



Operationalisation of Natural
Capital and Ecosystem Services

Case 09: Cairngorms National Park Management

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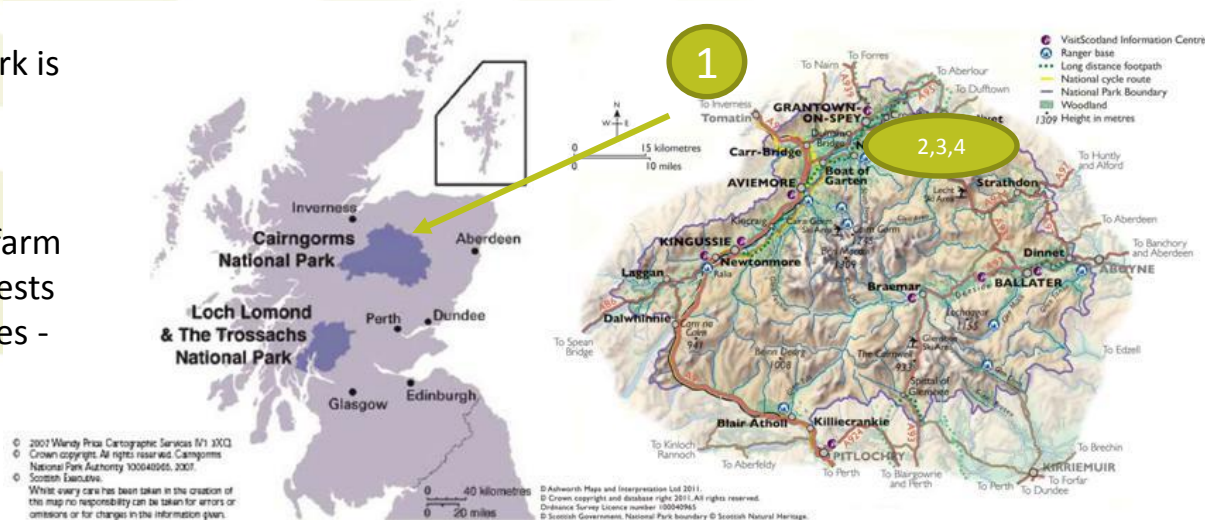
Aims and objectives of the case study

Four subprojects are ongoing which consider different actors and geographical scales within the park and are all link to the objectives of the Cairngorms Nature Strategy Group which are also the OpenNESS 'Case study Advisory Board'.

1. Recreation opportunity mapping – whole park – Sustainable Management planning
- 2. Management of Glenlivet Estate – one 'owner' – Competitiveness planning**
3. Mitigation of *Cryptosporidium* in Tomnavoulin – catchment – Human Well-being
4. Tomintoul and Glenlivet Regeneration Strategy and Master Plan – postcode delimited scale - multi-actor planning - Sustainable Management

Cairngorm National Park is Britain's largest (4,528 km²)

Glenlivet Estate has farm land, commercial forests and sporting tenancies - shooting & fishing (230 km²)



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All four sub-projects are related to governance

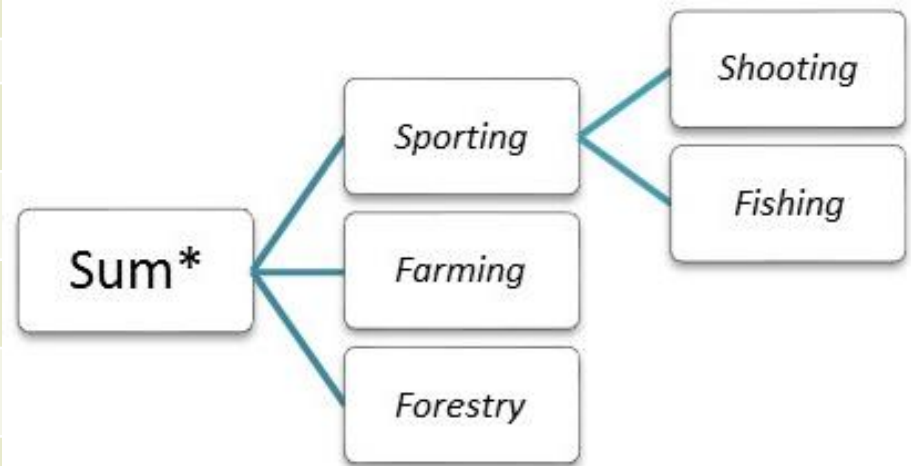
Combining money and non-monetary assessment of ecosystem services

