
Developing urban ecosystem accounts for Great Britain

Emily Connors

Head of Natural Capital Accounting
Office for National Statistics (UK)

UK motivation

UN 2014

54%

Of the world's
population lives in
a town or city

UN 2014

82%

Of the UK
population live in
urban areas

ONS 2017



5,900

Life years saved in
UK urban
environments
from nature

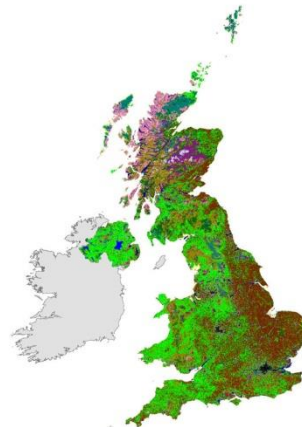
What are we trying to achieve?

- Produce an urban ecosystem account to help private and public sectors value and monitor the extent and condition of nature in the urban environment
- Help policy makers prioritise investment and make informed decisions.

Strategy for account development

| | | | |
|--------------|--|---|--|
| Complete | <p>UK account</p>  | <p>Cross-cutting accounts</p> <ul style="list-style-type: none"> Land cover and land use Carbon stock Pollution removal Recreation | <p>Habitat accounts</p> <ul style="list-style-type: none"> Farmland Woodland Freshwater Urban |
| Not complete |  | <p>All ecosystem services</p> <ul style="list-style-type: none"> Biodiversity Soil | <ul style="list-style-type: none"> Coastal margins Semi-natural grassland Marine Mountains, moorland and heath |

Spatial accounts



Which can be broken down by region and by habitat

What are natural capital accounts?

Non-monetary (physical) accounts

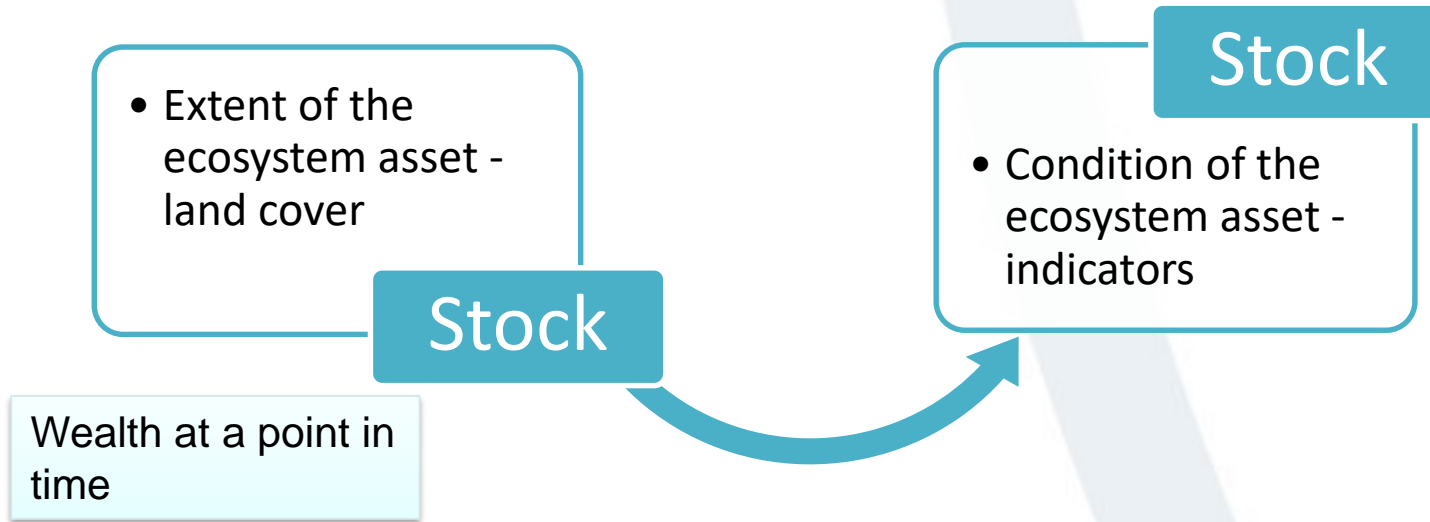
- Extent of the ecosystem asset - land cover

Stock

Wealth at a point in time

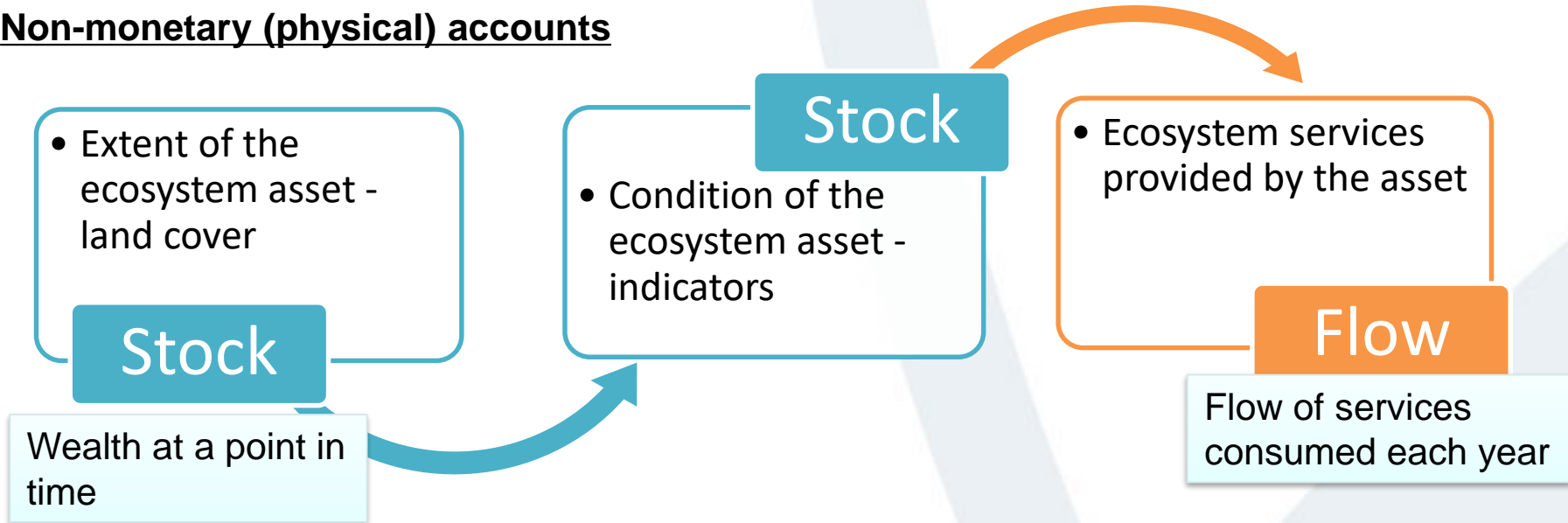
What are natural capital accounts?

