

# Mapping Natural Capital and Ecosystem Services to inform local decision making and policy: **EcoServ-GIS**

**Dr Jonathan Winn**  
Scottish Wildlife Trust



# Content

- Why map Natural Capital?
- Why did we create EcoServ-GIS
- How we created EcoServ-GIS
- Uses of Natural Capital and ecosystem service mapping
- Challenges and experience in mapping Natural Capital



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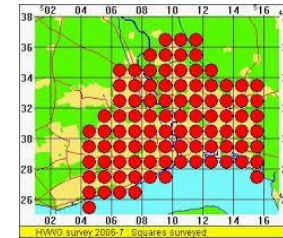
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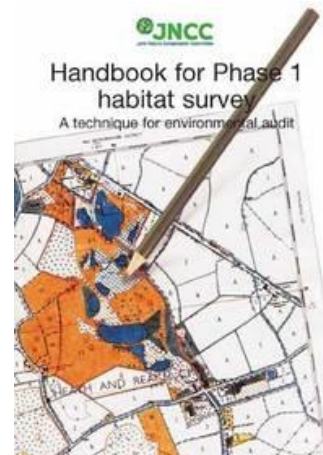
# **To include Natural Capital in decision making we need to know where it is...**

- Local authority + partners
- Spatial planning
- Sites + strategies
- Development plans
- Green Infrastructure
- Living Landscapes

# Available local habitat information is very variable across the UK



- Phase 1 habitat surveys
- Biodiversity Action Plan legacy....
- Local record centres
- Wildlife Trusts
- Local authorities



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# **EcoServ-GIS maps local ecosystem services**

**To show where Natural Capital delivers benefits to people**

- Include non-designated sites / general countryside
- Local planning and Green Infrastructure context
- Include cultural ecosystem services

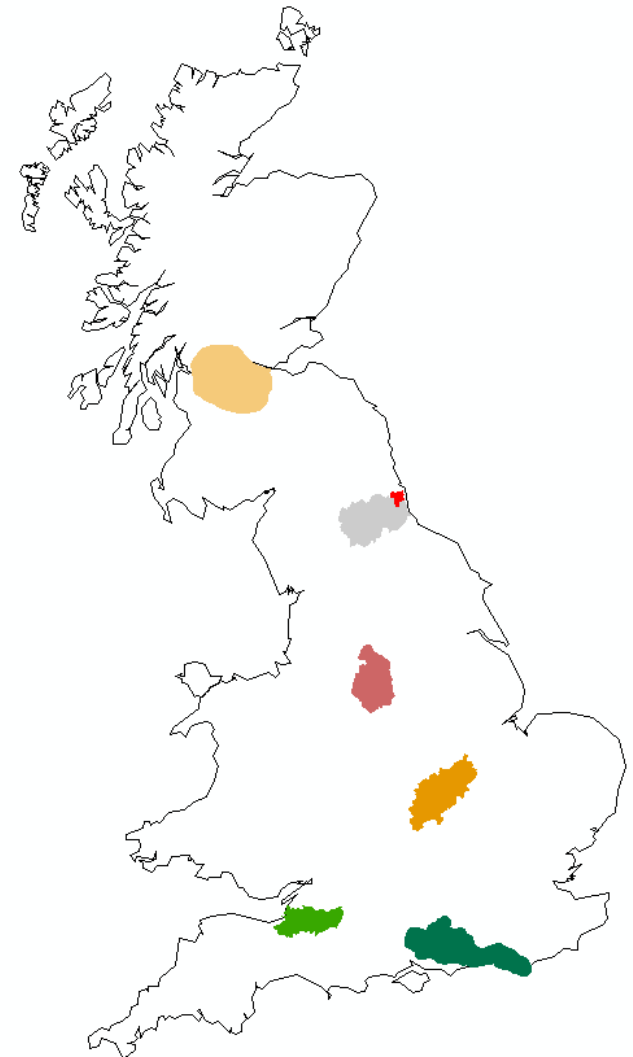
# EcoServ–GIS developed to save time and money

- All 47 Wildlife Trusts have an interest in ecosystem services
- Avoid repetition in methods
- Mapping takes time, but can be automated – cost savings



## Developed in England, expanded to Scotland

- Began 2011
- Partnership
- Promoted via EKN
- Now working with SEPA / SNH
- Always seeking collaboration

