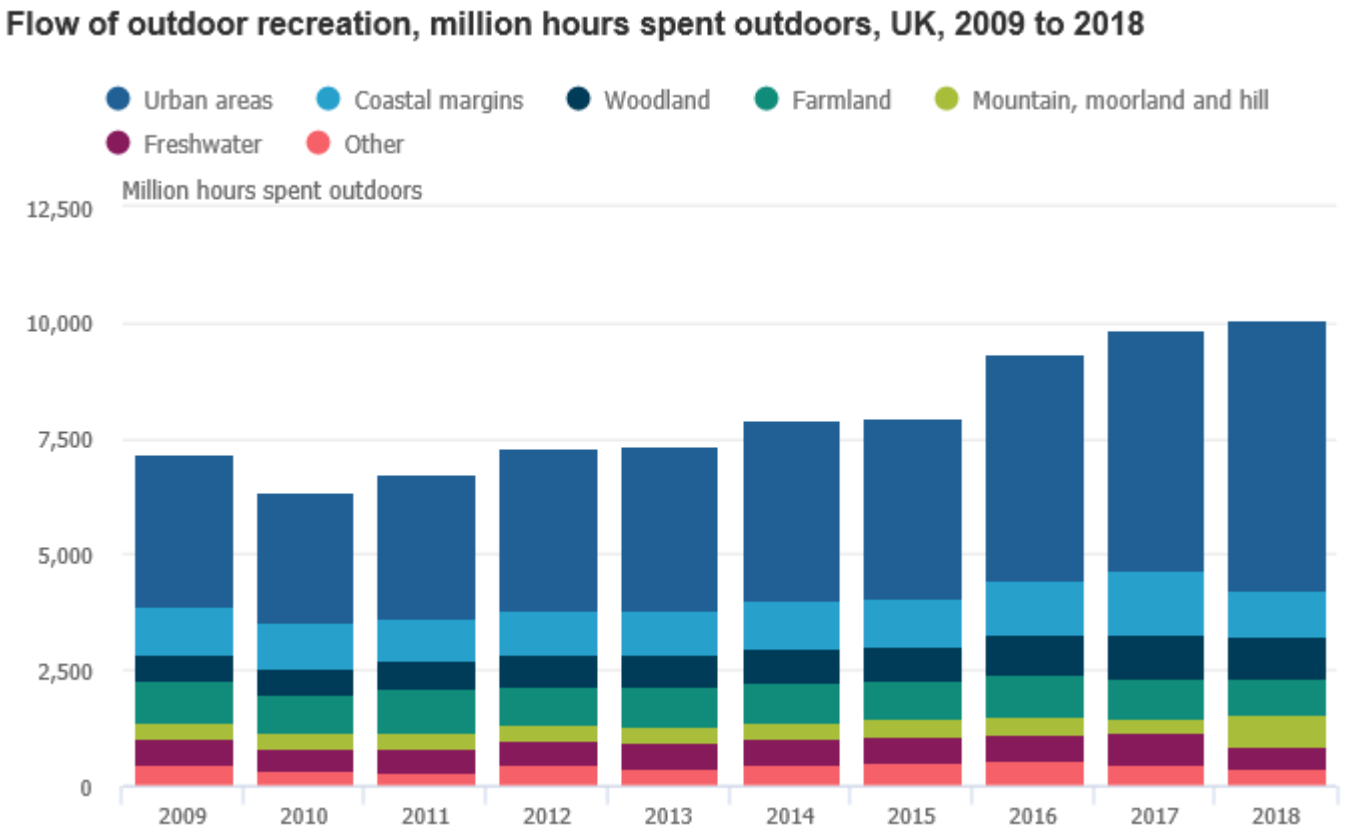
Regulating services – Noise regulation

- Vegetation can protect against noise pollution, by acting as a physical buffer between the noise pollutant and those nearby. Noise associated with adverse outcomes through lack of sleep and annoyance.
- Service limited to roadside vegetation mitigating traffic noise of major urban roads – location is everything!
- Ideally would have specialist model like air pollution estimating noise levels with / without vegetation
- Modelling tested in Greater Manchester – method applied across all UK urban areas
- 167,000 buildings received the service in 2017
- Apply standard UK noise damage costs to population - £14.4m in 2017
- Methodology currently under review to make more robust – but service likely to be quite small.



