Simple tools for assessing the value of nature

Alison Smith

Environmental Change Institute, University of Oxford

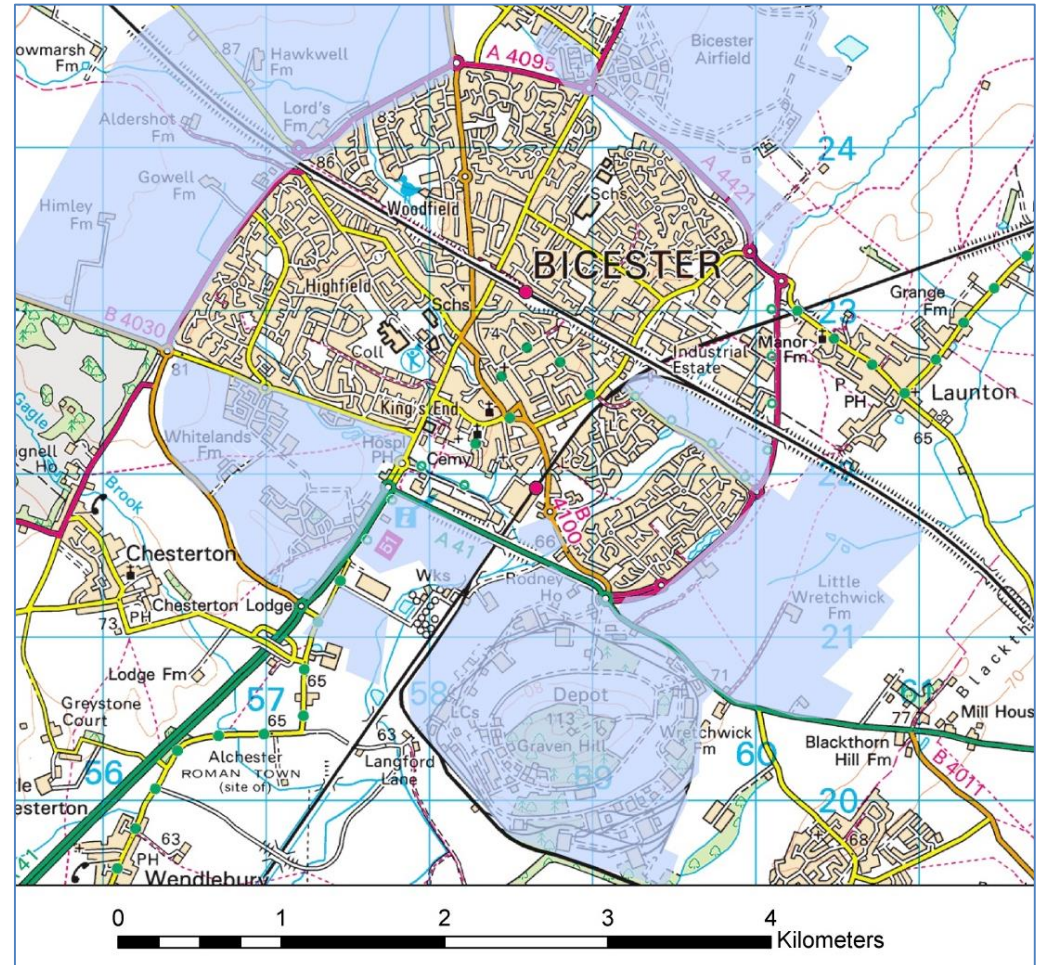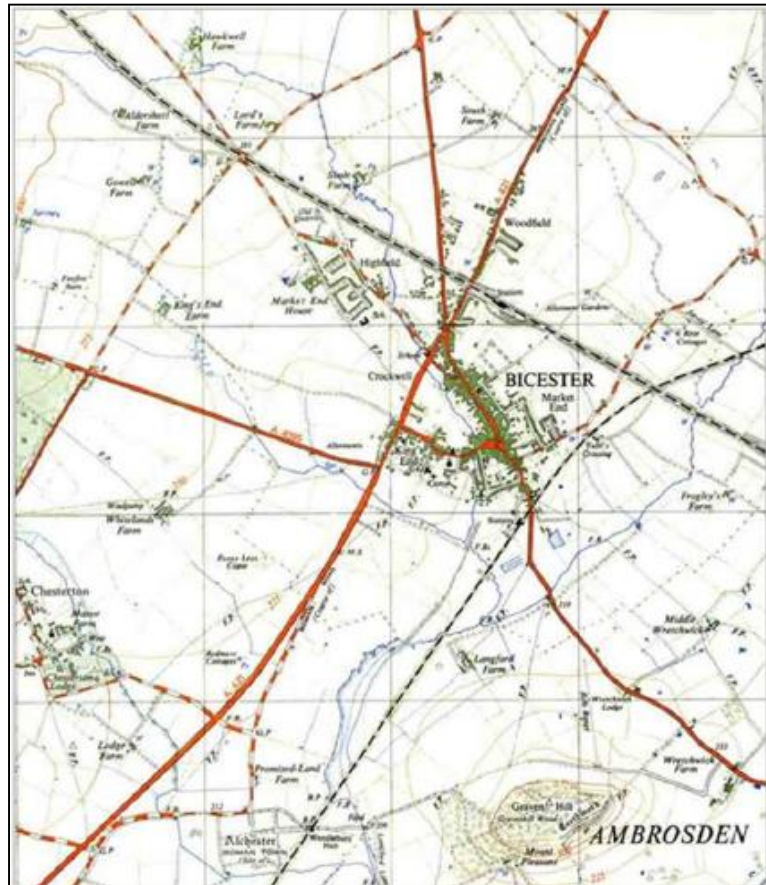Valuing Nature Network Conference, Cardiff, 12-13 November 2018

Environmental *Change* Institute

Rapidly growing places, e.g. Bicester...

1950

2031

Simple tools for valuing nature

Non-monetary value

- **Land cover score maps**
- **Participatory maps**
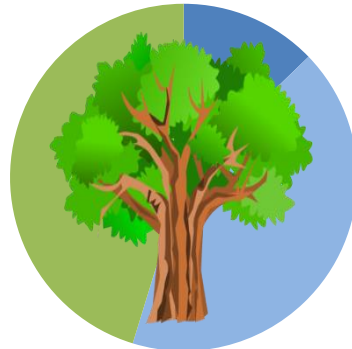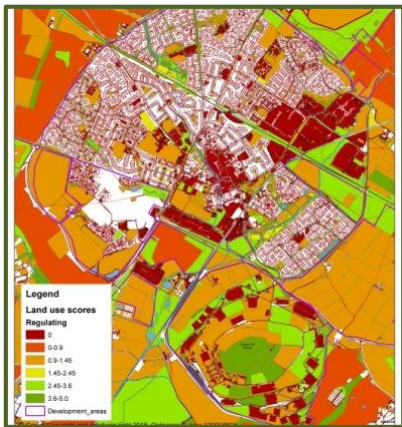- **Social media (Flickr photos)**