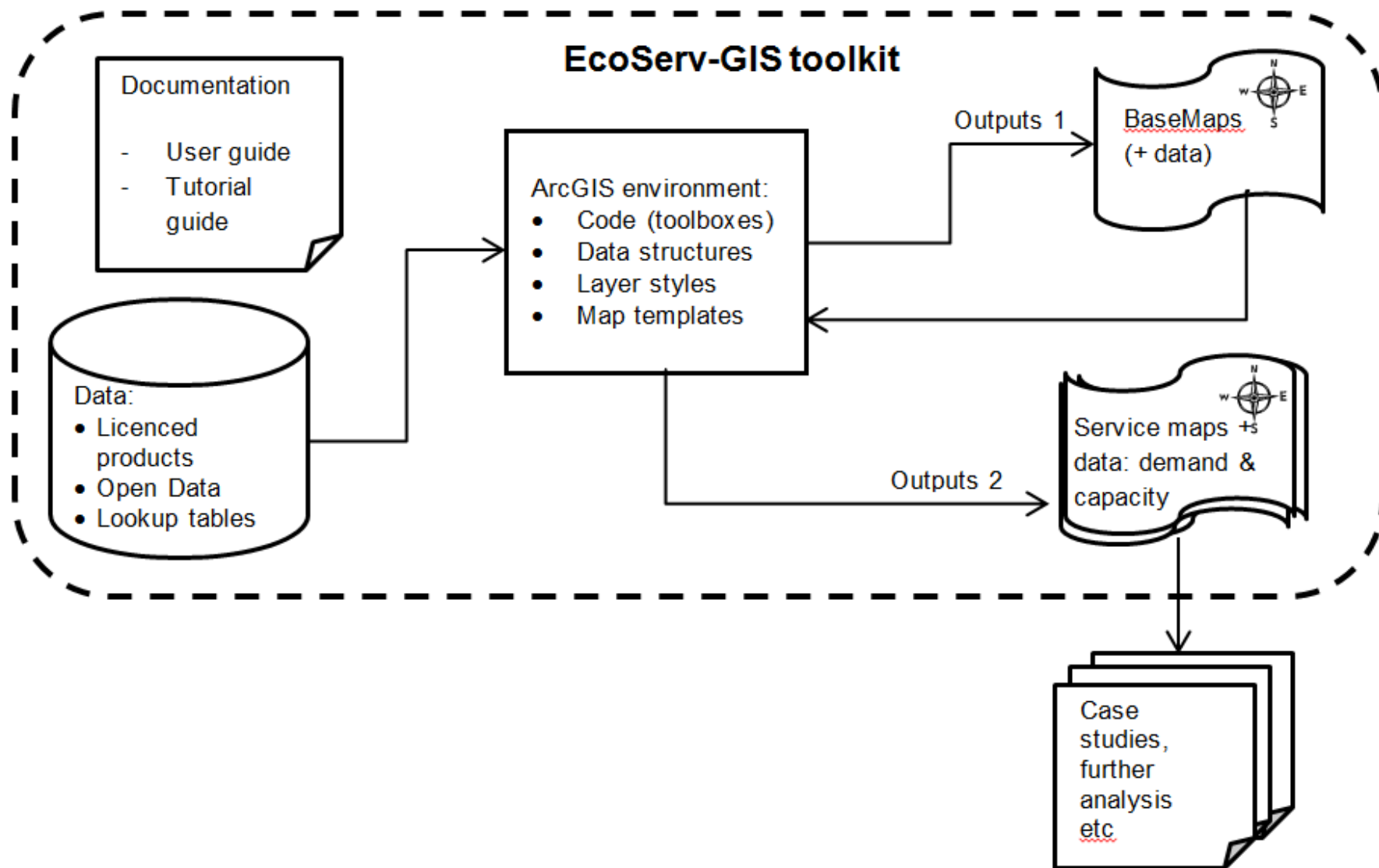


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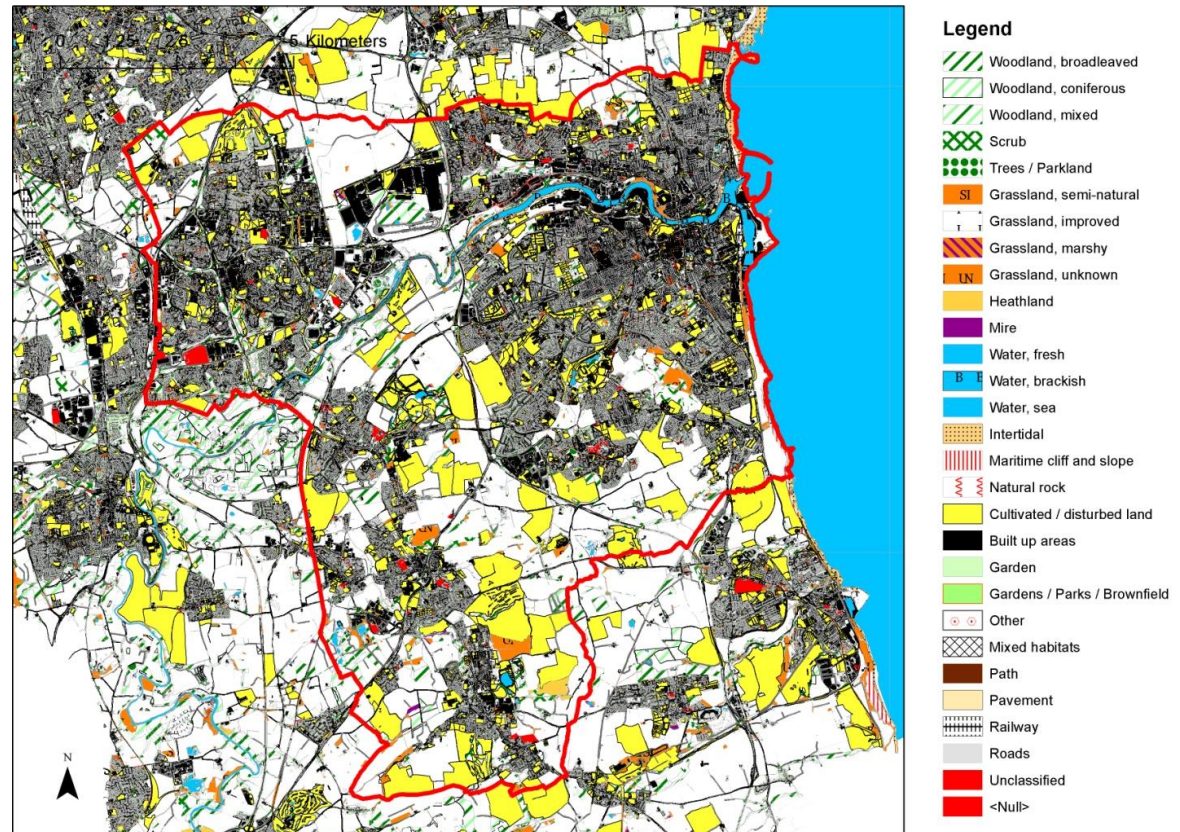
# An ArcGIS Toolkit, based on OS MasterMap data