Non-monetary (physical) accounts



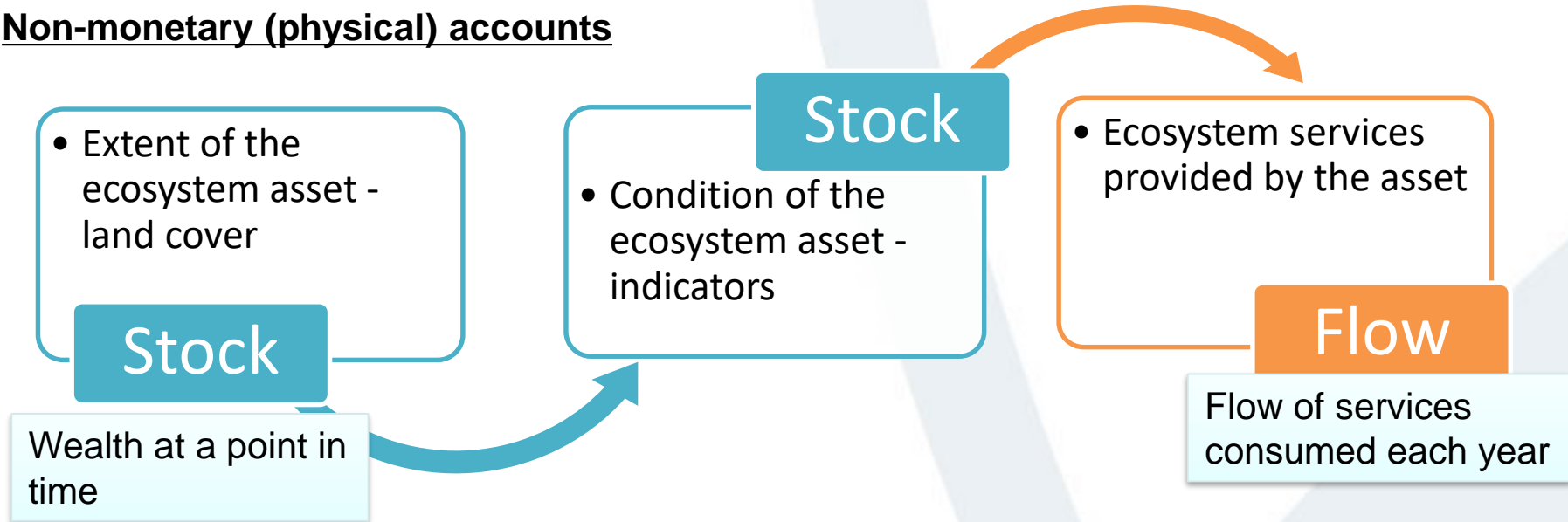
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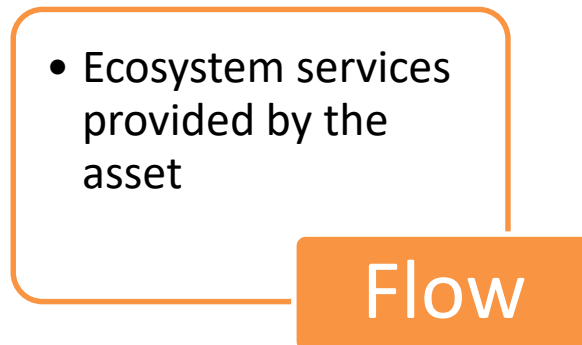


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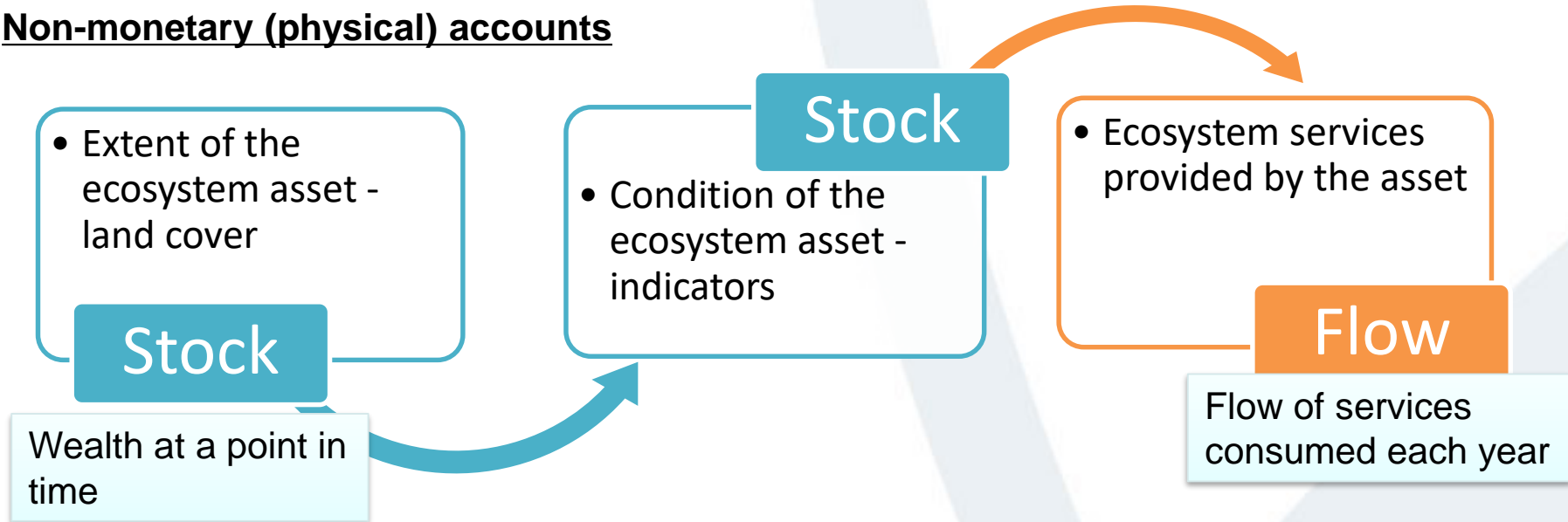