Monetary value

- GI-Val
- BEST
- iTree
- CAVAT
- ORVal

Using scores to assess change

- NCPT
- Eco-metric
- Green factor scores

Opportunity mapping

- Scores and rules
- EcoServ-GIS
- ANGSt
- Participatory maps
- Network mapping

Development Impact Score
Average Per-Hectare

Ecosystem Service	Max Possible	Adjusted Scores	Min Possible
1.Harvested Products	+0.15	-2.54	-2.67
2.Biodiversity	+4.34	-0.22	-0.66
3.Aesthetic Values	+2.40	-0.71	-2.60
4.Recreation	+4.99	+1.46	-0.01
5.Water Quality Regulation	+3.19	-0.54	-4.27
6.Flood Risk Regulation	+6.85	-0.42	-1.15
7.Air Quality Regulation	+3.00	-0.05	-1.69
8.Local Climate Regulation	+3.81	-0.74	-2.18
9.Global Climate Regulation	+4.40	-0.11	-0.60
10.Soil Contamination		+0.00	
Development Impact Score	+33.13	-3.86	-15.83

Land-cover score matrix

- Scores from 0 to 5 for each ecosystem service
- Derived with stakeholders in Warwickshire
- Refined using literature review of >700 papers

Ecosystem services

Habitat	Recreation	Aesthetic	Spiritual	Intellectual	Sense of Place	Wildness	Pollination	Pest Control	Habitat	Climate Reg	Air Quality	Flood Prot'n	Water Purif'n	Soil Erosion	Microclimate	Noise	Intensive Crops	Urban Food	Livestock	Water Supply	Food provision	Regulating (av)	Cultural (av)
Broad-leaved woodland	5.0	5.0	5.0	4.5	5.0	5.0	5.0	4.0	5.0	5.0	5.0	4.5	4.0	5.0	5.0	5.0	0.0	2.0	0.5	2.0	2.0	4.8	4.9
Broad-leaved plantation	4.5	4.0	3.0	3.0	4.0	4.0	3.5	3.0	3.5	4.0	4.0	4.0	4.0	4.0	5.0	5.0	0.0	1.0	0.0	1.0	1.0	4.0	3.8
Coniferous plantation	3.0	2.5	1.5	3.0	3.0	3.0	2.0	2.0	2.0	4.0	4.0	4.0	2.5	3.5	5.0	5.0	0.0	0.0	0.0	0.5	0.0	3.4	2.7
Dense scrub	2.0	2.0	2.0	3.0	3.0	3.0	4.5	3.5	4.0	3.5	3.0	3.0	3.0	3.0	2.0	3.0	0.0	1.0	2.0	1.0	2.0	3.3	2.5
Acidic grassland	3.5	4.5	3.0	4.0	5.0	5.0	5.0	4.0	5.0	2.0	1.5	1.5	3.0	4.0	1.0	0.0	0.0	0.0	3.0	2.5	3.0	2.7	4.2
Neutral grassland	4.0	4.0	3.0	4.0	5.0	5.0	5.0	4.0	5.0	2.0	1.5	1.5	3.0	4.0	1.0	0.0	0.0	0.0	3.0	2.5	3.0	2.7	4.2
Calcareous grassland	3.5	4.5	3.0	4.0	5.0	5.0	5.0	4.0	5.0	2.0	1.5	1.5	2.5	4.0	1.0	0.0	0.0	0.0	3.0	2.5	3.0	2.7	4.2
Improved grassland	1.0	1.0	1.0	1.0	2.0	2.0	1.0	1.0	1.0	1.0	1.0	1.0	1.5	2.5	1.0	0.0	1.5	0.0	5.0	1.5	5.0	1.1	1.3
Marsh/marshy grassland	3.0	4.0	3.0	4.0	5.0	5.0	5.0	3.5	5.0	2.5	1.5	2.0	4.0	4.0	2.0	0.0	0.0	0.0	3.5	3.0	3.5	3.0	4.0
Tall ruderal	1.5	2.0	1.5	2.5	2.0	2.0	5.0	4.0	4.0	3.0	2.5	2.0	2.5	3.0					1.5	2.5	1.5	2.7	1.9
Dry heath	3.0	4.5	4.0	4.0	5.0	5.0	5.0	3.5	5.0	2.5	2.0	2.0	3.0	3.5	1.0	0.0	0.0	0.0	2.5	2.0	2.5	2.8	4.3
Standing water	4.0	5.0	5.0	4.0	5.0	5.0	2.5	2.0	5.0	2.5	1.0	1.5	3.5	0.5	2.0	0.0		1.0	1.0	5.0	1.0	2.1	4.7
Arable	1.0	1.0	0.5	1.0	1.0	1.0	1.0	1.0	0.5	1.5	1.0	1.0	1.0	1.0	1.0	0.0	5.0	0.0	1.0	1.0	5.0	0.9	0.9
Amenity grassland	3.0	1.0	1.0	0.5	3.0	1.0	1.0	1.0	1.0	1.0	1.0	2.0	2.0	2.5	1.0	0.0	0.0	0.0	1.0	2.0	1.0	1.3	1.6
Bare ground	1.0	1.0	0.0	0.5	0.0	0.0	1.0	1.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.7	0.4
Hard surfaces	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Regulating services (average of all ten)

ES Score

- **0** — 0
- **0.01-1.45** V Low
- **0.90-1.45** Low
- **1.45-2.45** Moderate
- **2.45-3.60** High
- **3.60-5.00** V High