Strategy

- The income to the Crown Estate from its tenants was estimated per land cover (data from land agent)
- The location and time spent conducting recreational activities by local people was collected (69 random semi-structured interviews)
- The recreational activities were converted to monetary values by multiplying time by annual income
- Values were plotted on land cover maps to show bundles of ecosystem services on the same land parcels

Rental income to estate- Summed per land cover

	Farming			Sporting (Shooting & Fishing)			Forestry		
	ERV (£/acre /yr)	Capital (£/acre)	Income (£/acre /yr)	ERV (£/acre /yr)	Capital (£/acre)	Income (£/acre /yr)	ERV (£/acre /yr)	Capital (£/acre)	Income (£/acre /yr)
Arable	40	3000	100						
Improved	27	2000	162						
Hay	27	2000	162						
Acid grassland	27	2000	162						
Heather and dwarf shrub	10	1000	20	1	405	2			
Heather grass	10	1000	20	1	405	2			
Bog grass dominated	1	750	20	1	663	2			
Bog heather dominated	0	600	20	1	663	2			
Montane	0	500	0	1	663	2			
Rough low-productivity	0	500	0	1	0	2			
Lake/River (*per lake parcel)				1959 *	144025	NE			
Conifer							0	2471	4



Multiple income per land parcel

Non-monetary assessment of cultural ecosystem services

Semi-structured interviews examining 3 overarching ecosystem service category groups:

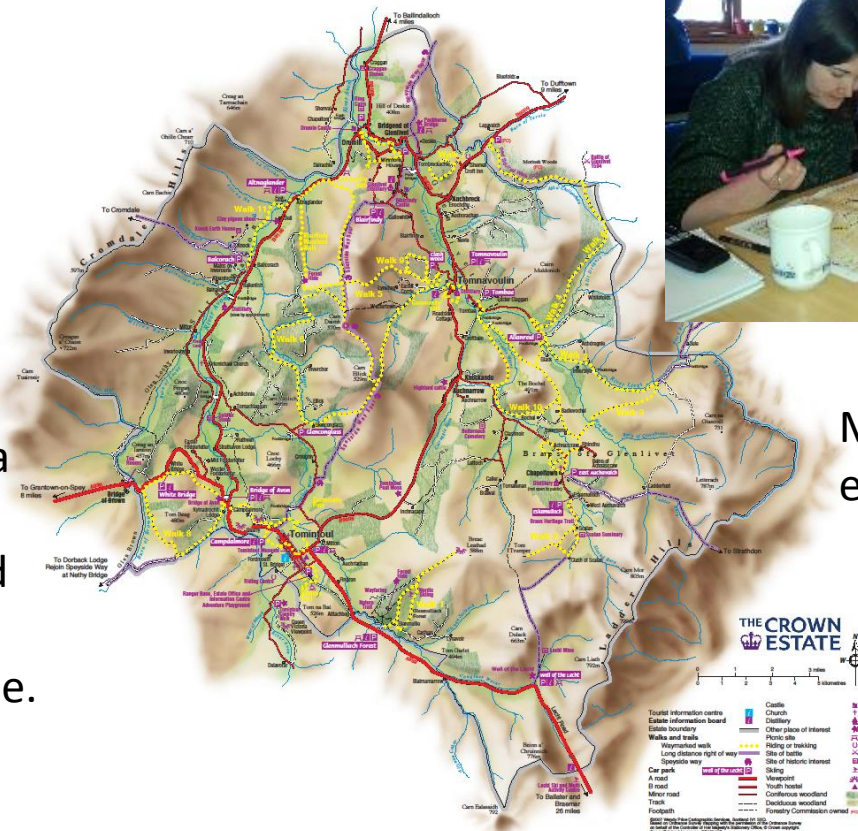
recreation,
cultural and
cultural disservices

Marked location on
map and record
frequency and
duration of recreation

Socio-demographic data
gender, age, household
composition, years lived
on the Estate,
employment and income.