Monetary accounts

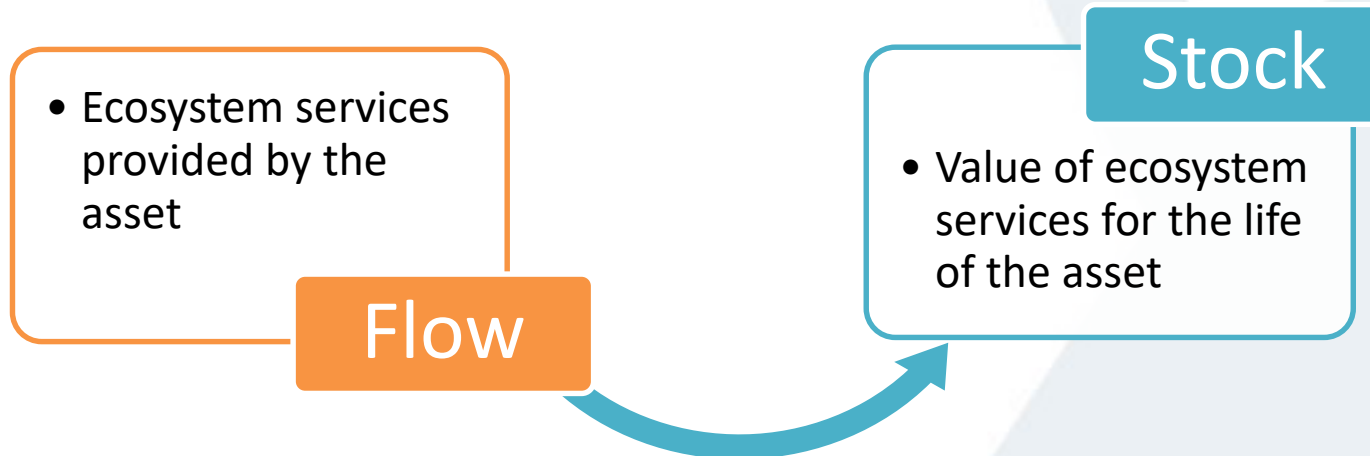


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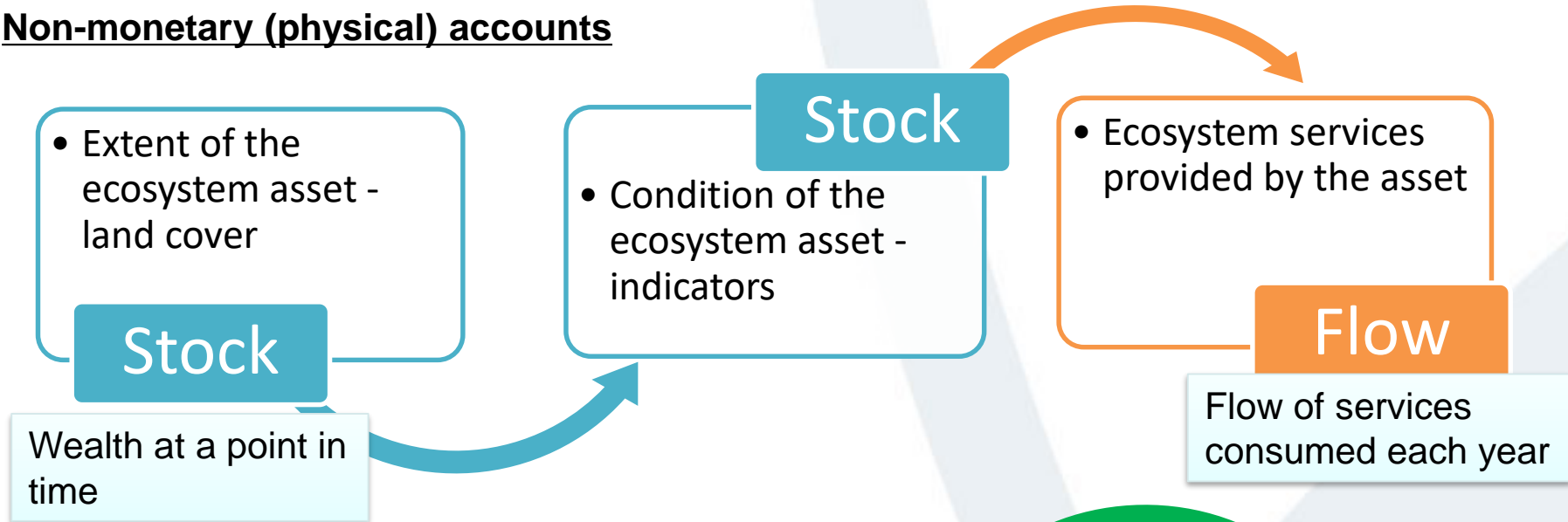


Monetary accounts

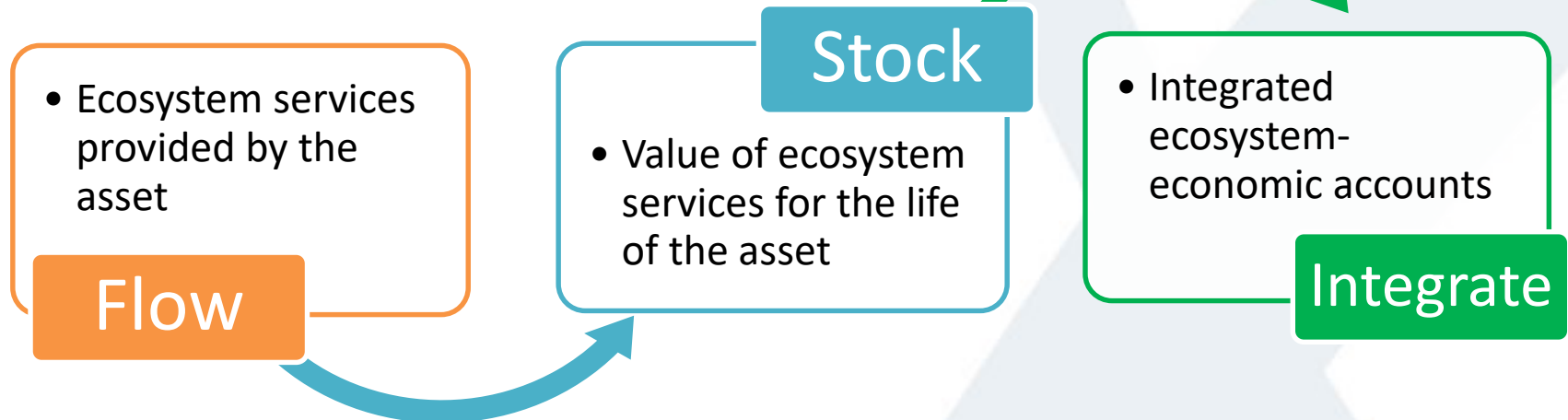


What are natural capital accounts?

Non-monetary (physical) accounts



Monetary accounts



Extent - Defining urban

Land cover or population?

- The ONS (2011) Rural-Urban Classification defines output areas as urban if they have a population over 10,000. The land cover map however, as the name suggests, defines what's urban on land cover.