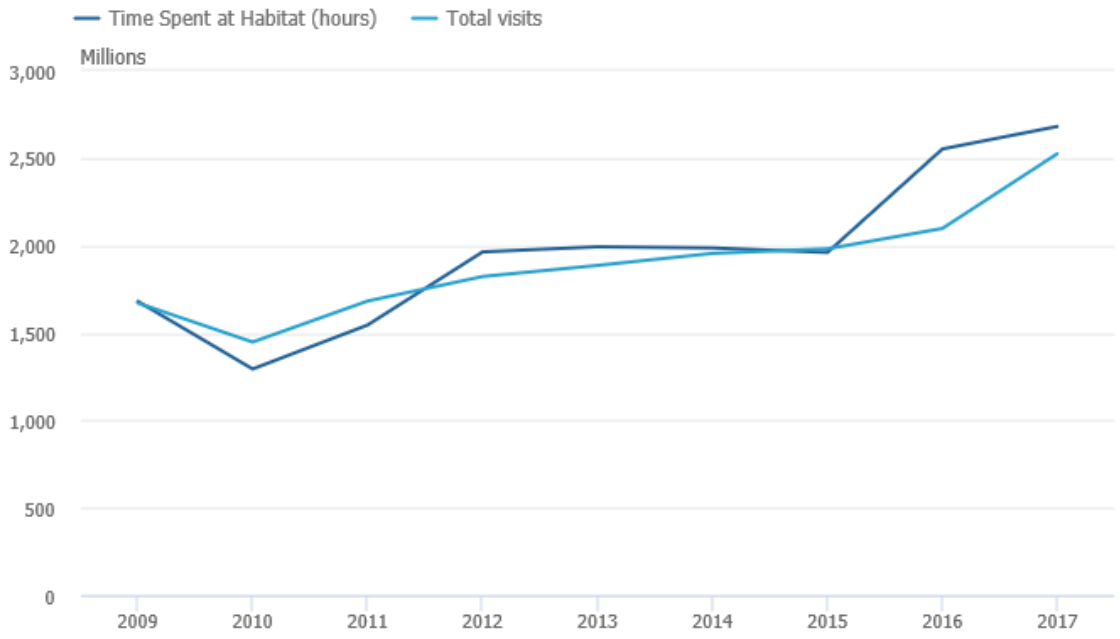
Cultural services – urban so important for nature-based recreation

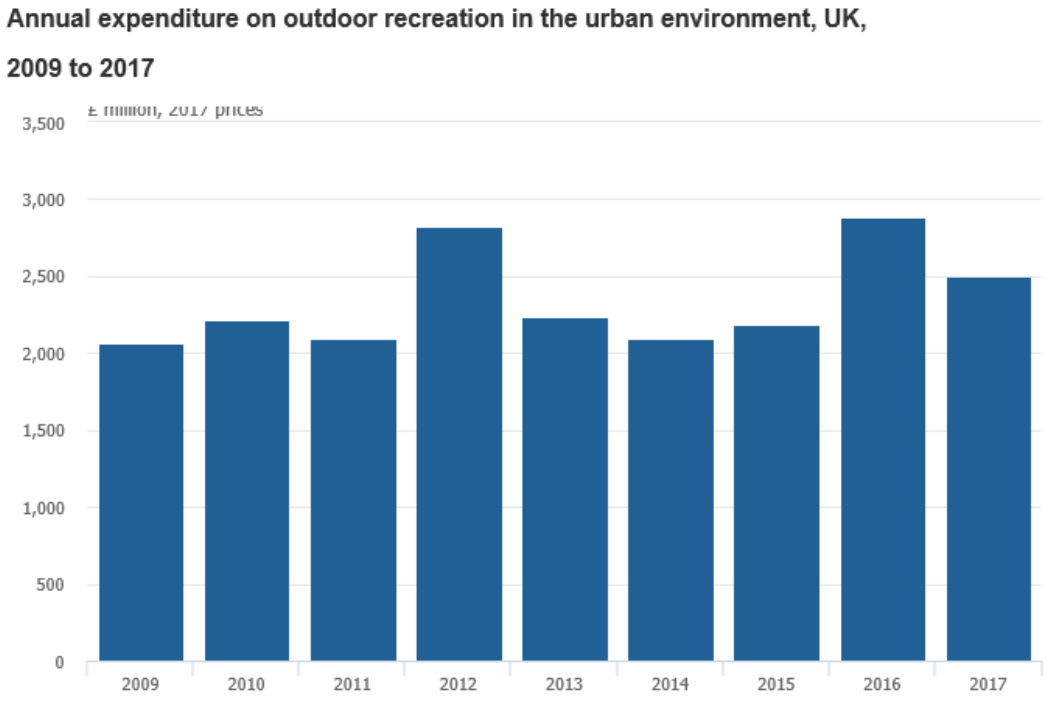
Urban visits dominate time spent in the UK natural environment