# Compile the best available information on Natural Capital into one place - BaseMap (stock check)

- OS MasterMap
- LA Greenspace data
- LCM 2007
- BAP data
- Cross-validated
- Easily updated

*Use as much “surveyed”  
data as possible*



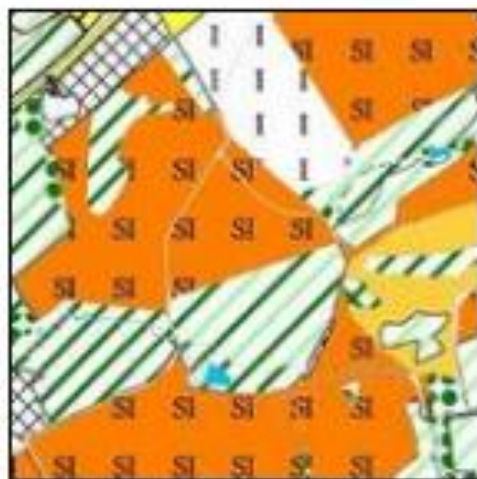


# Link Natural Capital stock (BaseMap) to ecosystem service attributes

- Link attributes to habitat types

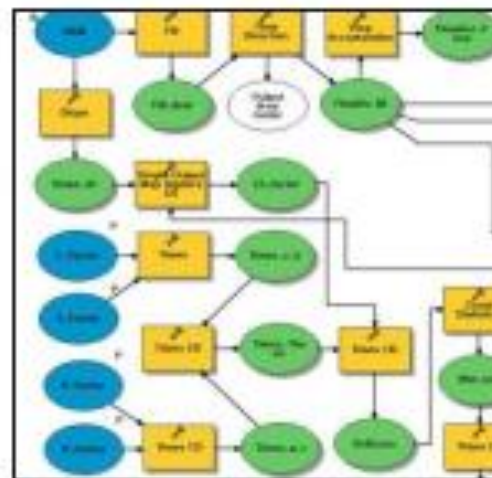
Ph1code	Naturalness	TotCarb	AirPurScore	Noise	Rough	Erosion	equivCLC2000	CostWood	CostHeat	CostMire	CostGrass
A11	7.75	273	50	80	0.6	0.005	Broadleaved forest	1	35	50	20
A11/A2	7.75	103.11	50	80	0.6	0.005	Transitional woodland-scrub	1	35	50	20
A121	6.5	166.1	100	100	0.5	0.005	Coniferous forest	20	20	40	20
A12_AW	8.5	166.1	100	100	0.5	0.005	Coniferous forest	20	20	40	20
A122	6.5	166.1	100	100	0.5	0.005	Coniferous forest	20	20	40	20
A12	6.5	166.1	100	100	0.5	0.005	Coniferous forest	20	20	40	20
A12/A2	6.5	103.11	100	100	0.5	0.005	Transitional woodland-scrub	15	20	40	20
A131	7.125	202	75	90	0.55	0.005	Mixed forest	1	35	50	20
A132	7.125	202	75	90	0.55	0.005	Mixed forest	1	35	50	20
A13	7.125	202	75	90	0.55	0.005	Mixed forest	1	35	50	20
A13/A2	7.125	103.11	75	90	0.55	0.005	Transitional woodland-scrub	1	30	50	20
A2	7.125	103.1	0	40	0.4	0.005	Transitional woodland-scrub	1	10	30	20
A2m	7.125	103.1	0	40	0.4	0.005	Transitional woodland-scrub	1	10	30	20
A21	7.125	103.1	0	40	0.4	0.005	Transitional woodland-scrub	1	10	30	20
A22	7.125	103.1	0	40	0.4	0.005	Transitional woodland-scrub	1	10	30	20
A31/A2	7.125	103.1	0	40	0.4	0.005	Transitional woodland-scrub	1	10	30	20

# Mapping Ecosystem Services from Natural Capital



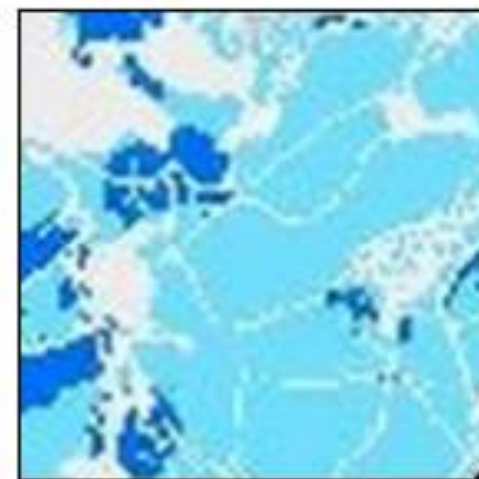
BaseMap

+



Model tools

=



Mapped ecosystem services

# Map environmental capacity and human demand

- 1) **Ecosystem service capacity:** capability of an ecosystem or landscape to deliver a service to people
- 2) **Service demand areas:** where there is societal demand (need) for a service and/or the need for ecological regulation
- 3) **Service benefiting areas:** graded according to their capacity to deliver a service and the societal and ecological demand for the service





# Capacity for Noise Regulation

- Relative scores
- Habitat type
- Habitat size

EcoServ-GIS  
V3.0

Noise Regulation  
Capacity

## Z Scores

Noise regulation capacity reflects the ability of different ecosystems and habitats to absorb noise pollution.

This is based on habitat structure, density and seasonality estimates.