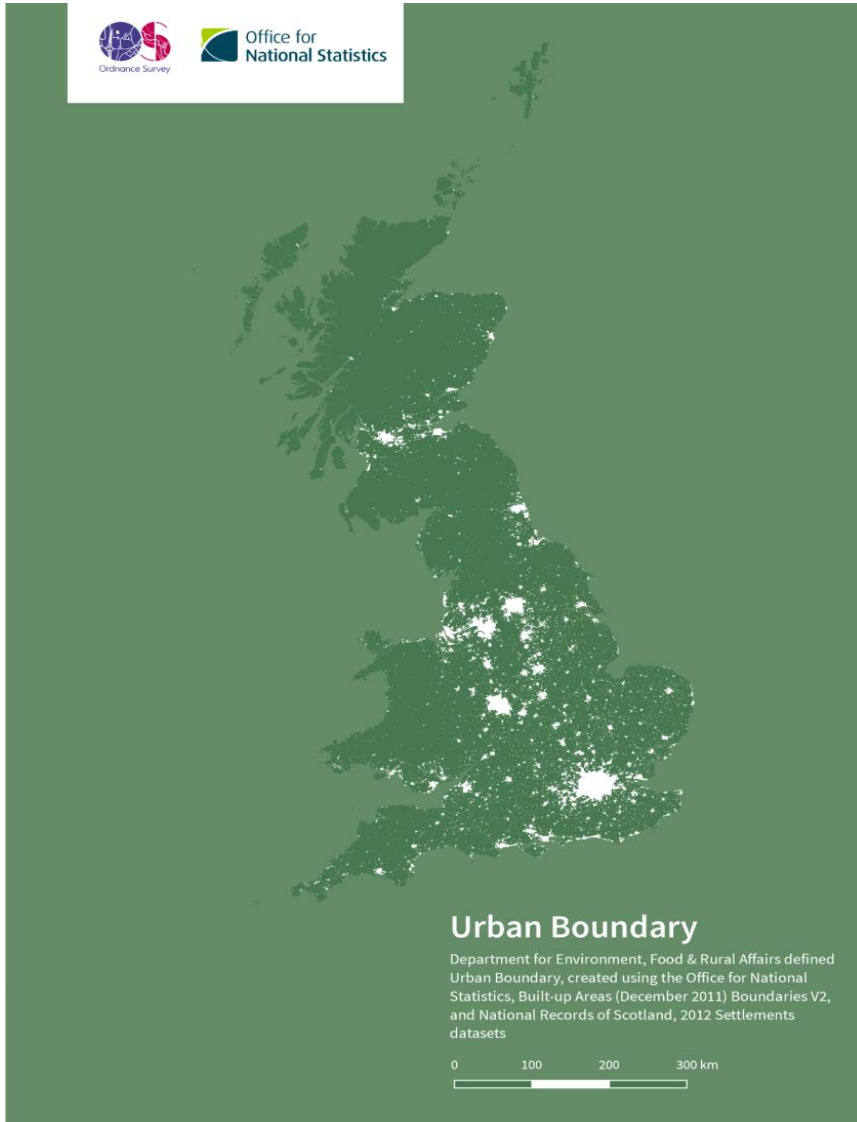
How we define urban.

Data Source: ONS (2011) Built-up-Areas dataset

Limitation: Excludes large areas of natural capital surrounded by urban land such as large parks or rivers

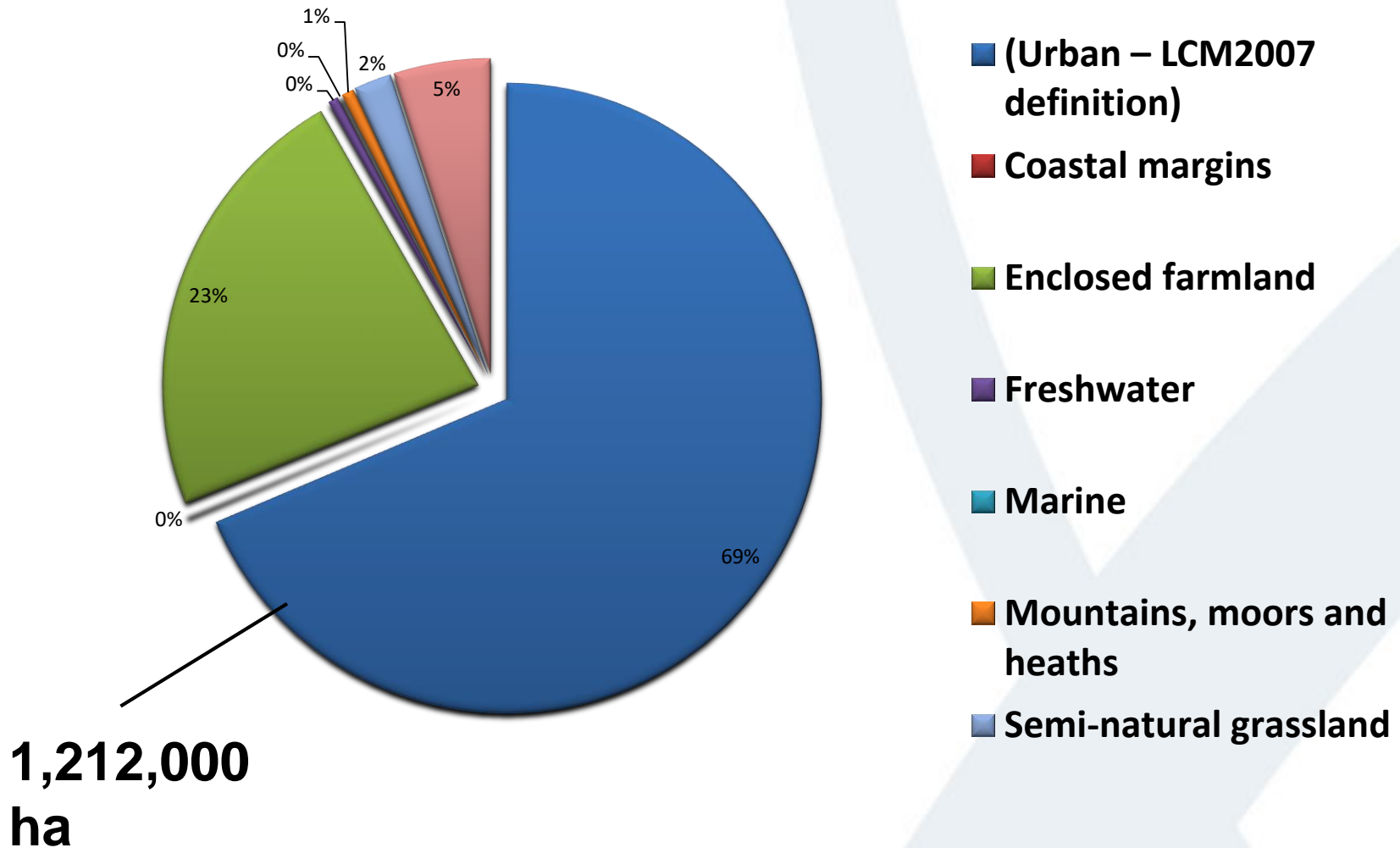
Modification: Introduce a buffer zone around the built up area map