Cultural services – environmental settings for recreation and leisure

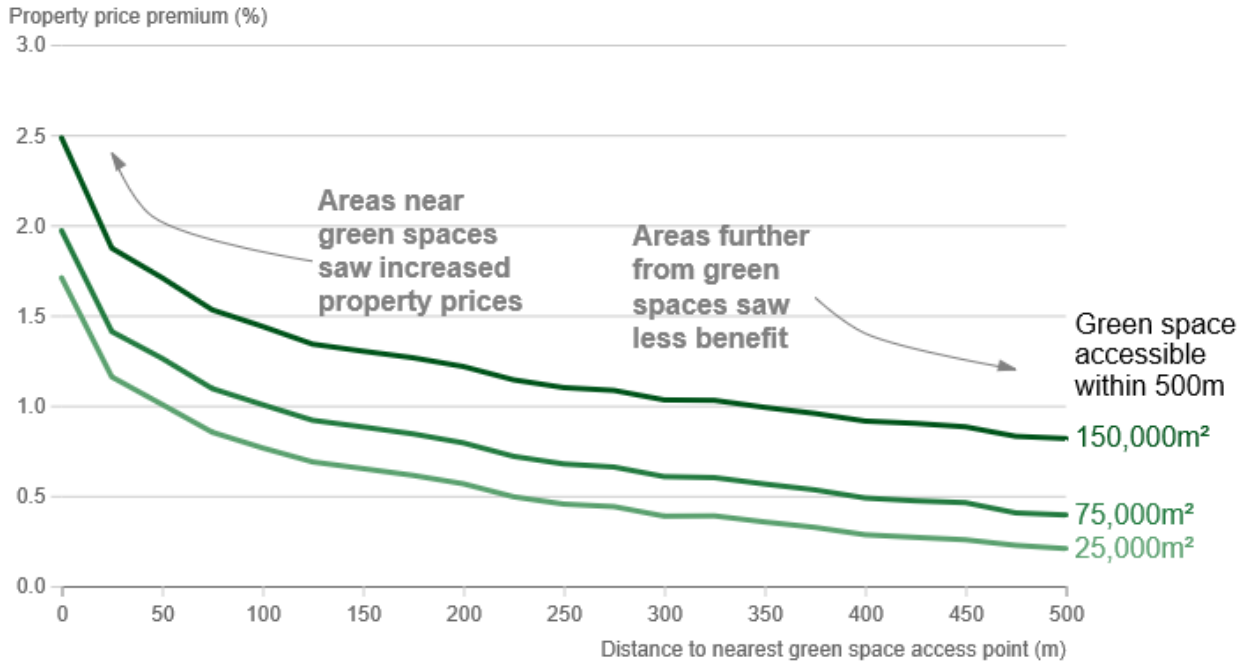
- Different beneficiaries / benefits associated with one service – additive if exchange values
- Physical service can be measured by time or trips
- Core valuation based on travel and entry costs - £2.5 billion in 2017
- Excludes local / “free” visits - can be picked up in house price data (next slide).
- Overnight trips excluded





Cultural services – valuing local recreation and amenity through hedonic pricing

- Access to local parks are 'paid for' when purchasing a house – like a membership ticket
- Use house price data to estimate effect of green and blue space on price – one characteristic among many
- 1.3% average premium on homes within 500 metres of accessible green and blue spaces - larger spaces + 2.5%
- Additional 2% premium where there is a view of green or blue space (visual amenity)
- Translate capital values into annual rental equivalents
- Valued at £2.6 billion in 2017 (of which visual amenity 12%)
- Possible double-counting with regulating services?