Development areas
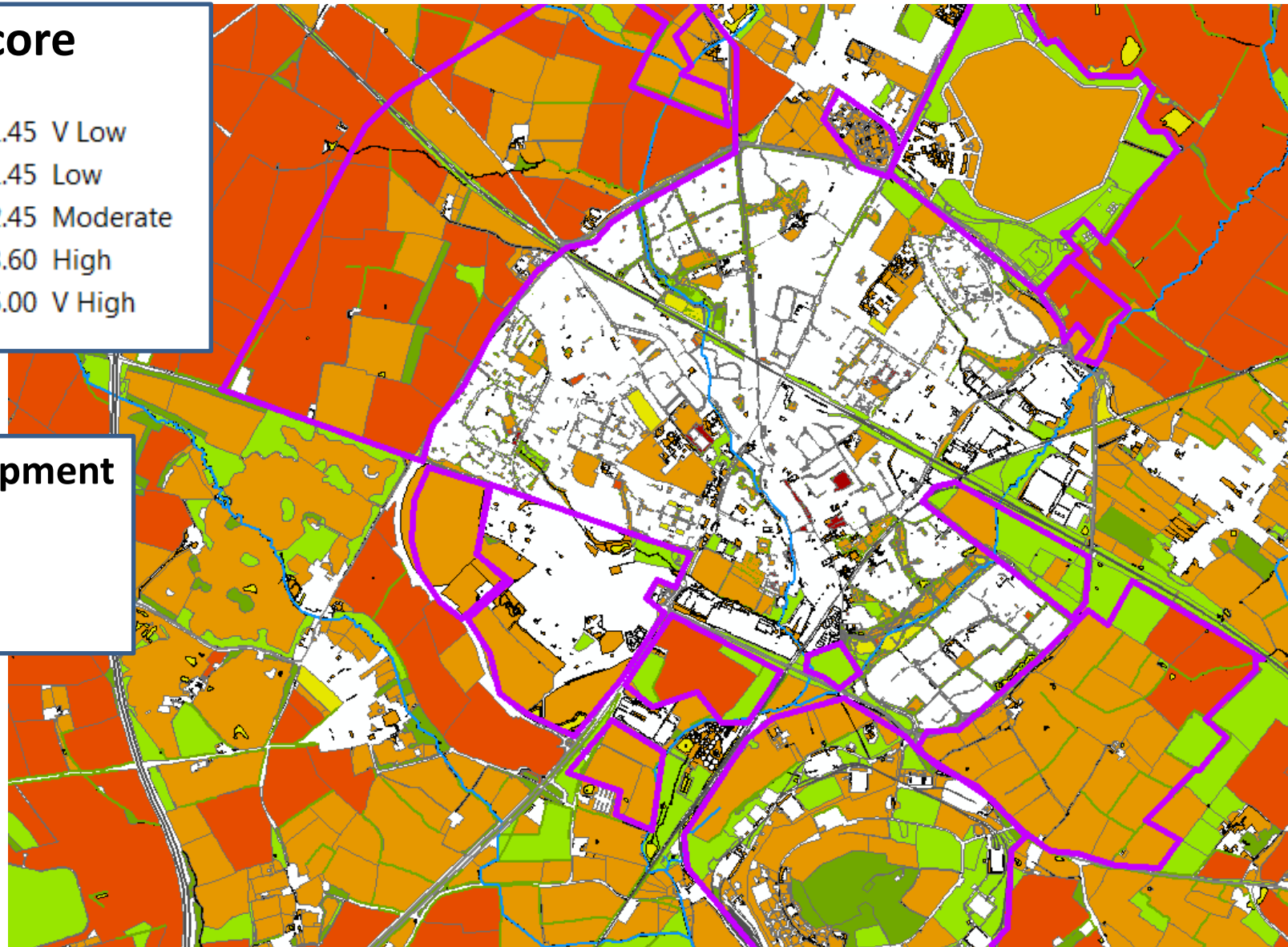
ES Score

- 0
- 0.01-1.45 V Low
- 0.90-1.45 Low
- 1.45-2.45 Moderate
- 2.45-3.60 High
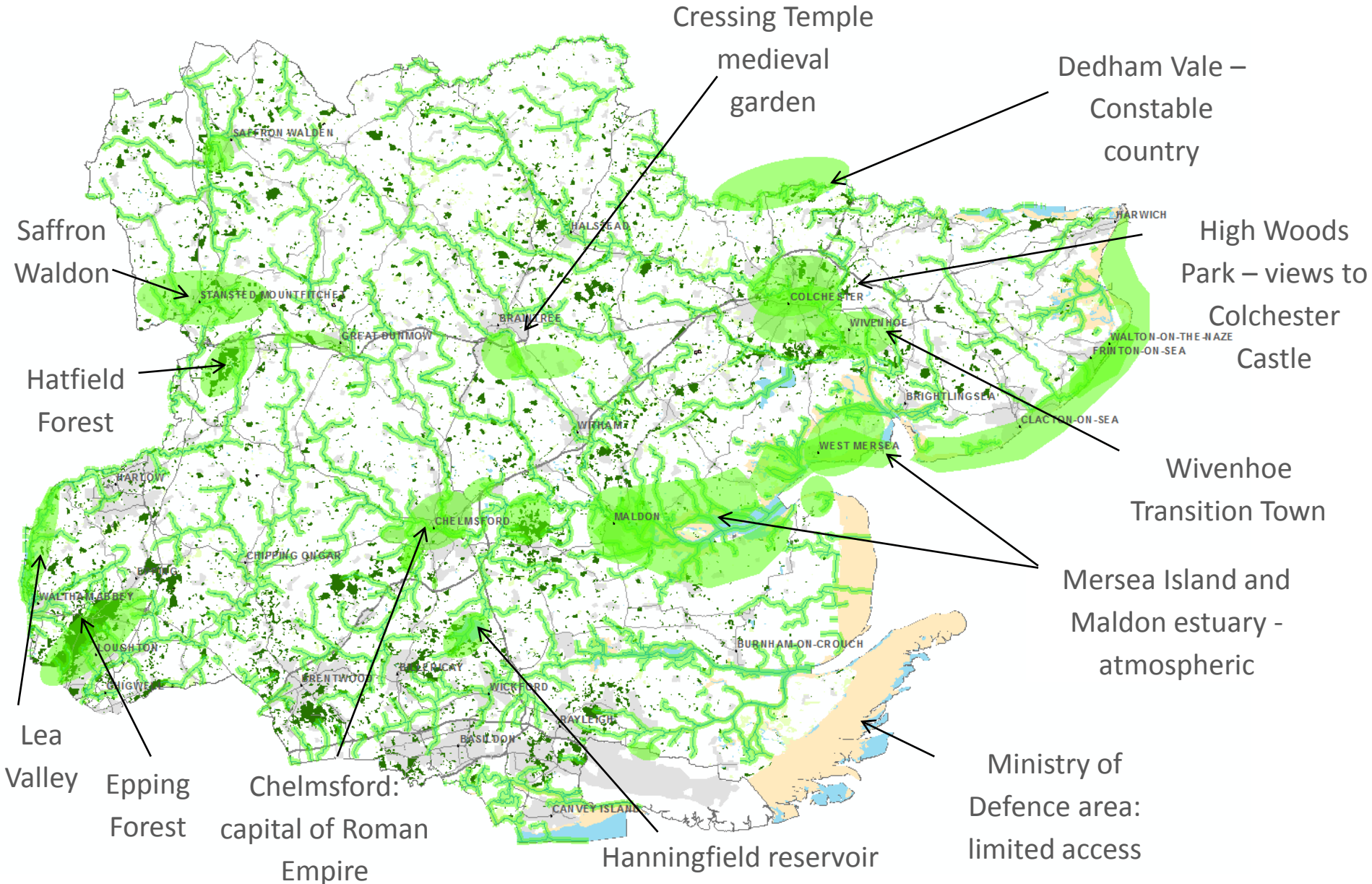- 3.60-5.00 V High

Ecosystem service score

Zero
Very low
Low
Moderate
High
Very high

0   1   2   3
Kilometers

© Crown Copyright and database right 2018. Ordnance Survey 100018504 . This map incorporates biodiversity data supplied by the Thames Valley Environmental Records Centre (TVERC) which is copyright to TVERC and/or its partners

Participatory mapping

Special Places

Green spaces with cultural, historical, emotional or spiritual value that contribute to your sense of place and belonging.