Urban boundary

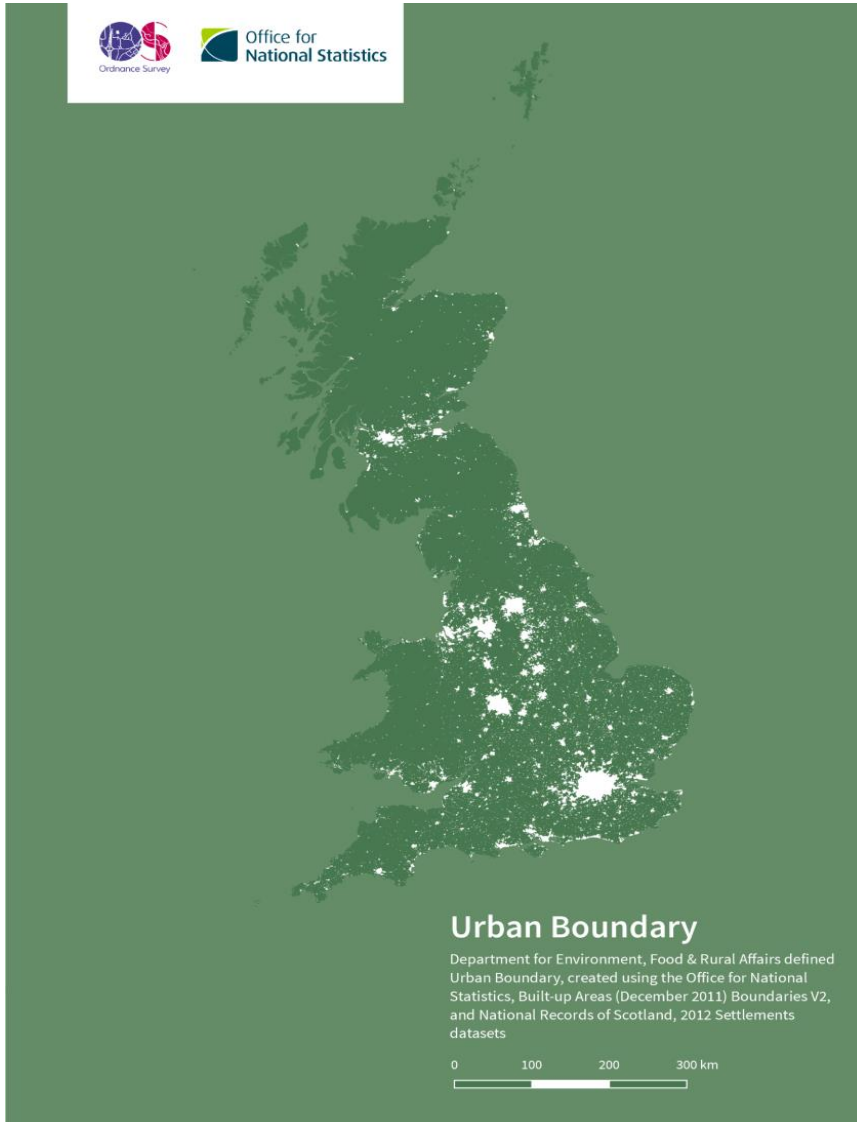


- ✓ Boundary
- ✓ Green and blue space within...

It is a cross cutting habitat account



Urban boundary



- ✓ Boundary
- ✓ Green and blue space within...

...but not at the detail we need for urban areas

Need another data source.

Ordnance Survey Greenspace map

Publicly accessible greenspace

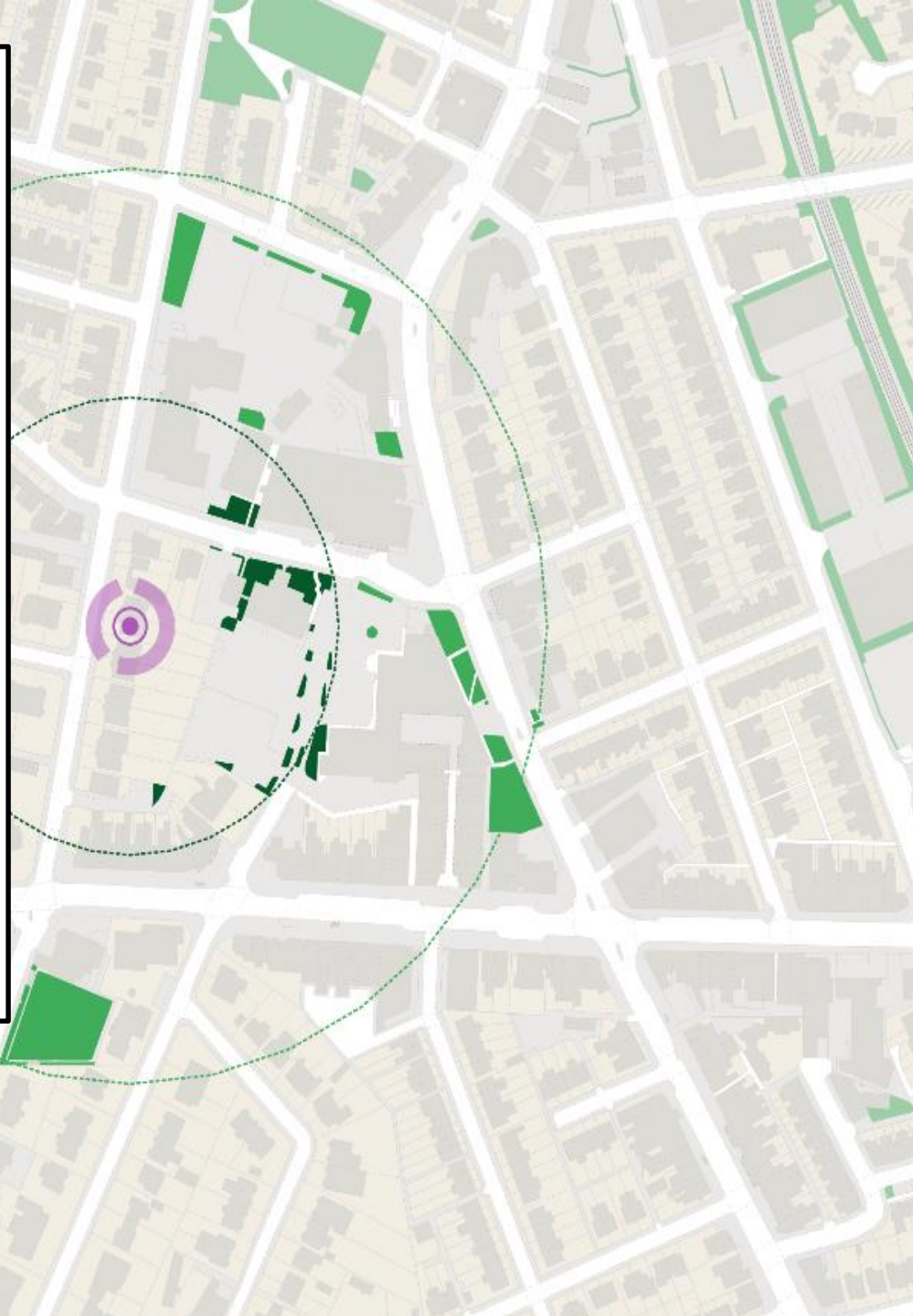
- Parks/public gardens
- Playing fields
- Cemetery
- Open access land
- Religious grounds

Non-publicly accessible greenspace

- Golf course
- Allotments and growing spaces
- Bowling green
- Other sports facilities