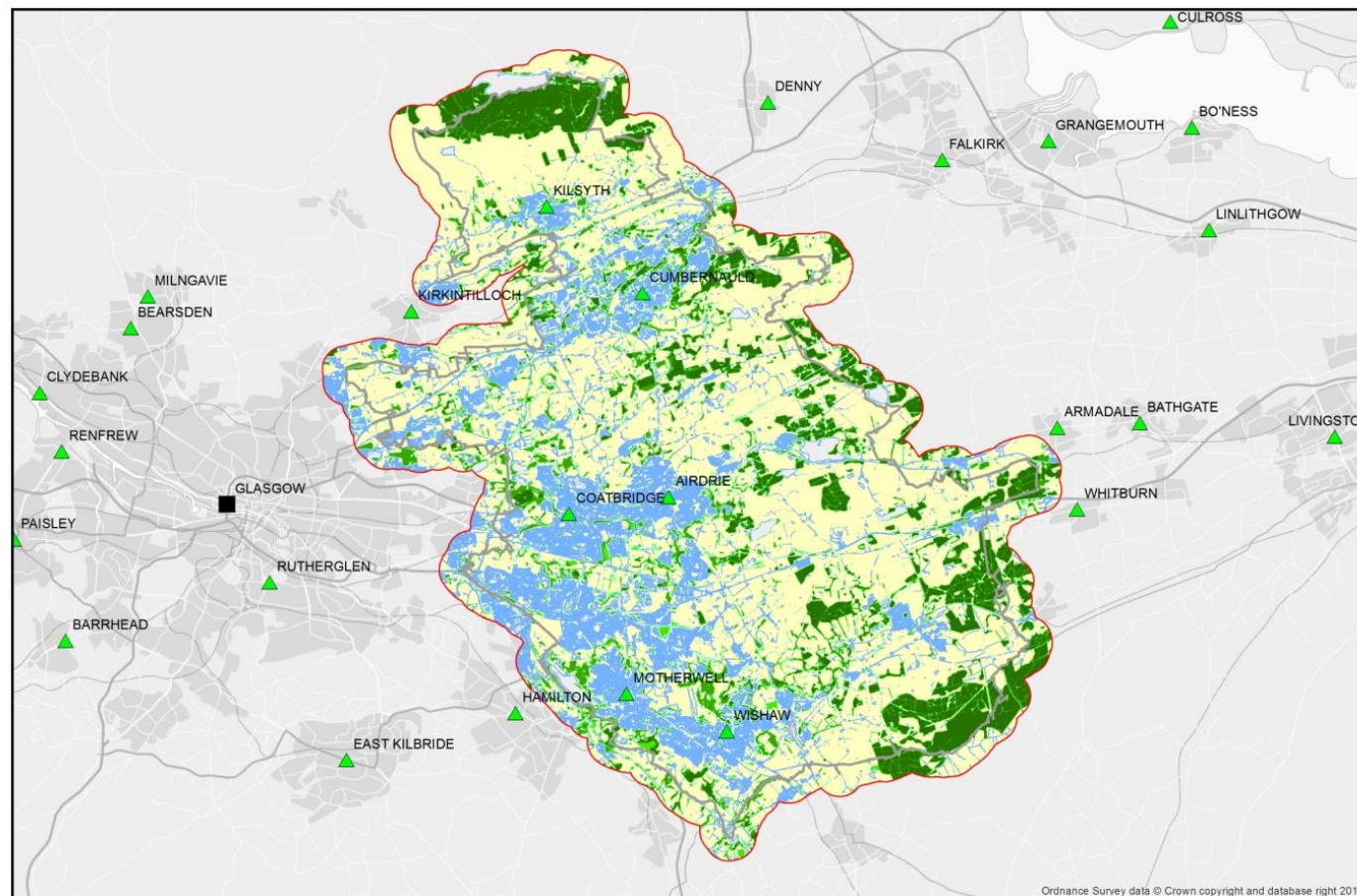
### Map Methods and Limitations

Refer to the User Guide for method details.

EcoServ-GIS relies on indicators to predict where ecosystem services occur.

Results are relative to the study area and cannot be compared to other areas.

Local knowledge must be used to interpret what the values mean in absolute terms.



Study Area  
Study Area Buffer

< -3 SD  
-2 SD  
-1 SD  
-0.5 SD  
mean  
+0.5 SD  
+1 SD  
+2 SD  
> +3 SD

White space within the Study Area shows areas with no data, or with no capacity.

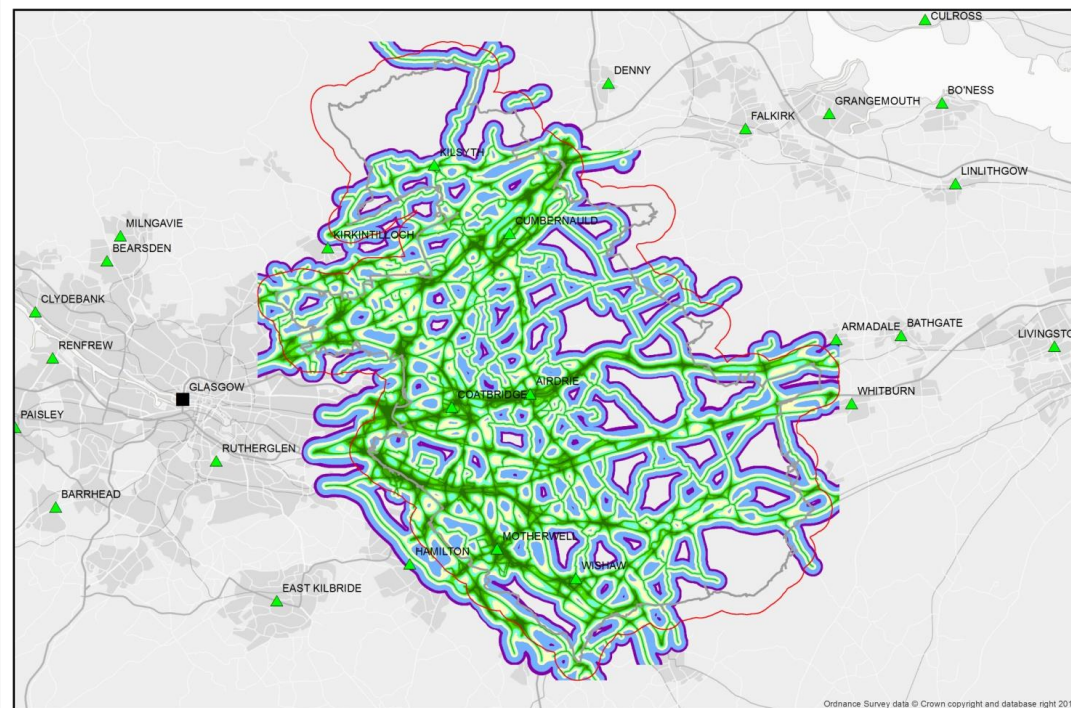
Z Scores indicate the degree to which areas are above or below the average score for the whole Study Area.