Aesthetic value

Participatory mapping of 'sense of place': Essex

Cressing Temple medieval garden

Dedham Vale – Constable country

High Woods Park – views to Colchester Castle

Saffron Waldon

Hatfield Forest

Wivenhoe Transition Town

Mersea Island and Maldon estuary - atmospheric

Lea Valley

Epping Forest

Chelmsford: capital of Roman Empire

Hanningfield reservoir

Ministry of Defence area: limited access

Participatory mapping
Street survey * Library drop-in week * Focus group * App

Garth Park is always filled with locals and has a friendly atmosphere. People stop for a chat – there's a sense of community

[*Male, 18-24*]

Fantastic for wildlife - has been left wild and unmanaged - perfect! [*Male, 65+, Skimmingdish Lane balancing pond*]

... the small playgrounds are a lifeline for single mums... [*Female, 45-64, Avon Crescent*]

There is a lovely natural view from my house [*Female, 45-64, Blenheim Drive amenity GS*]

**136 people
550 responses
64 green spaces**

We do an estate 'playground crawl' - these small spaces are often overlooked by the council but we use them loads! [*Female, 25-44*]

Gavray meadows is nice and wild-looking [*Female, 45-64*]

Data collected and analysed by Helen Mason, MSc student, in 2017

Participatory mapping: 396 benefits of green space

Local identity
- memories
- making a meaningful contribution
- local identity - village buffer
- local identity
- heritage
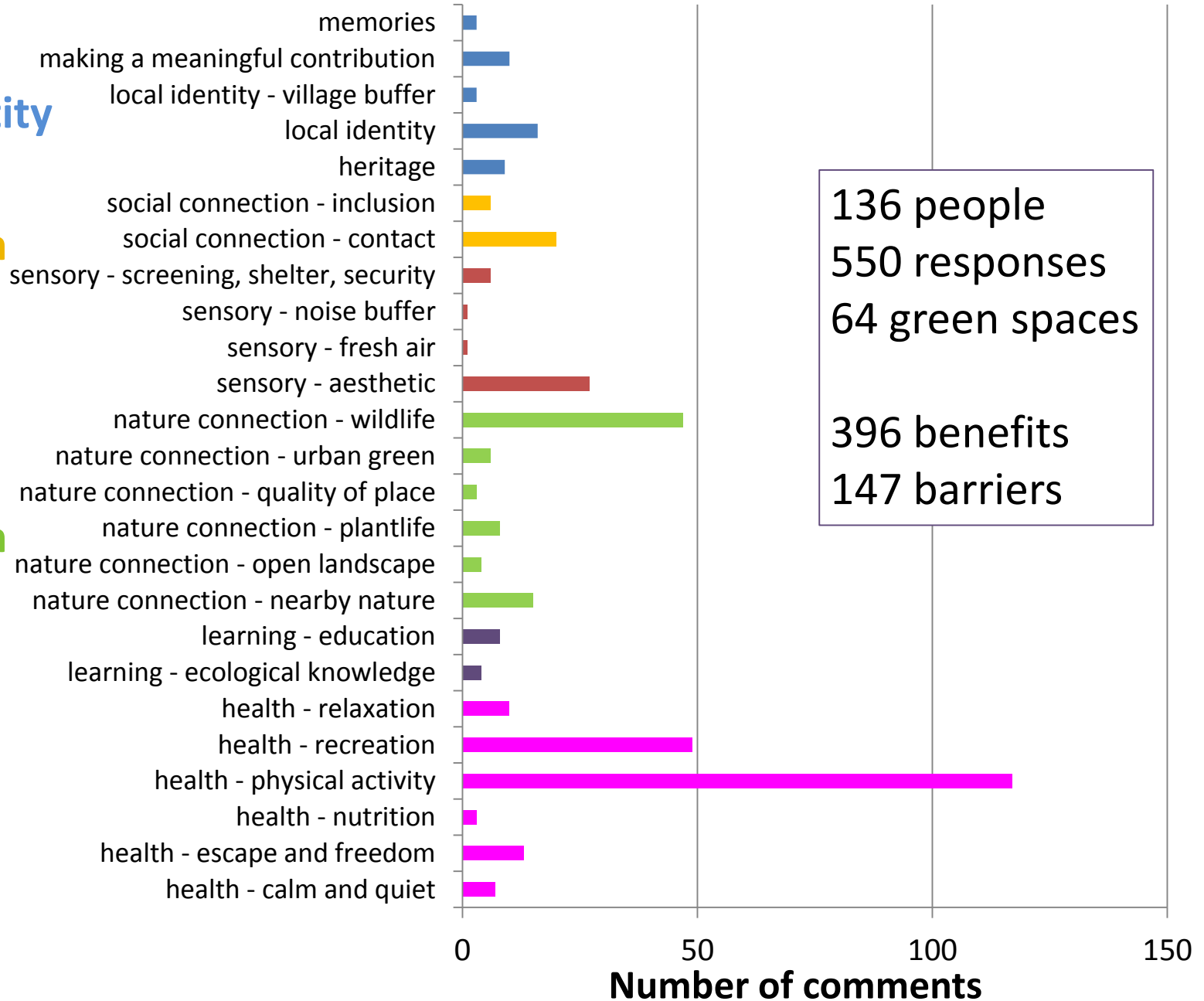
Social connection
- social connection - inclusion
- social connection - contact

Sensory
- sensory - screening, shelter, security
- sensory - noise buffer
- sensory - fresh air
- sensory - aesthetic

Nature connection
- nature connection - wildlife
- nature connection - urban green
- nature connection - quality of place
- nature connection - plantlife
- nature connection - open landscape
- nature connection - nearby nature

Learning
- learning - education
- learning - ecological knowledge

Health
- health - relaxation
- health - recreation
- health - physical activity
- health - nutrition
- health - escape and freedom
- health - calm and quiet