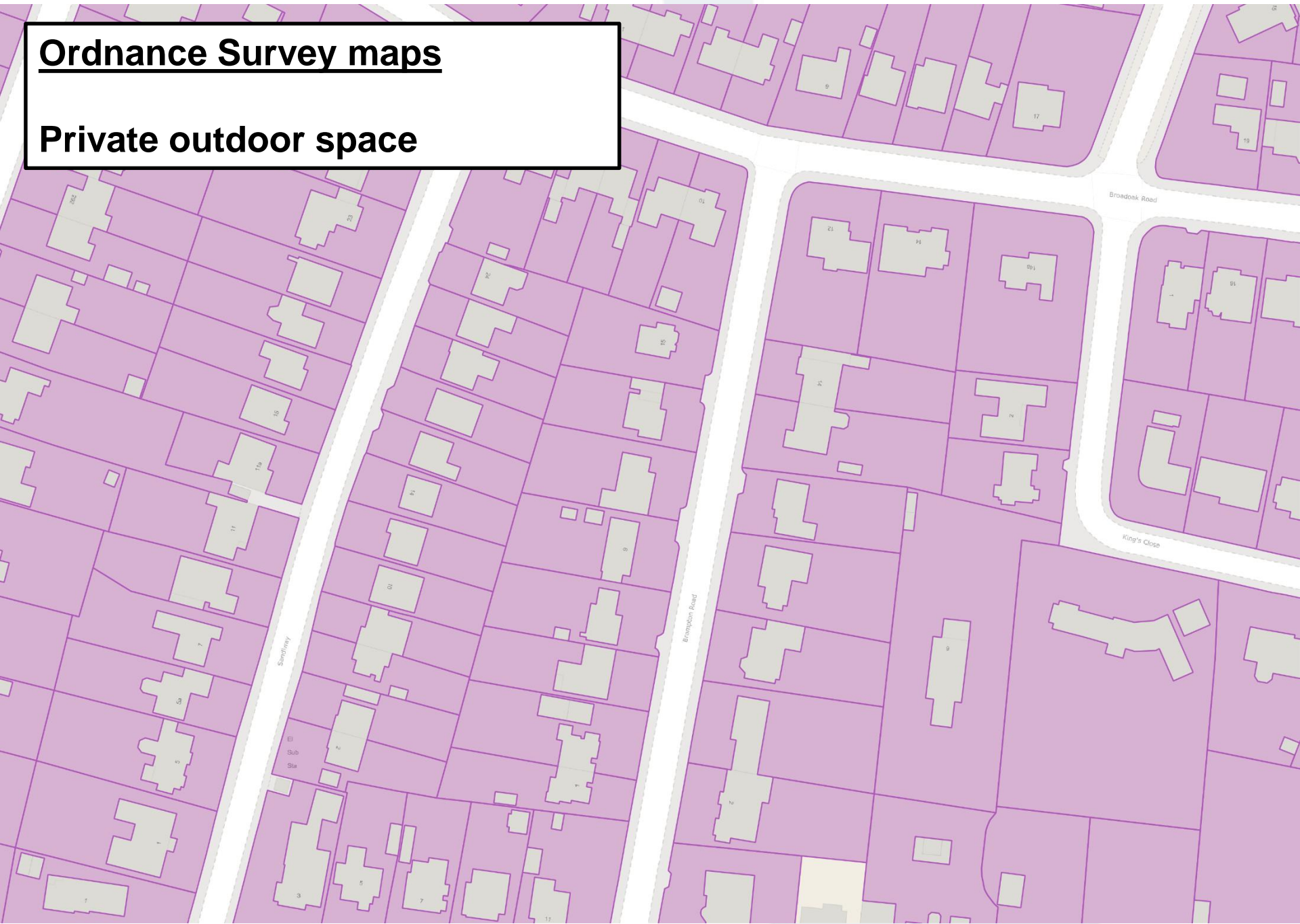
Non functional greenspace

Blue space



Ordnance Survey maps

Private outdoor space

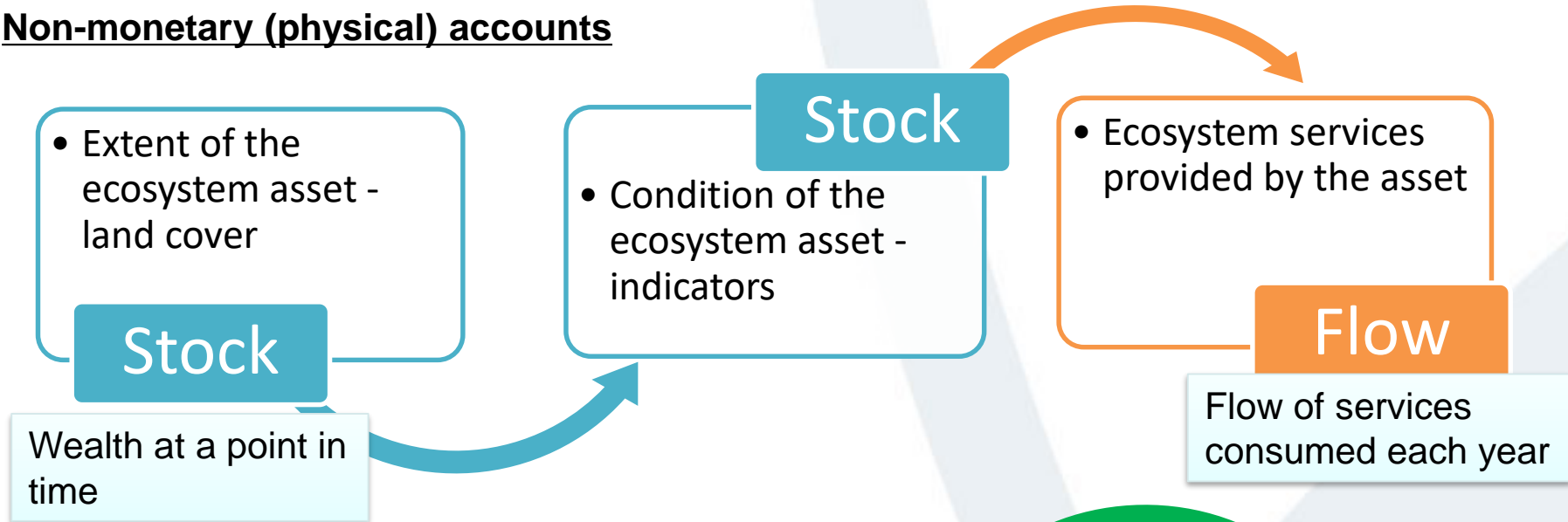


Extent account

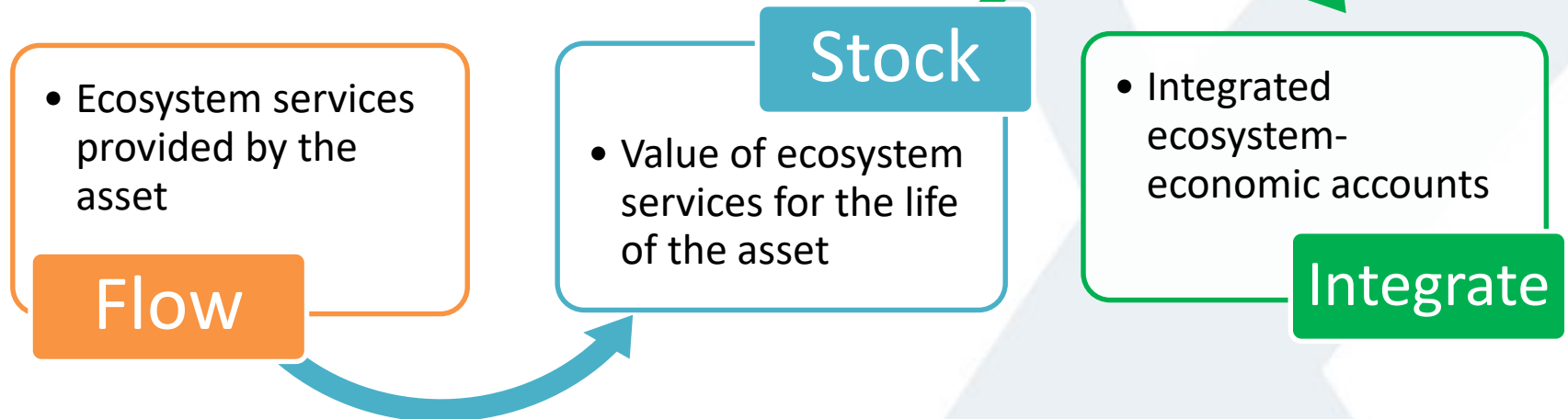
| | Unit | 2015 |
|--------------------------------|------|------|
| Urban area | Ha | |
| Natural Land Cover | Ha | |
| Functional green space | Ha | |
| Non-functional greenspace | Ha | |
| Publicly accessible greenspace | Ha | |
| | | |
| Blue space | Ha | |
| Private outdoor space | Ha | |

What are natural capital accounts?

Non-monetary (physical) accounts



Monetary accounts



Condition Indicators

What we would like

Sustainable urban drainage schemes

Soil chemical status

Degree of compaction

Biodiversity

Presence of rare species

Perimeter access points

Public rights of way

What we have

SSSI condition

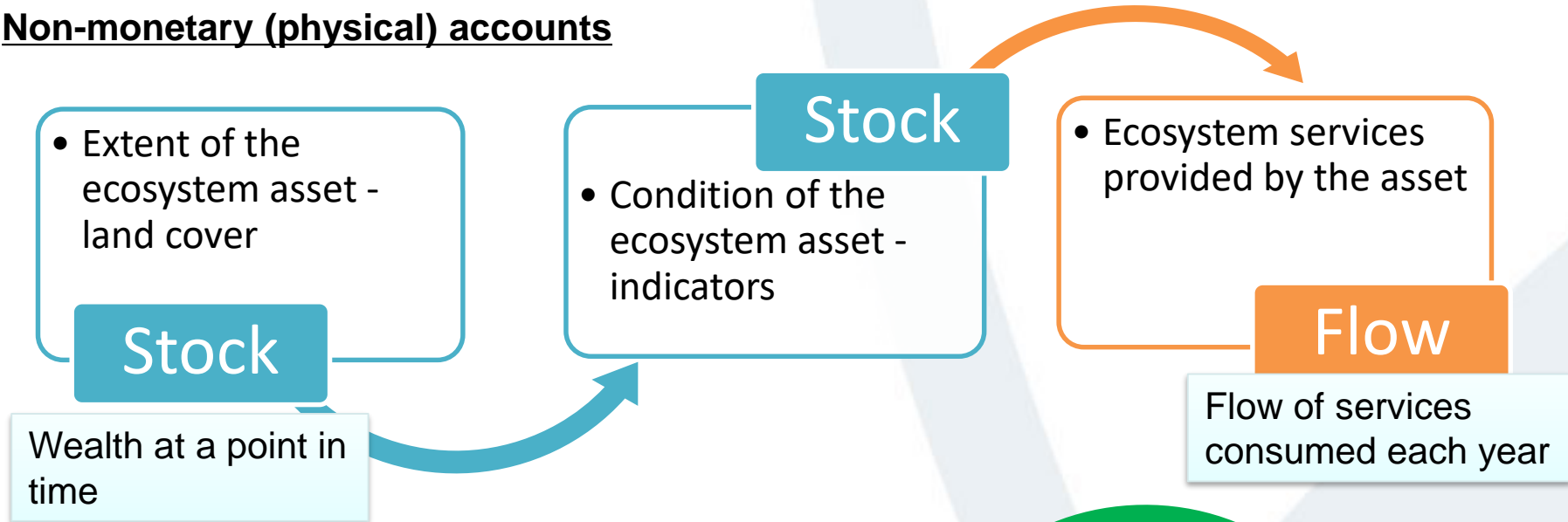