Ordnance Survey data © Crown copyright and database right 2014

Noise regulation values per ecosystem / habitat are inferred from available literature. These are estimated typical values. Habitat age and management is not considered.



## Demand score comprises several indicators



EcoServ-GIS  
V3.0

Noise Regulation  
Demand

Noise levels  
Indicators

Noise regulation demand reflects the predicted need for noise regulation. This is based on modelled noise levels, population density and health data.

Map Methods and Limitations

Refer to the User Guide for method details.

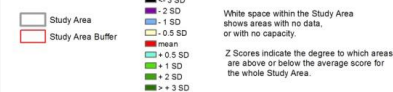
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## Modelled noise levels

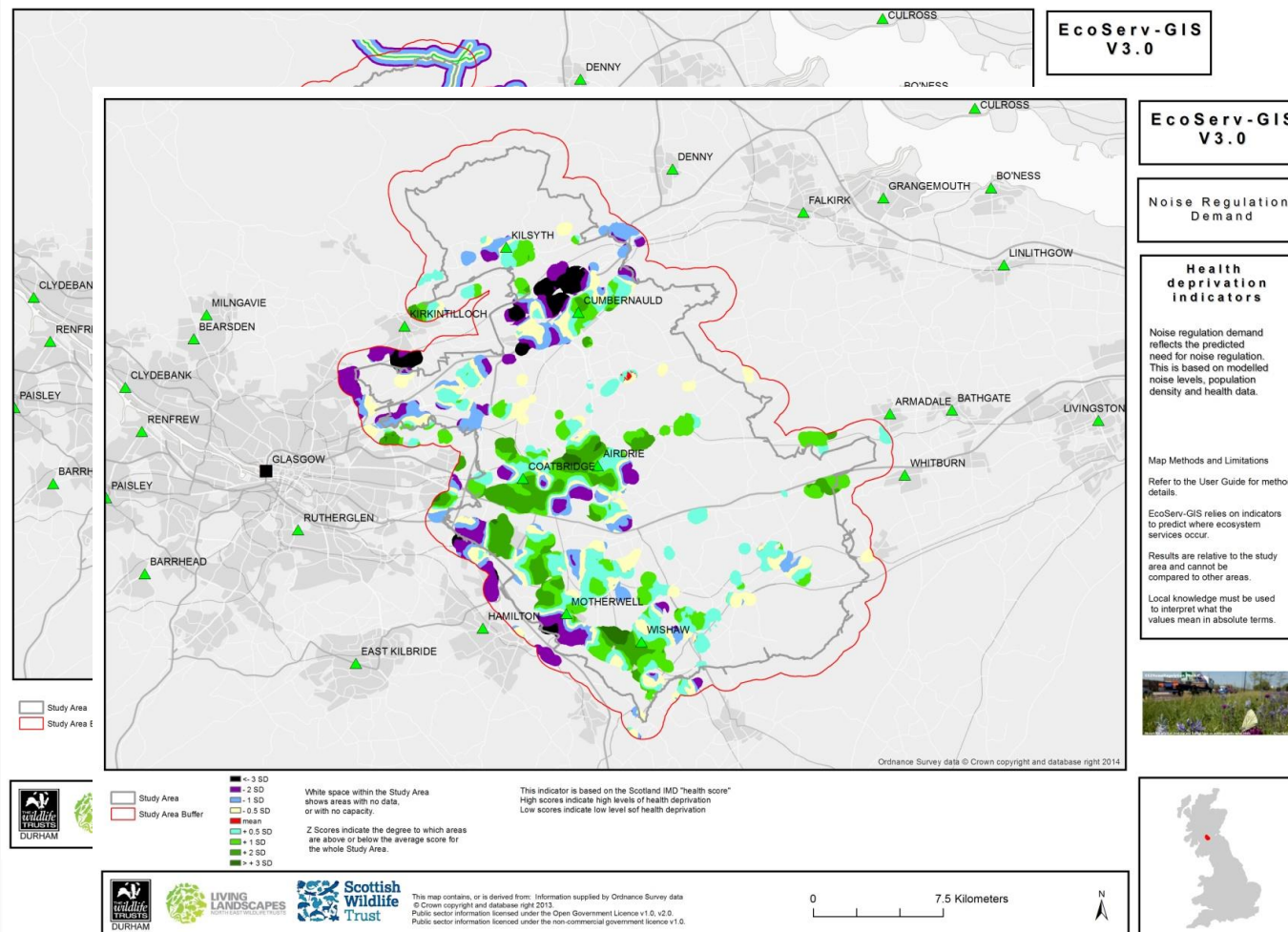


0 7.5 Kilometers





# Demand score comprises several indicators



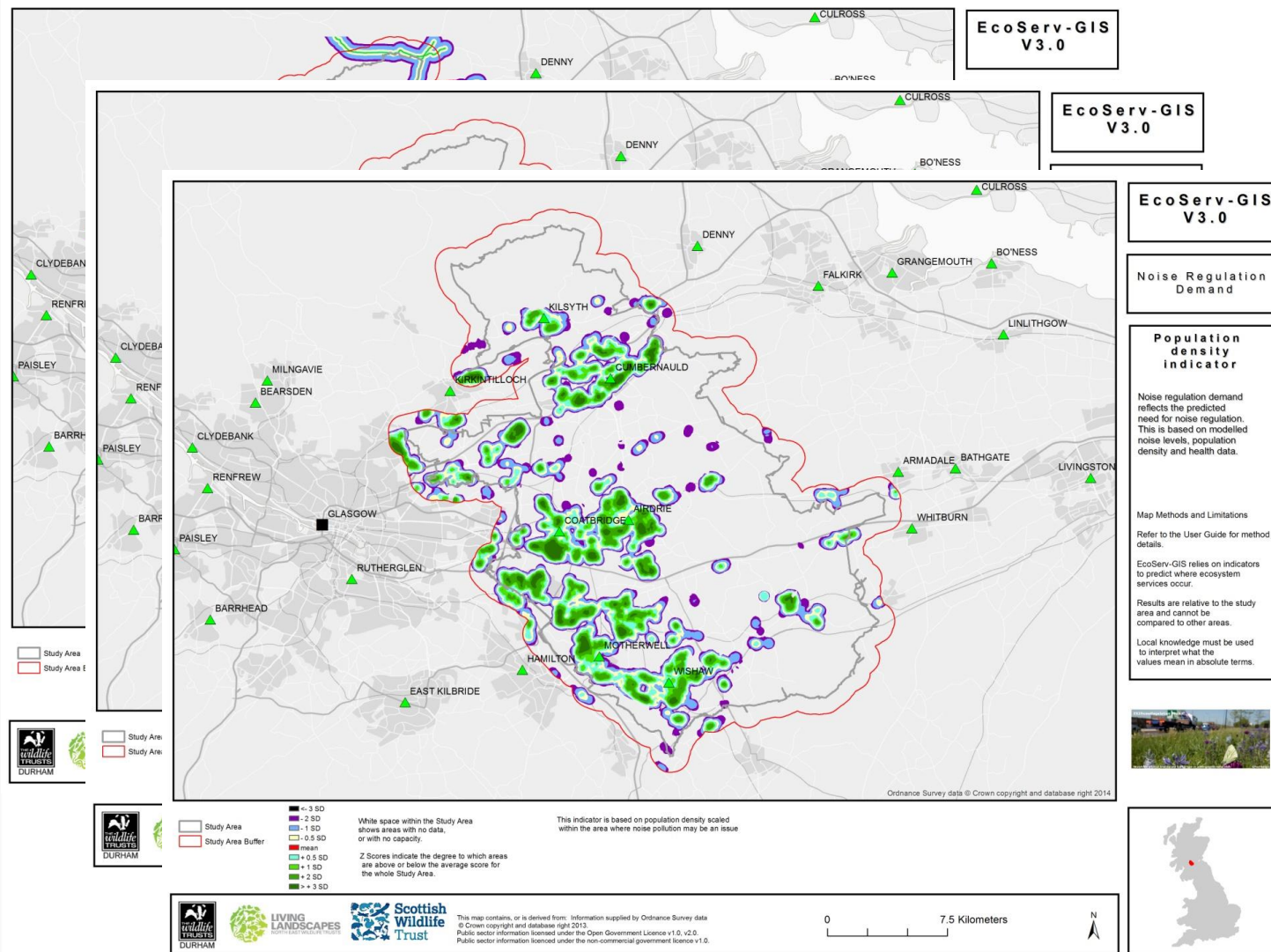
Modelled noise  
levels

+

Health  
deprivation



# Demand score comprises several indicators



Modelled noise levels

+

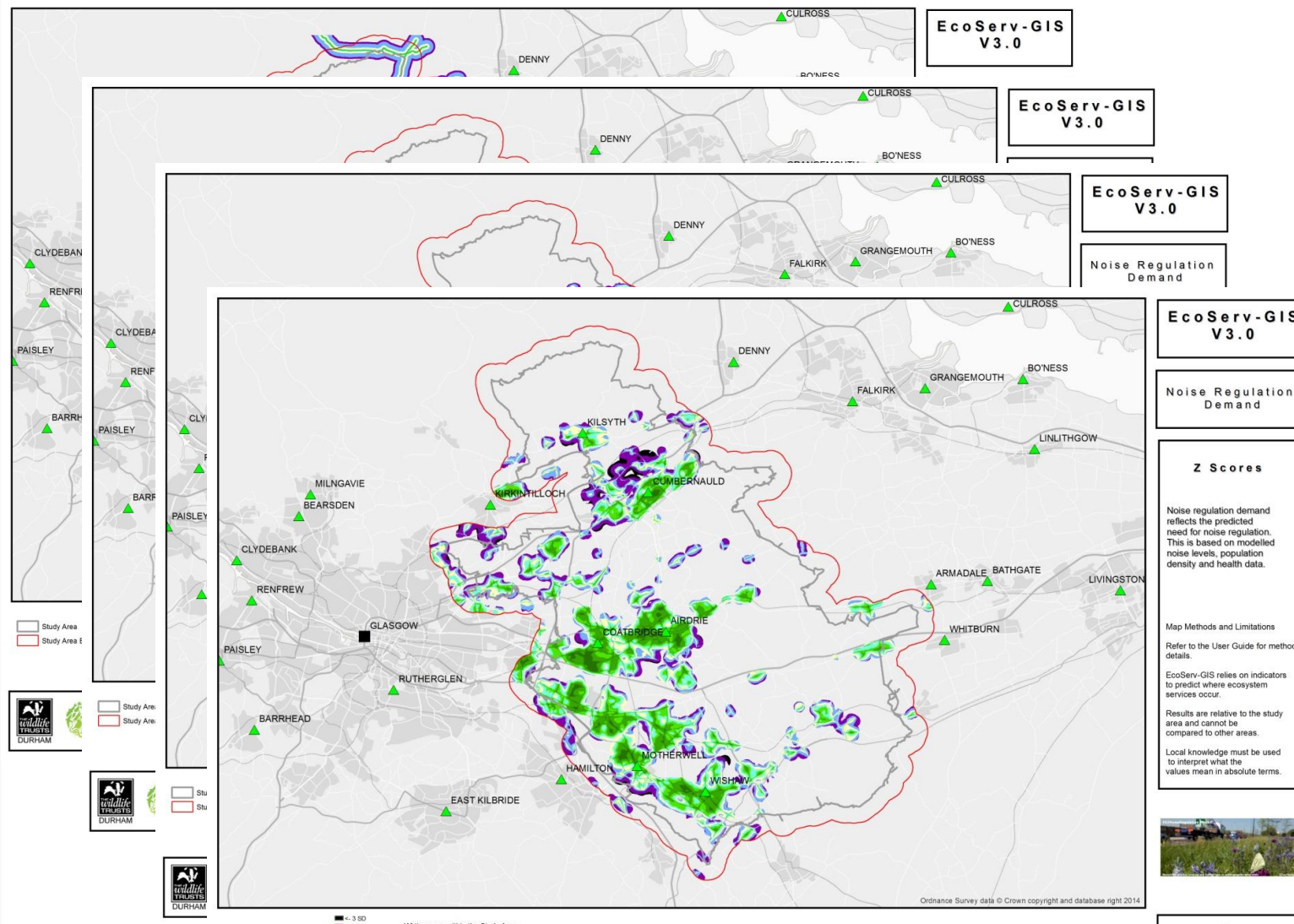
Health deprivation

+

Population density



# Demand score comprises several indicators



Modelled noise levels

+

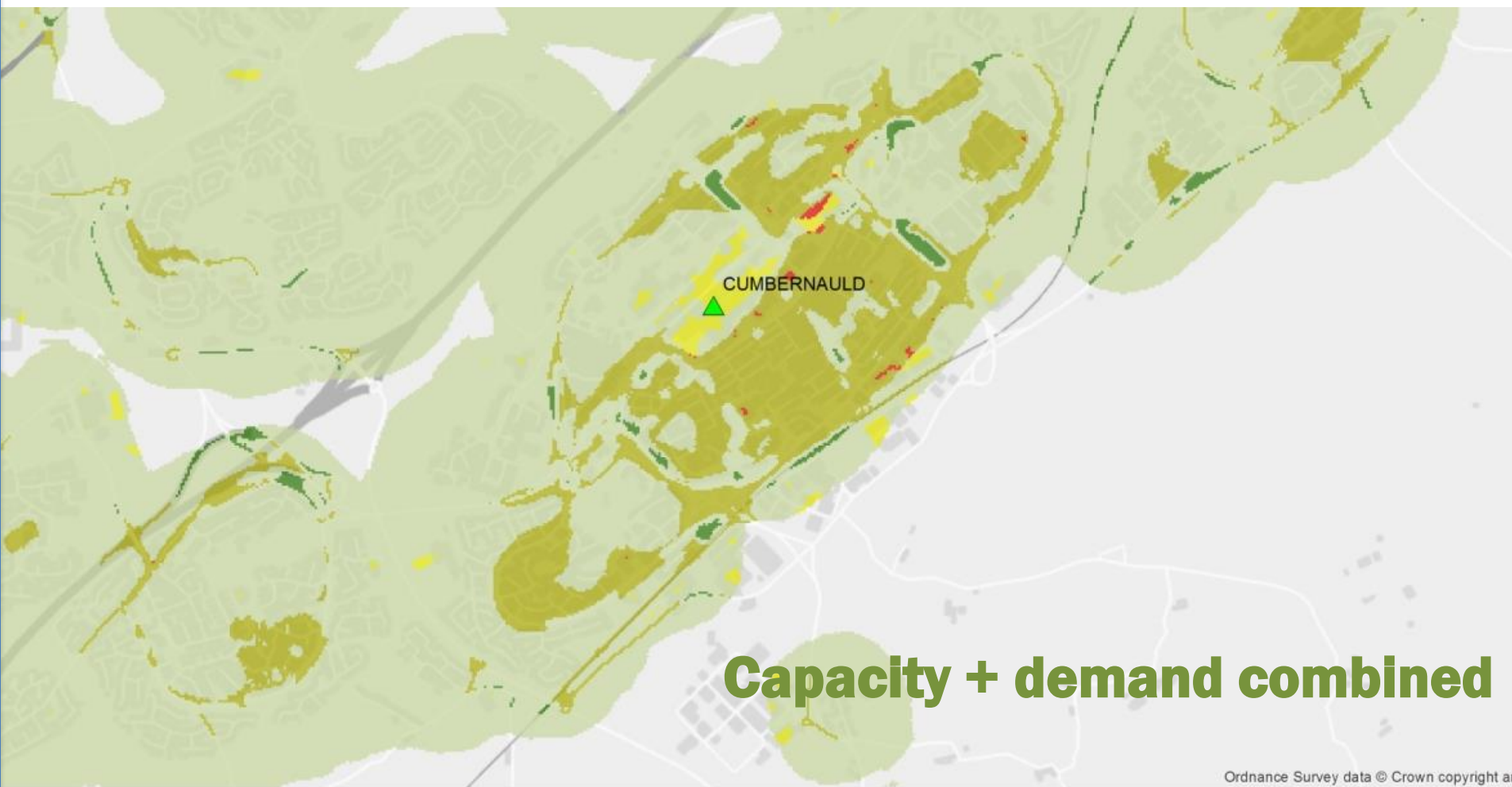
Health deprivation

+

Population density

=

Demand score



**Capacity + demand combined**

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## Noise\_ESBA\_and\_Gaps\_Prioritised

### Category

- A. Other areas where current habitats help to buffer noise
- A1. Areas where the most effective habitats help to absorb the most noise pollution
- A2. Areas where there is high noise pollution but the habitats are less effective to help absorb it
- B. Other areas of noise pollution with no habitats to help buffer noise
- B1. Areas of high noise pollution with no habitats to help absorb noise

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## Maps highlight the value of areas that we already know are important!