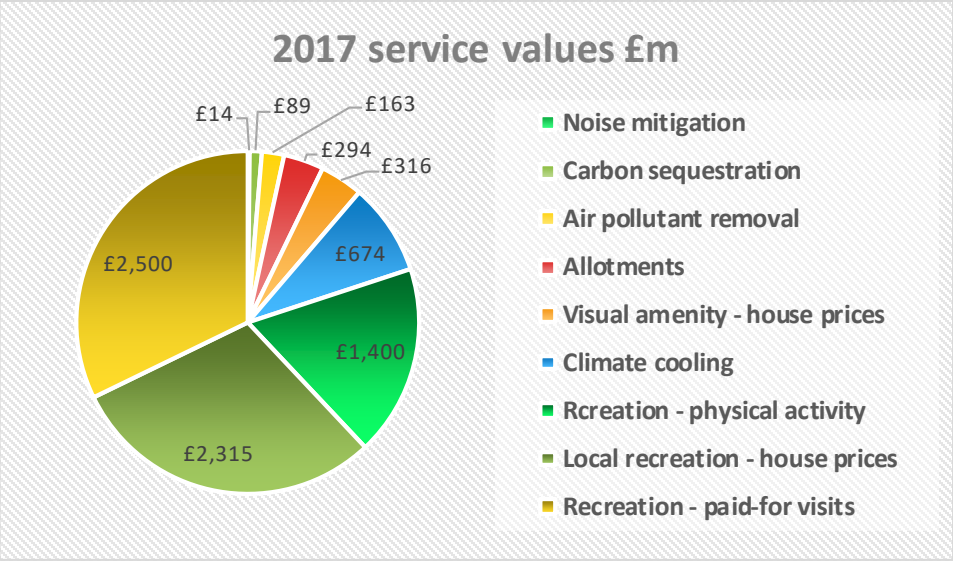
Valuing physical health benefits from recreation

- Not yet formally integrated
- A proportion (~18%) of visits sufficiently “active” to imply a health benefit – can be converted into “quality adjusted life years”
- QALYs have a cost of delivery to health providers
- In 2015, 362 million visits to green space provide a measurable health benefit
- 362m visits = 74,000 QALYs = replacement cost of £1.1. billion
- Can be updated to later years

- Values seen as additional:
  - exchange values used
  - Separate beneficiary i.e. health providers
- Tricky issues about causality / counterfactual

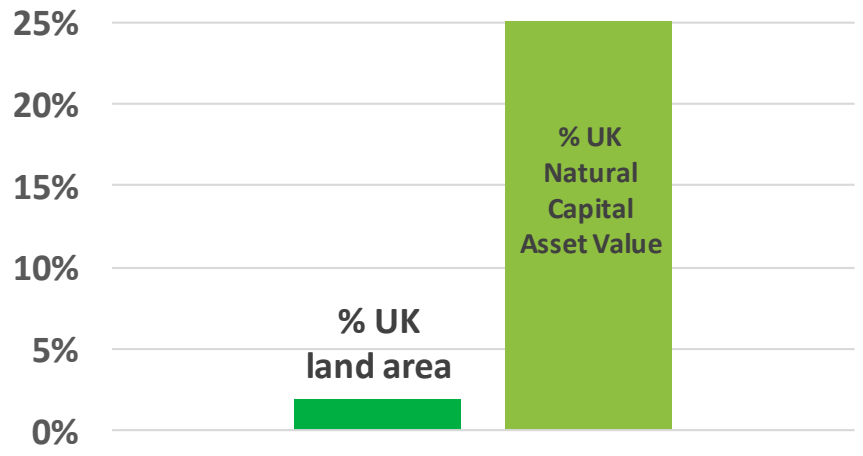
Key insights from UK Urban Accounts

- Urban ecosystem – like the urban economy – is disproportionately valuable nationally
- Provide a range of measurable services that benefit local populations
- Cultural services dominate, but regulating services significant
- Health benefits significant if indicative
- Some methods / estimates can scale down to sub-national areas