Number of comments

136 people
550 responses
64 green spaces

396 benefits
147 barriers
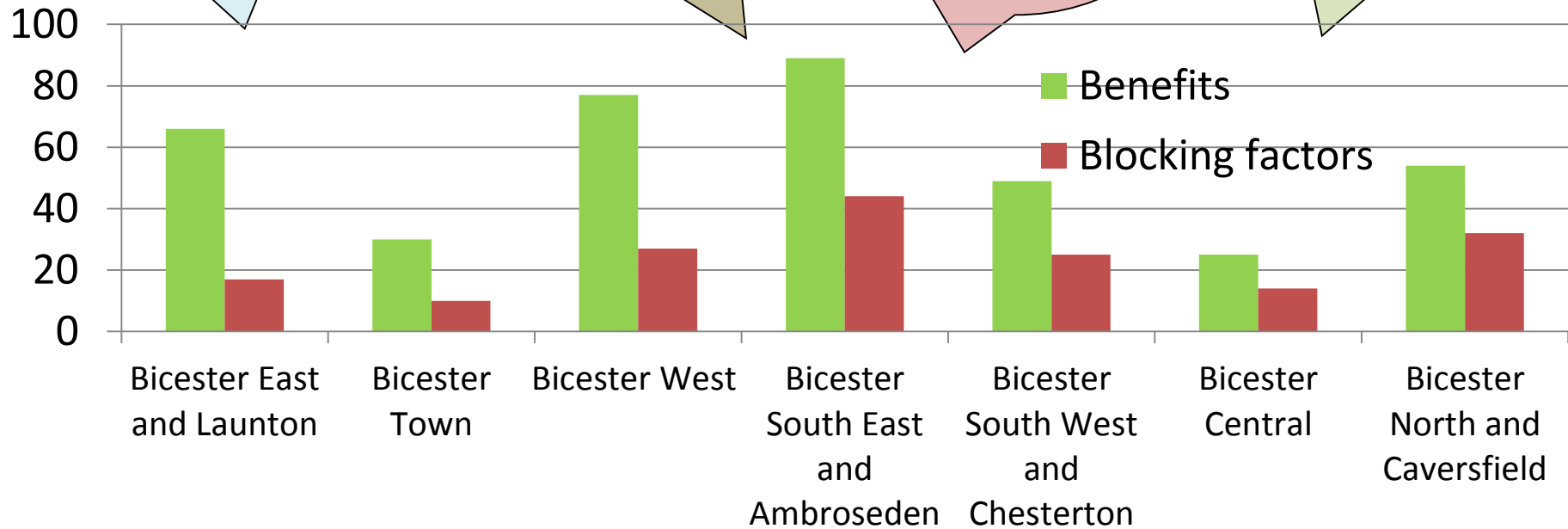
Analysing Flickr photos for Warwickshire, Coventry and Solihull

230,000 publically available geotagged Flickr photos in Warwickshire, Coventry and Solihull

Excluded 'urban' habitats (but included urban green spaces) -> 80,911 photos

Random sample of 5,737 were classified

1,937 were relevant
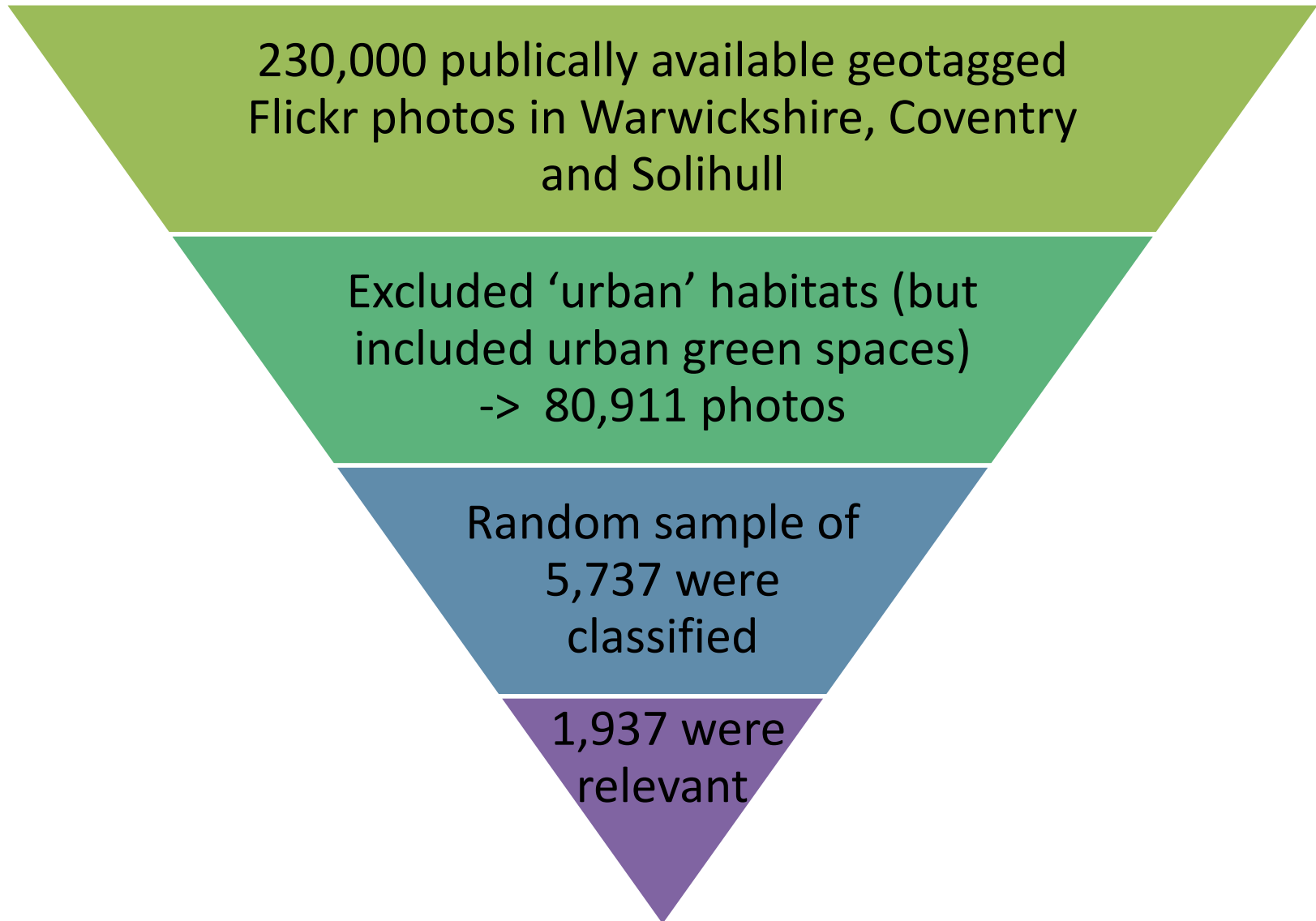
Flickr photo hotspots showing cultural ecosystem services in Warwickshire, Coventry and Solihull

Ladywalk nature reserve (single user)

Kingsbury Water Park

Hawkes End (single user)