Green Flag Status

Access points

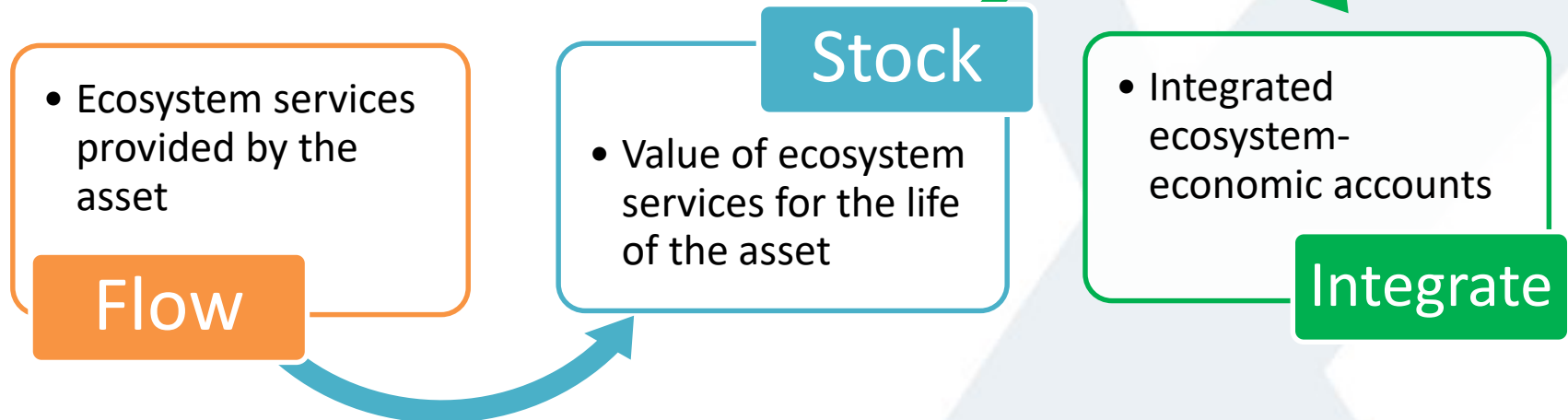
Average distance to functional green space

What are natural capital accounts?

Non-monetary (physical) accounts



Monetary accounts



Ecosystem services

Provisioning

Food

Fibre

Water

Fuel/energy

Regulating

Air filtration

Water filtration

Protection against noise,
smell and visual pollution

Flood, erosion and
landslide protection

Temperature regulation

Pollination and seed
dispersal

Cultural

Recreational enjoyment

Scientific and educational
interactions

Heritage and aesthetic
interactions

Symbolism

Existence

Ecosystem services – new services developing

Provisioning

Food

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Valuing cultural services

How do we currently measure recreation?

- Travel and entry costs
- Previously used opportunity costs

Limitations of travel costs?