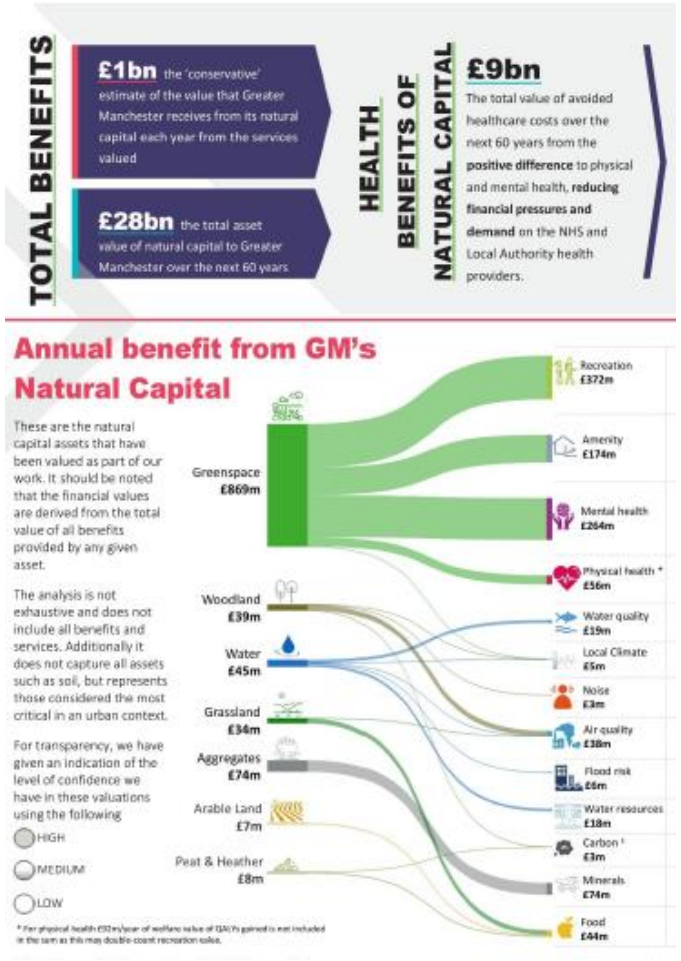
And so:

- Making value of urban nature more visible in national policymaking
- Giving a lead to local accounting initiatives



Interest in ecosystem (natural capital) accounting by UK municipal authorities

For every £ spent on public green space in London - £27 of benefits



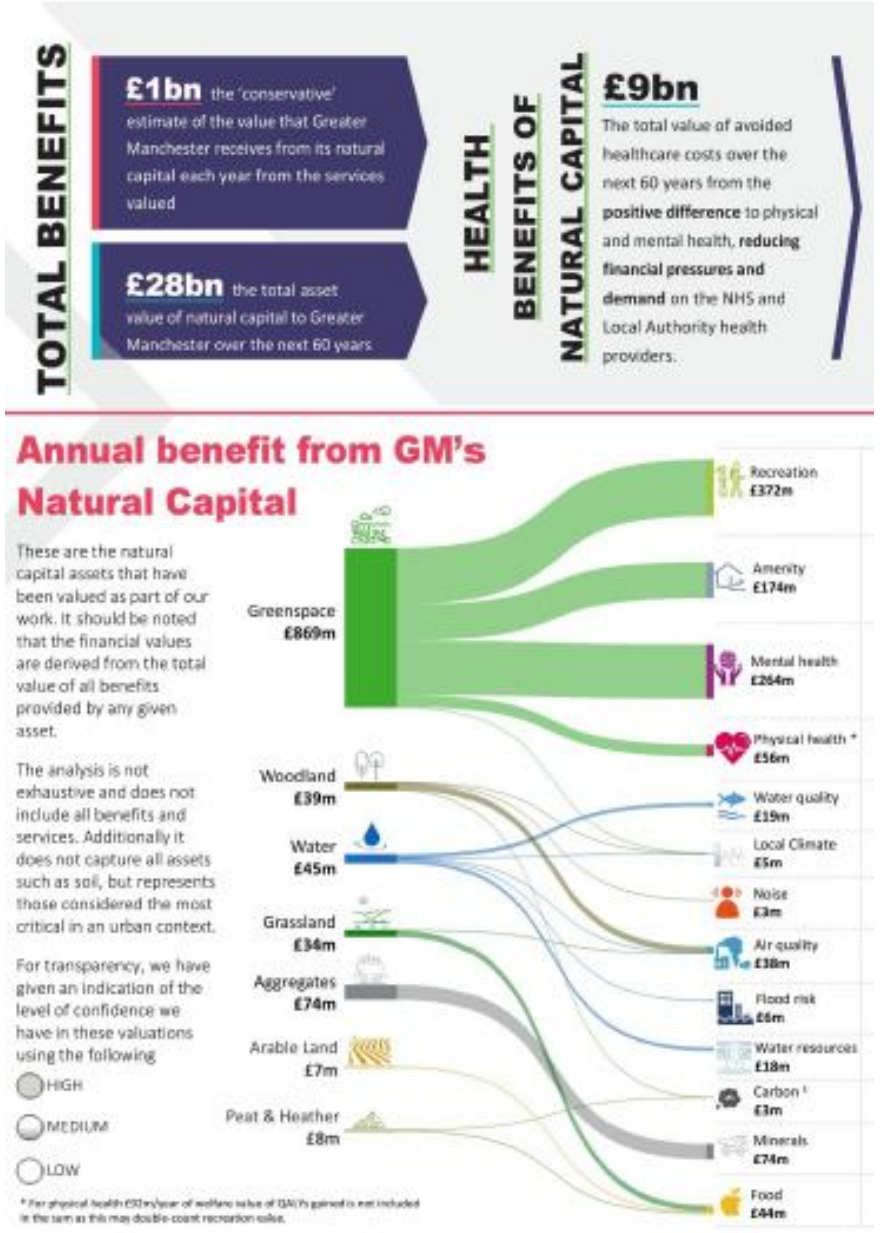
- Establishing an evidence base
- Some use of national accounts and methods
- Local additions / variations e.g. welfare and health values, maintenance costs