Brueton Park, Solihull

Brandon woods and Brandon Marsh

Kenilworth castle

Midland Cross-country Championships

Warwick castle and Leamington Spa

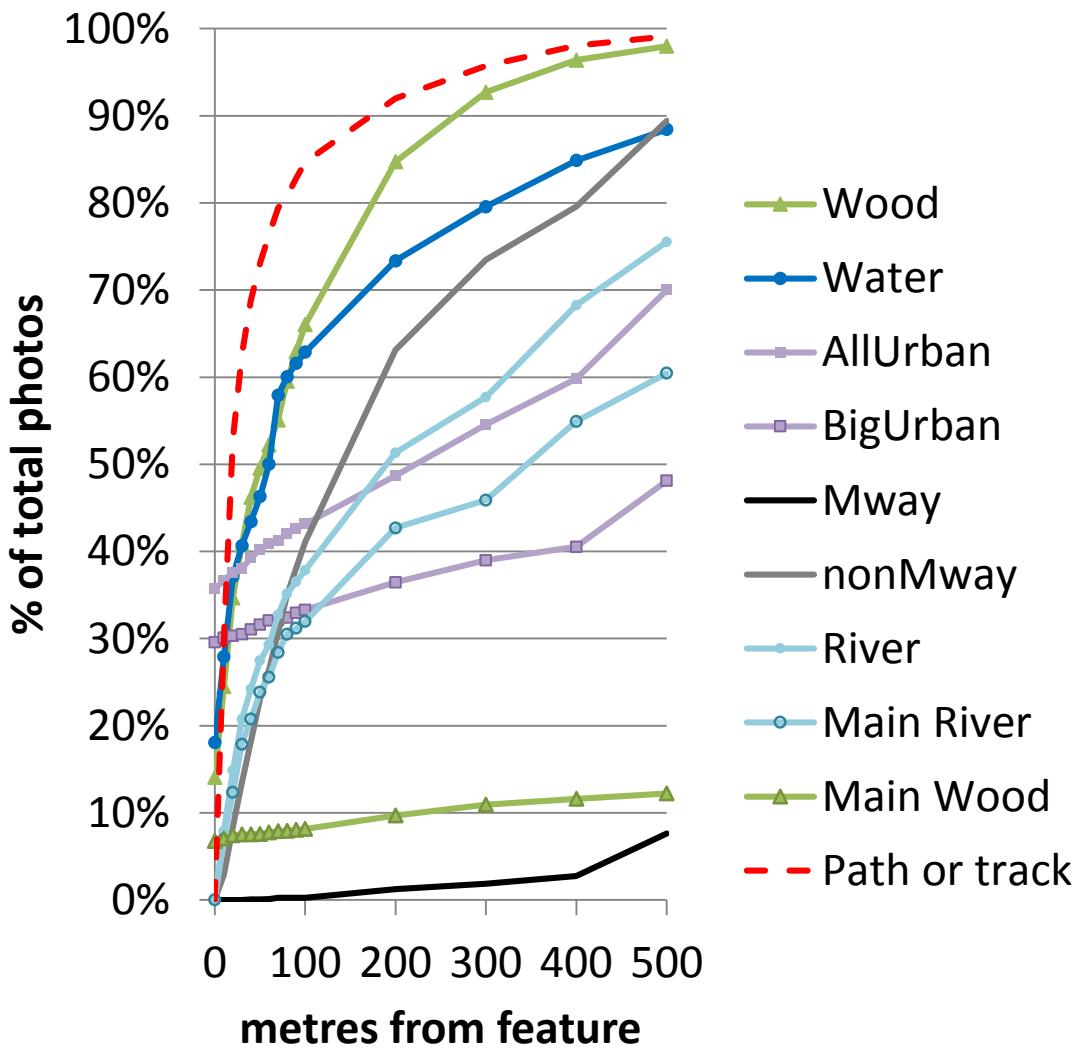Hampton-in-Arden lakes

Charlcote Park

Stratford-upon-Avon
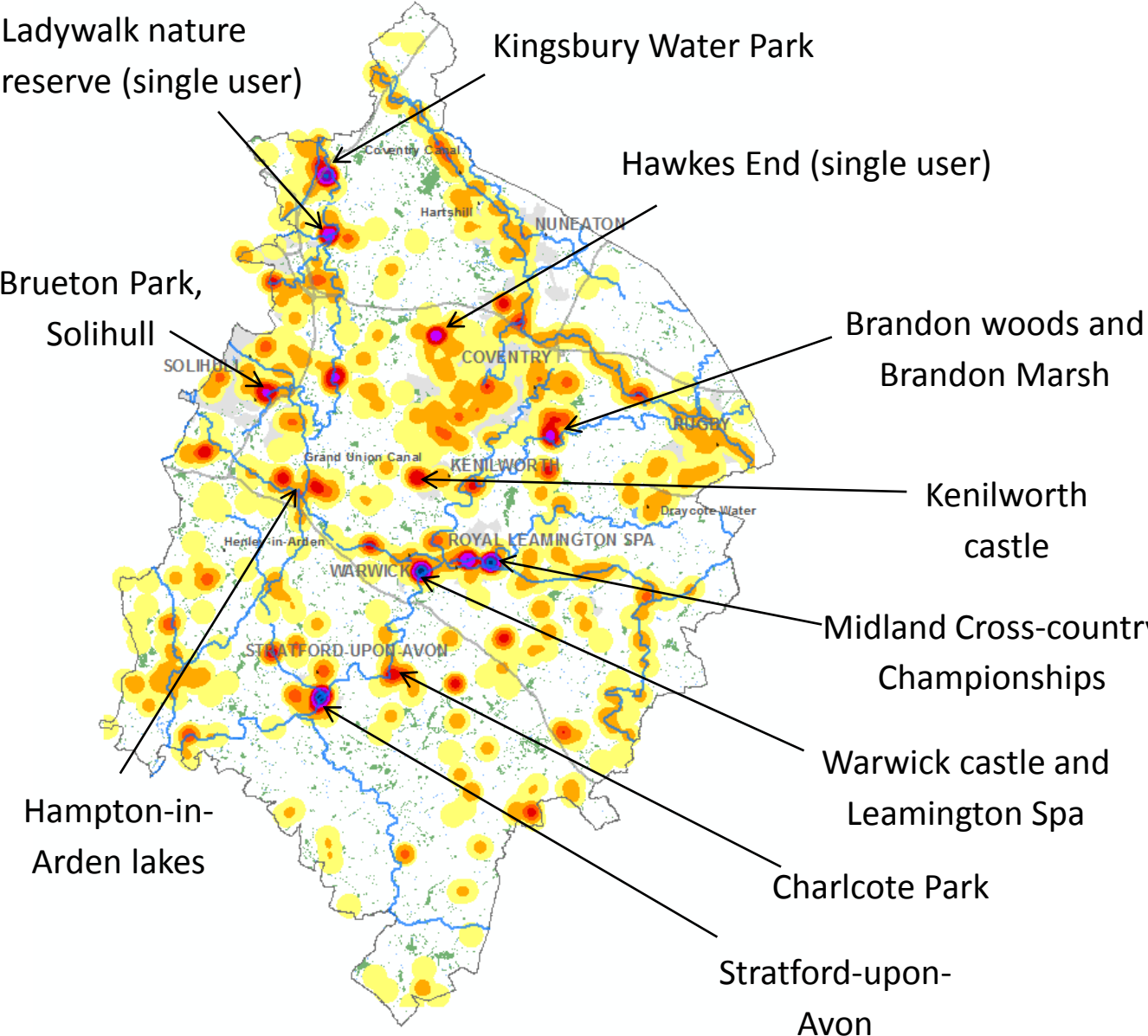
Hotspots
- Rivers and canals
- Lakes and wetlands
- Woodlands with public access
- Historic buildings in an attractive outdoor setting: Warwick Castle, Kenilworth Castle, Stratford-upon-Avon
- Country parks
- Urban parks /green space
- Nature reserves
- Recreational events: cross-country championship
- Single-user clusters