- No value is assigned for those who have not paid to enter to travel to sites
- Underestimate

How can this value be captured?

- Access to local parks are 'paid for' when purchasing a house.

Cultural

Recreational enjoyment

Scientific and educational interactions

Heritage and aesthetic interactions

Symbolism

Existence

Hedonic pricing method to value cultural services

What is the hedonic price method?

- Products can be broken down in to a number of characteristics.

How can we use it?

- Use house price data to estimate the extent to which the green and blue space affect price

What are we trying to value?

- A bundle of ecosystem services which are 'paid for' when purchasing a house e.g. access to a park or aesthetic views

Cultural

Recreational enjoyment

Scientific and educational interactions

Heritage and aesthetic interactions

Symbolism

Existence

Potential Variables

Structural

- Number of bedrooms
- Floor area
- Age
- Number of bathrooms
- Type
- Garage

Local

- Quality of schools
- Crime rates
- Average income
- Distance to places of work
- Happiness/
Wellbeing?

Environmental

- Distance to greenspace
- Distance to bluespace
- Proportion of green/bluespace in area
- Size of greenspace
- Size of domestic garden

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A lot of information to gather. Needed to work with many ONS teams and government bodies for this to work.

Potential Variables

Environment
Ministry

ONS Methodology
and Geography

Structural

- Number of bedrooms
- Floor area
- Age
- Number of bathrooms
- Type
- Garage

ONS Housing and
Data Collection

Local

- Quality of schools
- Crime rates
- Average income
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Ordnance Survey

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Advantages/ Disadvantages

Advantages:

- Estimates value based on real life choices rather than hypothetical ones (desirable from a policy perspective).
- Data on property transactions and characteristics are readily available.
- Fills a known gap in current recreation estimates – Free trips

Disadvantages:

- For accurate and robust estimates to be obtained from the method, large datasets are required
- Results depend heavily on the model specification that's used
- Represents a bundle of services e.g. amenity, health, views and therefore there's an obvious risk of double counting.

Ecosystem services – new services developing

Physical flows

All have involved modelling by natural science experts

Valuation

Combination of replacement cost, health damage costs, productivity loss

Regulating

Air filtration

Water filtration

Protection against noise, small and visual pollution

Flood, erosion and landslide protection

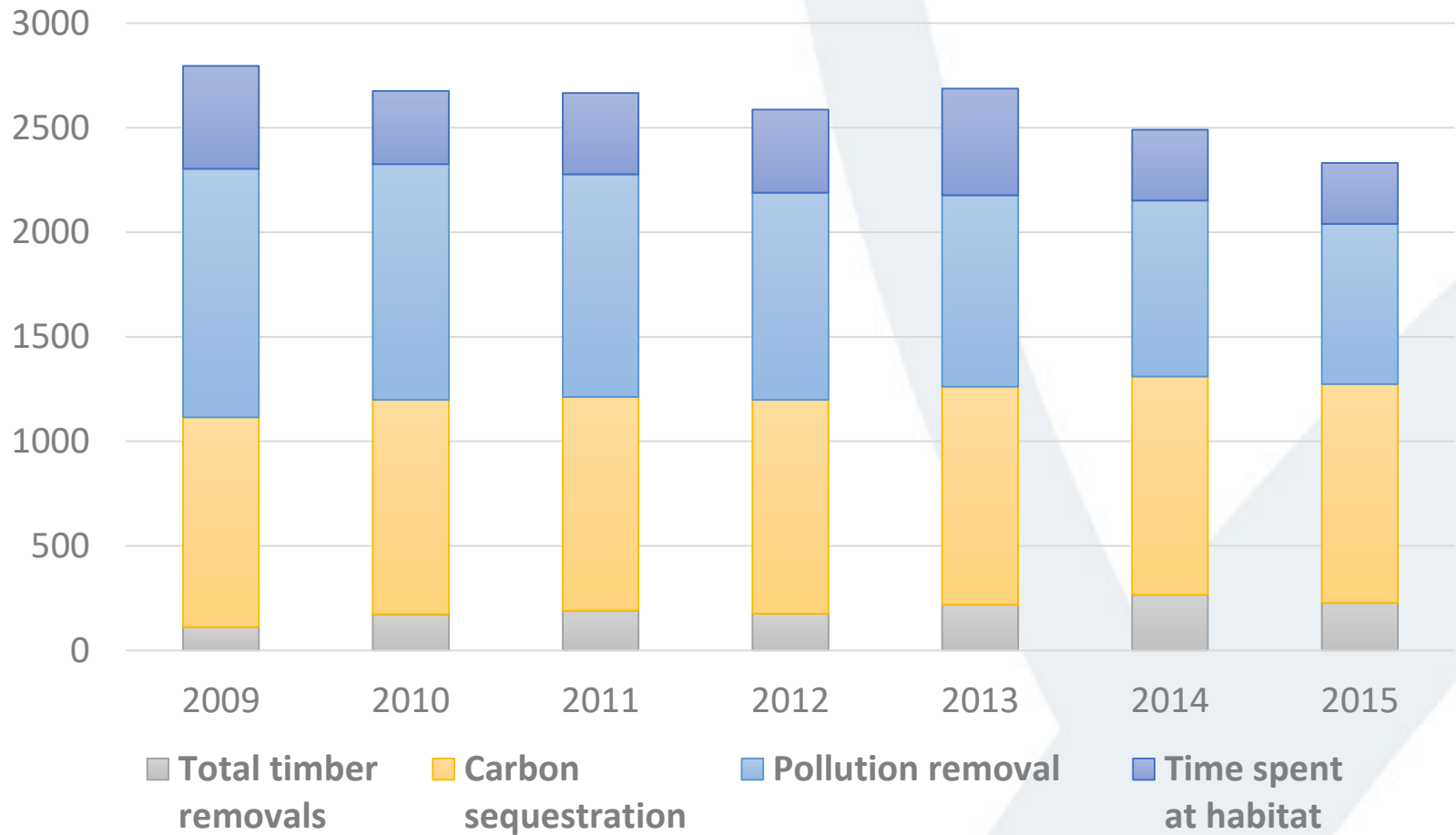
Temperature regulation

Pollination and seed dispersal

Ecosystem services account

| | Unit | 2015 Non-monetary | 2015 £ |
|--|---------------------------------------|----------------------|-----------|
| Allotments | tonnes | | |
| Agriculture | tonnes | | |
| Noise pollution regulation | No. of buildings with noise reduction | | |
| Air pollution regulation | Tonnes per year | | |
| Urban cooling (temperature regulation) | C | | |
| Recreation | No. of visits | | |
| | | | |
| Hedonic pricing value | | | |

UK Woodland accounts to demonstrate



In July we will publish....

- Initial urban ecosystem accounts:
 - Extent account
 - Partial condition account
 - Partial ecosystem service account
- Annual updates will then be made each year in our [broad habitat ecosystem accounts](#) - also include woodland, farmland and freshwater

Discussion points

- Is the urban environment an ecosystem?
- How should we define urban?
- What nature do we need to capture?
- What scale/resolution do we need?
- What do we need the valuations for?
- What is extent and what is condition?