Birmingham City Council

Greater Manchester

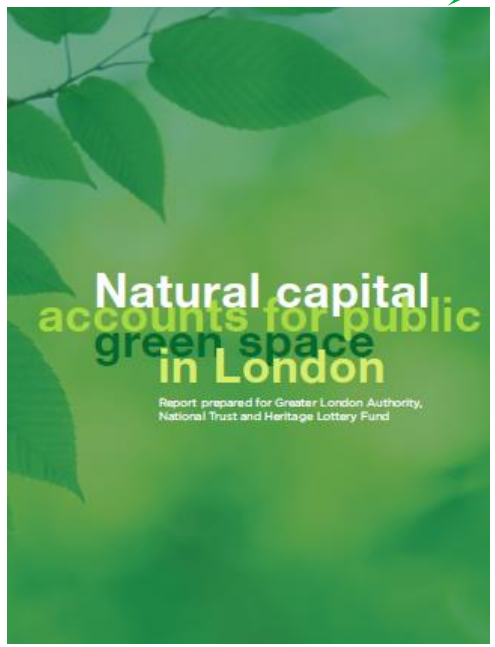
"This natural capital account developed for Greater Manchester and its 10 districts aims to interpret and calculate the social and economic benefits and services provided by the city-region's natural capital assets.

This is important as it helps us to understand the baseline value of Greater Manchester's natural capital, so we know what we currently have in order to successfully monitor the benefits over time. This will then help us improve and enhance our natural areas for everyone's benefit now and in the future."