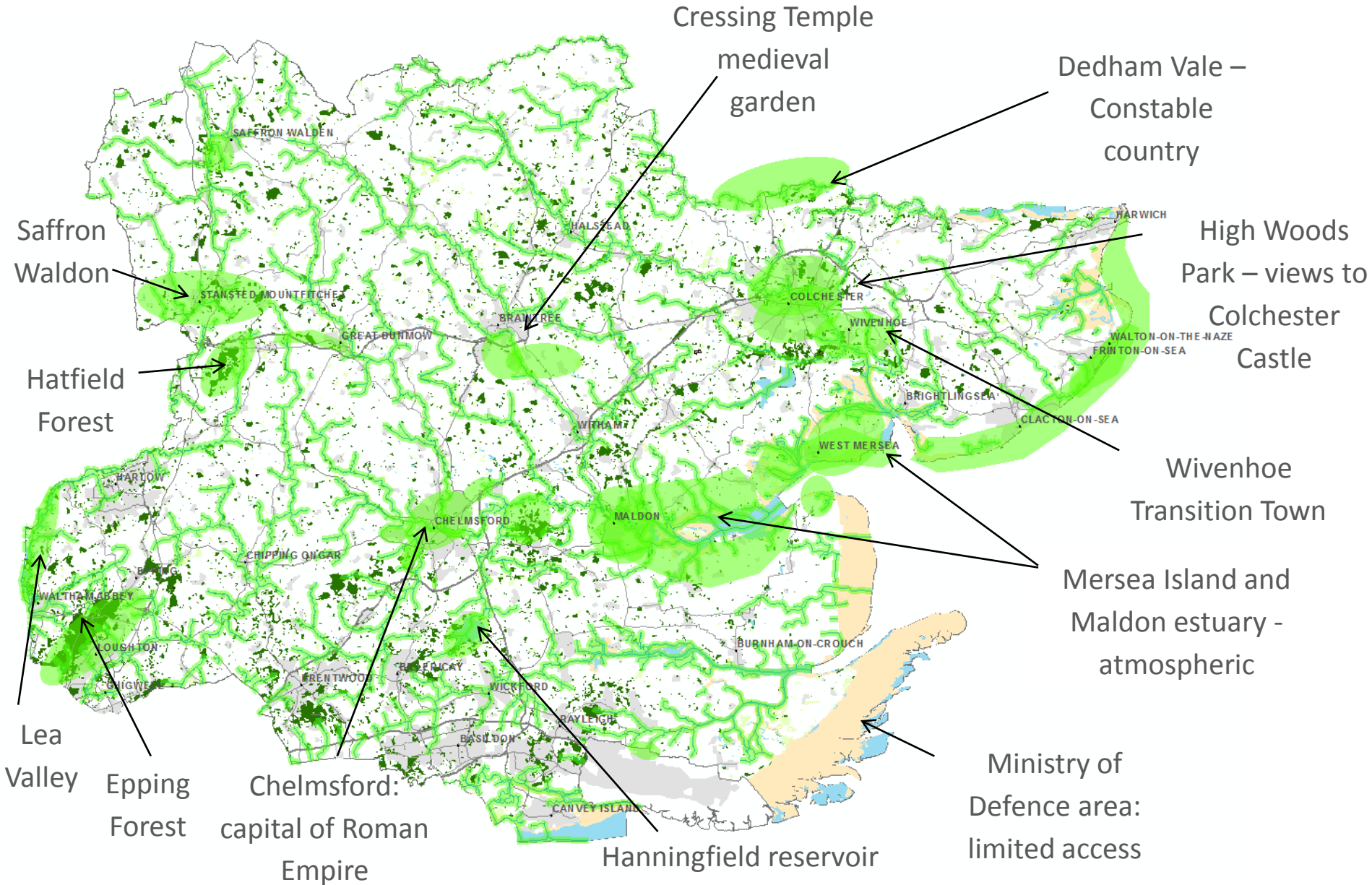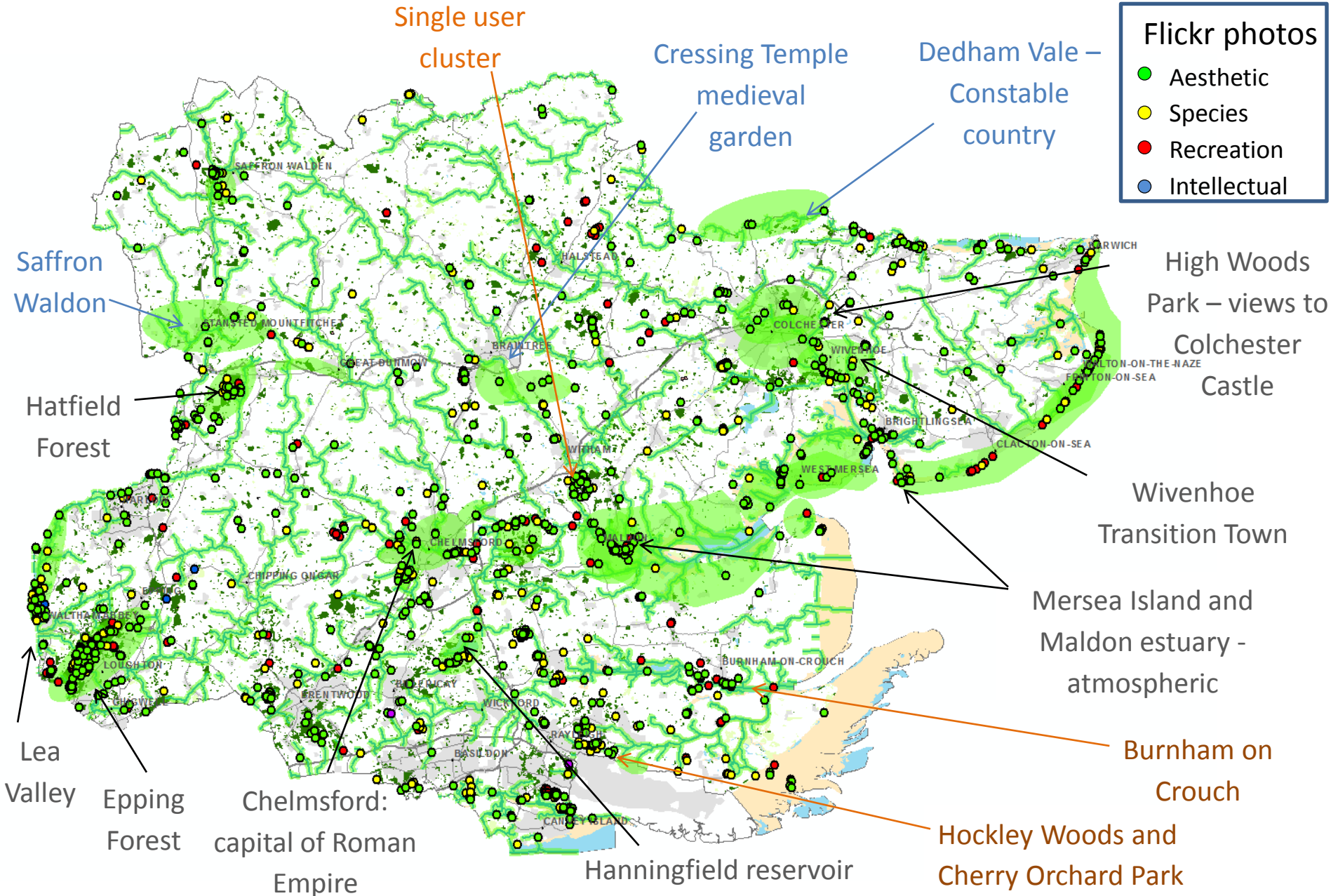# Which habitats are most popular for photo-taking?
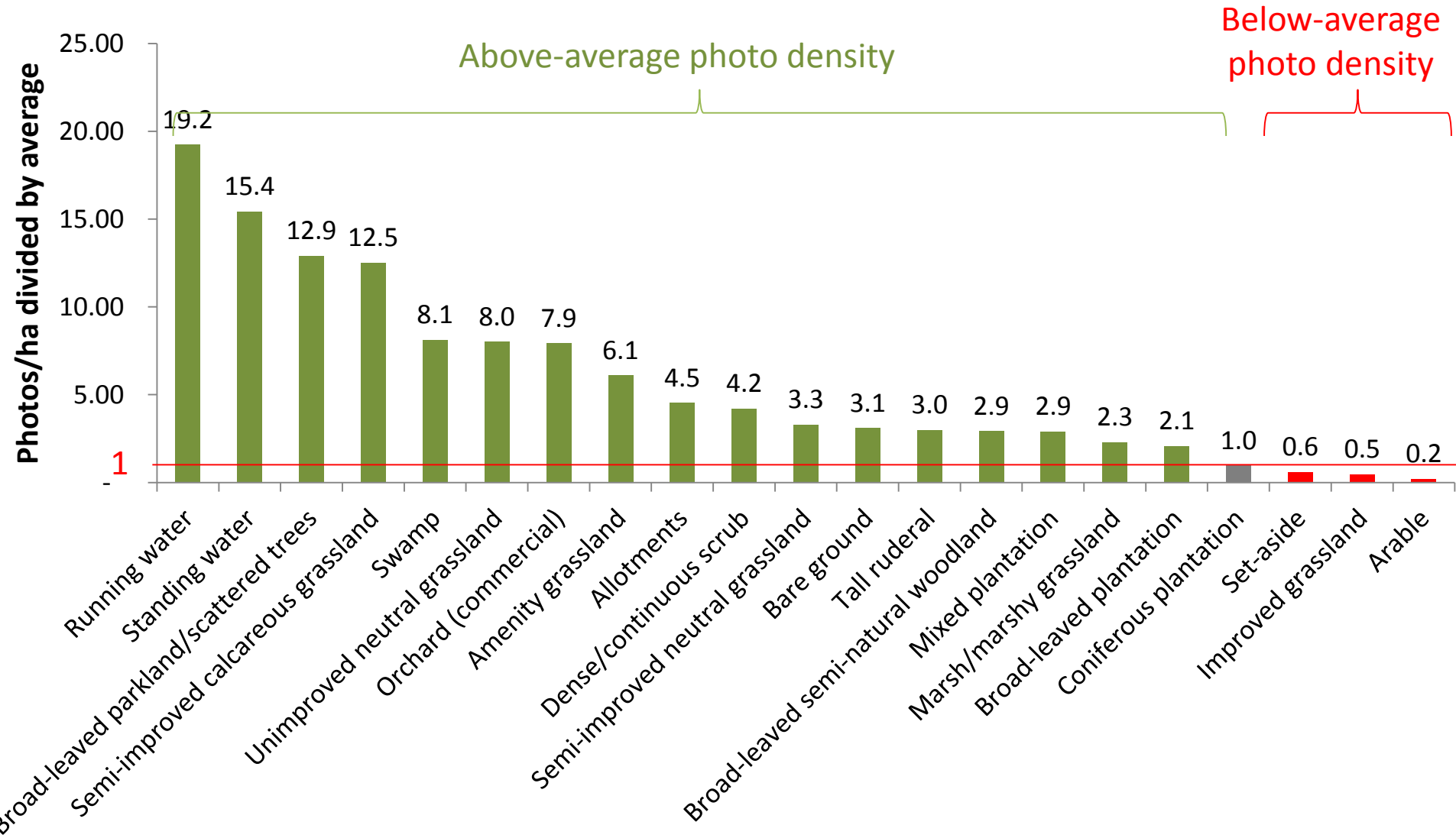
Proximity of photos to different landscape features and photo density (red line = average density)