- Publicity and promotion
- Awareness raising
- Grant bodies



## ... but maps most useful when they tell us something we don't already know

- Value of non-designated sites
- Targeting habitat creation and restoration areas to benefit people





## High resolution Natural Capital maps

- Automating urban habitat surveys
- Informing GI strategy
- Informing Living Landscape plans



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Lack of Greenspace data

Standardise collection, compile and report nationally (e.g. Scotland Greenspace)

Lack of local Biodiversity data

Use available technology to create county based ecosystem surveys, verify by field survey, compile and report nationally

Duplication of monitoring / surveys

Co-ordinate all OS MasterMap related environment surveys (Ordnance Survey, DEFRA, Forestry Commission, Natural England, Scottish Natural Heritage)

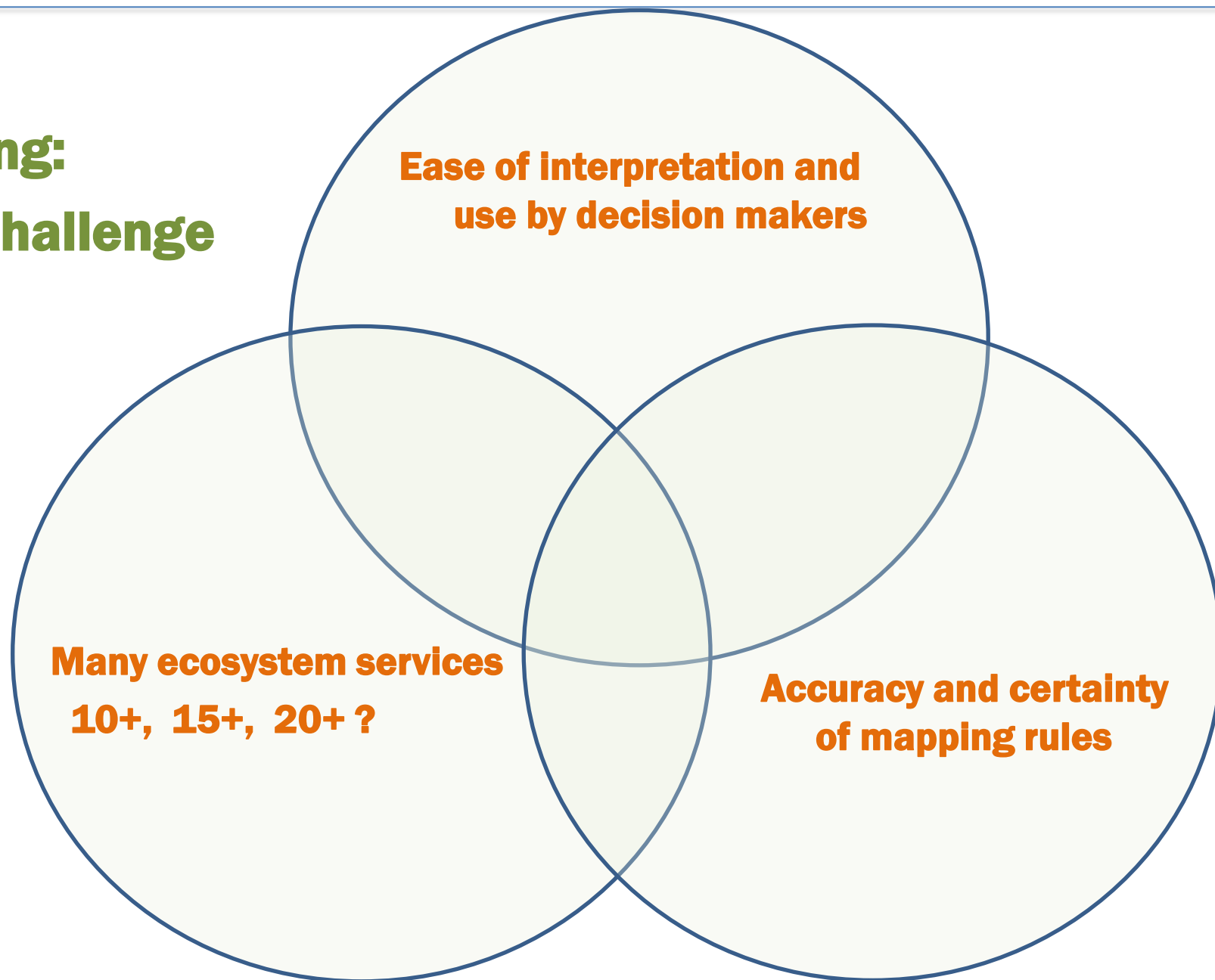
Data not available or easy to locate

Make data free, open and easily available

Technical issues (e.g. ArcGIS versions)

More resources / staff time

## **Mapping: main challenge**





# Thank you

[jwinn@scottishwildlifetrust.org.uk](mailto:jwinn@scottishwildlifetrust.org.uk)

**Or contact me on LinkedIn**



**RSWT Dame Mary Smieton Fund**