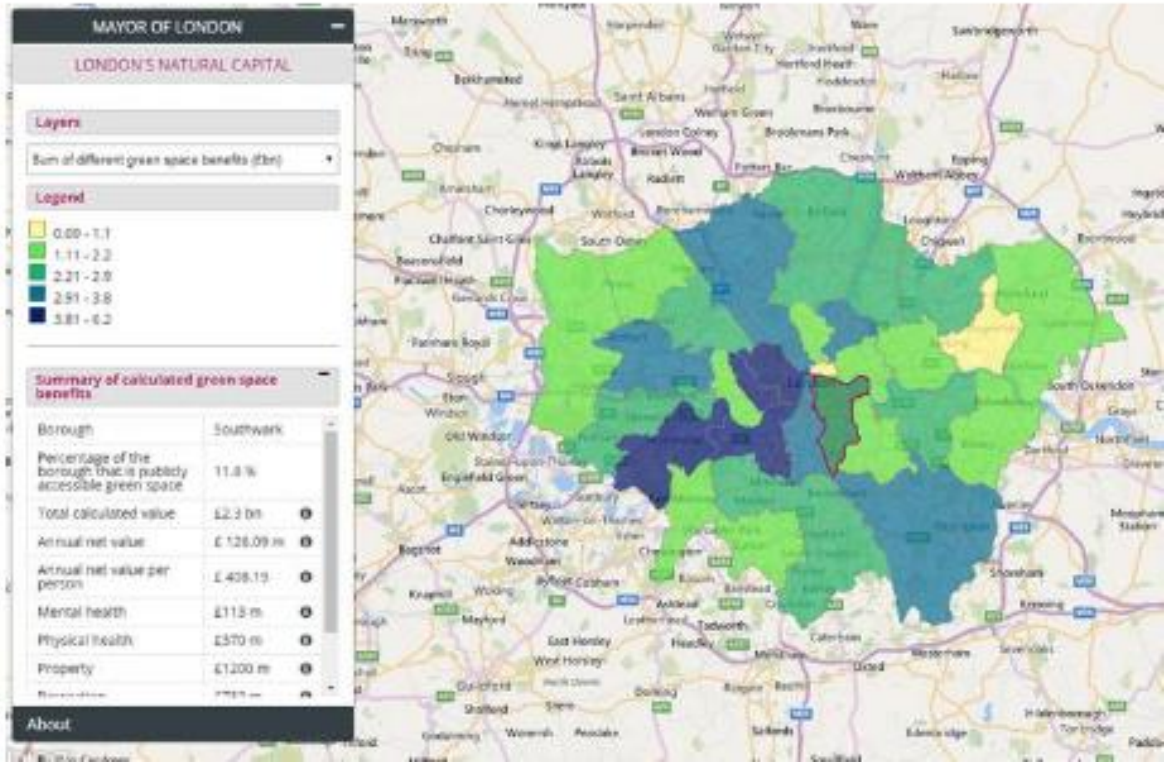


Greater London Authority

For every £1 spent on public green space in London - £27 of benefits



Natural capital accounts by borough



"A natural capital account can help to inform and improve decision-making by framing public green spaces as economic assets, and highlighting the range and value of benefits that they provide. This approach is supported by a national and London policy framework.

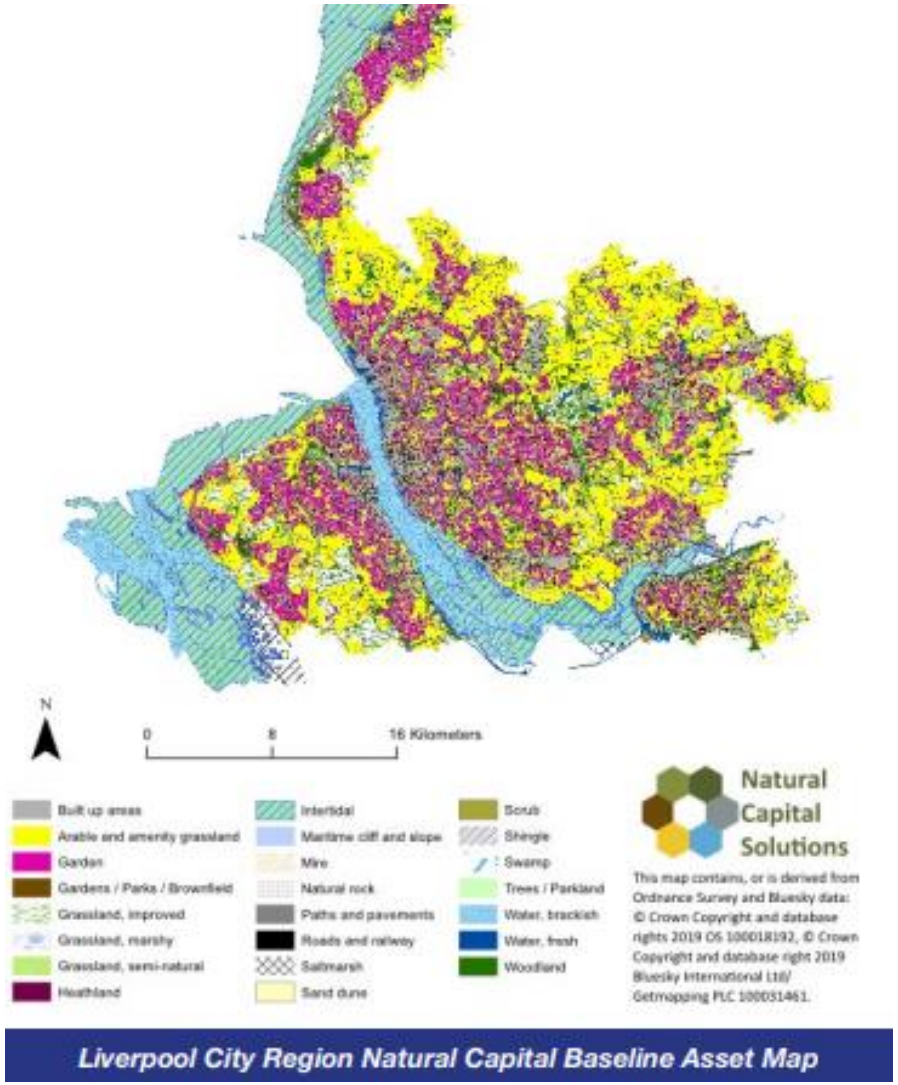
Protecting our natural heritage and public green spaces for sport and recreation is a cornerstone of city planning policy."