Participatory mapping of 'sense of place': Essex

Cressing Temple medieval garden

Dedham Vale – Constable country

Saffron Waldon

Hatfield Forest

High Woods Park – views to Colchester Castle

Wivenhoe Transition Town

Mersea Island and Maldon estuary - atmospheric

Lea Valley

Epping Forest

Chelmsford: capital of Roman Empire

Hanningfield reservoir

Ministry of Defence area: limited access

Participatory mapping of 'sense of place': Essex

Single user cluster

Cressing Temple medieval garden

Dedham Vale – Constable country

Flickr photos
- 🟢 Aesthetic
- 🟡 Species
- 🔴 Recreation
- 🔵 Intellectual

Saffron Waldon

High Woods Park – views to Colchester Castle

Hatfield Forest

Wivenhoe Transition Town

Mersea Island and Maldon estuary - atmospheric

Lea Valley

Epping Forest

Chelmsford: capital of Roman Empire

Hanningfield reservoir

Burnham on Crouch

Hockley Woods and Cherry Orchard Park

Conclusions

	Strengths	Limitations
Land-cover scores	Quick Cover full range of ES Visual	Generic – don't account for local conditions Based on expert judgement
Participatory mapping	Local stakeholder input Rich narratives	Based on limited numbers of people (but can reach more using apps)
Flickr photos	Shows actual delivered benefits Good for many cultural ES Can inform scoring method	Not so good for some ES e.g. recreation Limited demographic (Flickr users, public photos) Have to interpret reason for photo being taken

➡ Combine tools to assess uncertainty and improve the robustness of the assessment

Thank you. Feedback welcome…

Alison.smith@eci.ox.ac.uk