Liverpool City Region – “Natural Capital Baseline”

Maps ecosystem assets and services – identify areas of poor provision / need

- *“has the potential to inform local policy documents, such as the LCR Spatial Development Strategy and Local Authority Local Plans, the LCR Local industrial Strategy and other policy areas.*
- *forms the basis for the development of a Natural Capital investment plan. This has the potential to underpin green growth, support climate change targets and improve resilience, create a better environment for communities and wildlife …*”

Still early days – designed to have strategic (what to protect) and operational value (achieving net environmental gain)



Liverpool City Region Natural Capital Baseline Asset Map

Other examples

Birmingham City Council

True value of city's parks and open spaces calculated at £11billion

Published: Tuesday, 23rd July 2019

The value of parks and green estate in Birmingham, in terms of what they offer to all aspects of life in the city, has been calculated as £11billion.

An academic study, led by Birmingham City Council and the Consultancy for Environmental Economics & Policy, reached the conclusion – with the city council now looking at ways to unlock this potential to maximise the benefits for citizens and visitors.

In summary, the key findings of the report, entitled *Birmingham Health Economic Assessment & Natural Capital Accounts: Revealing the True Value of Council-managed Parks and Green Estate*, are as follows:

- Parks, greenspaces and allotments (covering an area of 4,700 ha) managed by Birmingham City Council have a total net Natural Capital asset value in the order of £11 billion (over a 25-year period);
- Each £1 the Council invests in its parks and greenspaces returns over £24 to society
- Physical and mental health benefits provided by Birmingham's Parks and Greenspaces are expected to add more than 3,300 Quality Adjusted Life Years (QALYs) each year (83,000 over 25 years);
- Council-managed woodlands capture more than 350 tonnes of pollutants each year, avoiding approximately 28 deaths, adding 489 life years for citizens and avoiding 133 hospital admissions;

Strong potential policy relevance, but questions and challenges remain

- Nature as asset, not liability – a source of value, a smart investment
- Softer gains of understanding
- Exchange values - point to potential savings?
- Welfare values - inform CBA; support funding bids?
- Inform strategic planning
- Identify investment priorities
- Policy drivers (net gain, nature recovery, green infrastructure)

But:

- Account only gives a baseline – not itself CBA
- Local accounts need repeating
- Difficult to prove link between investment and savings
- Divergence or convergence of methods?
- Accounts seen as one of several “tools” and approaches …

Accounts don't have a monopoly of evidence, but are a force for joining-up

- Accounts bring together disparate information into a coherent whole, and identify gaps for investing in data and methods
- Yet not the only form of evidence – need to integrate with and build on other sources
- Multi-functional → multiple benefits and economies of scale / scope
- Implies upfront strategic investment – accounts may be seen as nice to have?
- Other forms of evidence less easily integrated

Knowledge gaps and research priorities

- UK accounts – lot to do still on extent, condition and services. Update in 2022 – informed by stakeholder survey. Get involved:

  natural.capital.team@ons.gov.uk

- Some valuation methods established – others experimental. Biophysical as challenging as valuation

- Need more join-up with other mapping and monitoring initiatives

- Users / beneficiaries in urban areas

- Future trends in services and condition

- Linking to wider economic growth agenda

- Methods that can be easily scaled up / down spatially – how far can national accounts supply local accounting needs? Two way process?

References

For all UK natural capital accounting publications

https://www.ons.gov.uk/economy/environmentalaccounts/methodologies/naturalcapital

For all enquiries

natural.capital.team@ons.gov.uk

Urban valuations and associated methodologies can be found at

https://www.ons.gov.uk/economy/environmentalaccounts/bulletins/uknaturalcapital/urbanaccounts

(UK Urban Account 2019)

https://www.ons.gov.uk/economy/environmentalaccounts/bulletins/uknaturalcapitalaccounts/2020

(UK Natural Capital Accounts 2020, including updated valuation for urban cooling and hedonic amenity valuation)