Map provided to
each respondent



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Semi-structure interview prompts - Recreation

CES	Definition/Probing statement
Recreation	
Walking	I value this site for recreational walking or hiking.
Fishing	I value this site for recreational fishing.
Shooting	I value this site for recreational shooting.
Biking	I value this site for recreational biking.
Wildlife watching	I value this site for recreational wildlife observation.
Gathering wild products	I value this site for recreational harvesting of wild plant material and fungi.
Snow sports	I value this site for recreational skiing (or other snow-based recreational activity).
Photography	I value this site for recreational photography.
Other recreation (within living natural environment)	I value this site for the undertaking of other recreational activities in the natural environment and landscape, including forms of sport leisure and outdoor pursuit.
Other recreation (within non-living built environment)	I value this site for the undertaking of other recreational activities in the built environment.

Semi-structure interview prompts - Culture

Cultural	
Scientific knowledge and education	I value this site as it increases my knowledge about plant and animal species via providing scientific knowledge and education.
Cultural heritage	I value this site for its historical and cultural importance (including particular landscapes or land management practices).
Aesthetic values	I value the landscape(s) or ecosystem(s) at this site because of its particular beauty which positively influences my well-being, by inspiring a need to create something or by stimulating new thoughts or ideas that may foster a sense of place.
Spiritual and religious values	I value this site because of its associated spiritual or religious meaning (may or may not include associated manmade features).
Existence and bequest	I value this site because of its sole existence; I wish to preserve the present species and ecosystems for the enjoyment of future generations.
Other cultural values	I value this site because its environmental gives rise to cultural goods and services which positively contribute to my personal well-being.

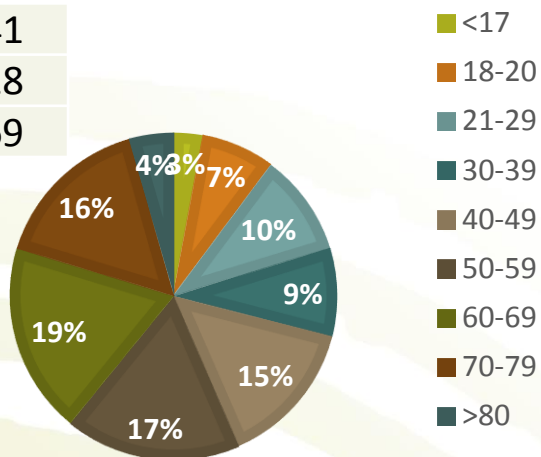
Semi-structure interview prompts – Cultural ecosystem disservices

Disservice	
Unpleasantness (human driven)	I perceive this site to be unpleasant because of factors caused by human activities (including visually unattractive landscapes, often neglected, abused or damaged).
Unpleasantness (nature driven)	I perceive this site to be unpleasant because of factors caused by the natural environment, and discomfort associated with the existing wildlife.
Scariness (human driven)	I perceive this site to be scary as it evokes a sense of danger or threat caused by human activities or man-made features.
Scariness (nature driven)	I perceive this site to be scary as it evokes a sense of danger or threat caused by the natural environment.
Noisiness (human driven)	I perceive this site to be noisy as a result of human activity.
Noisiness (nature driven)	I perceive this site to be noisy as a result of the natural environment.
Other disservice	I perceive this site, defined by specific environmental functions and attributes, to be negative for my human well-being.

Socio-demographic of respondents

Female	41
Male	28
Grand Total	69

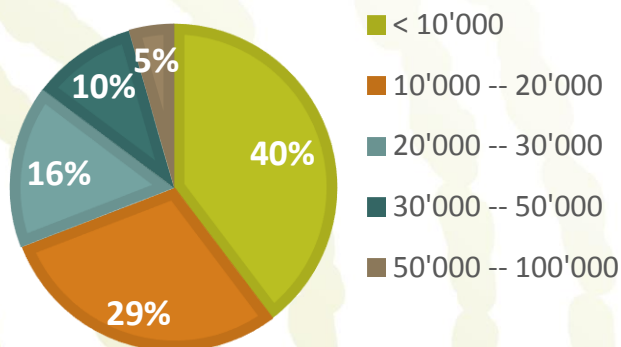
AGE



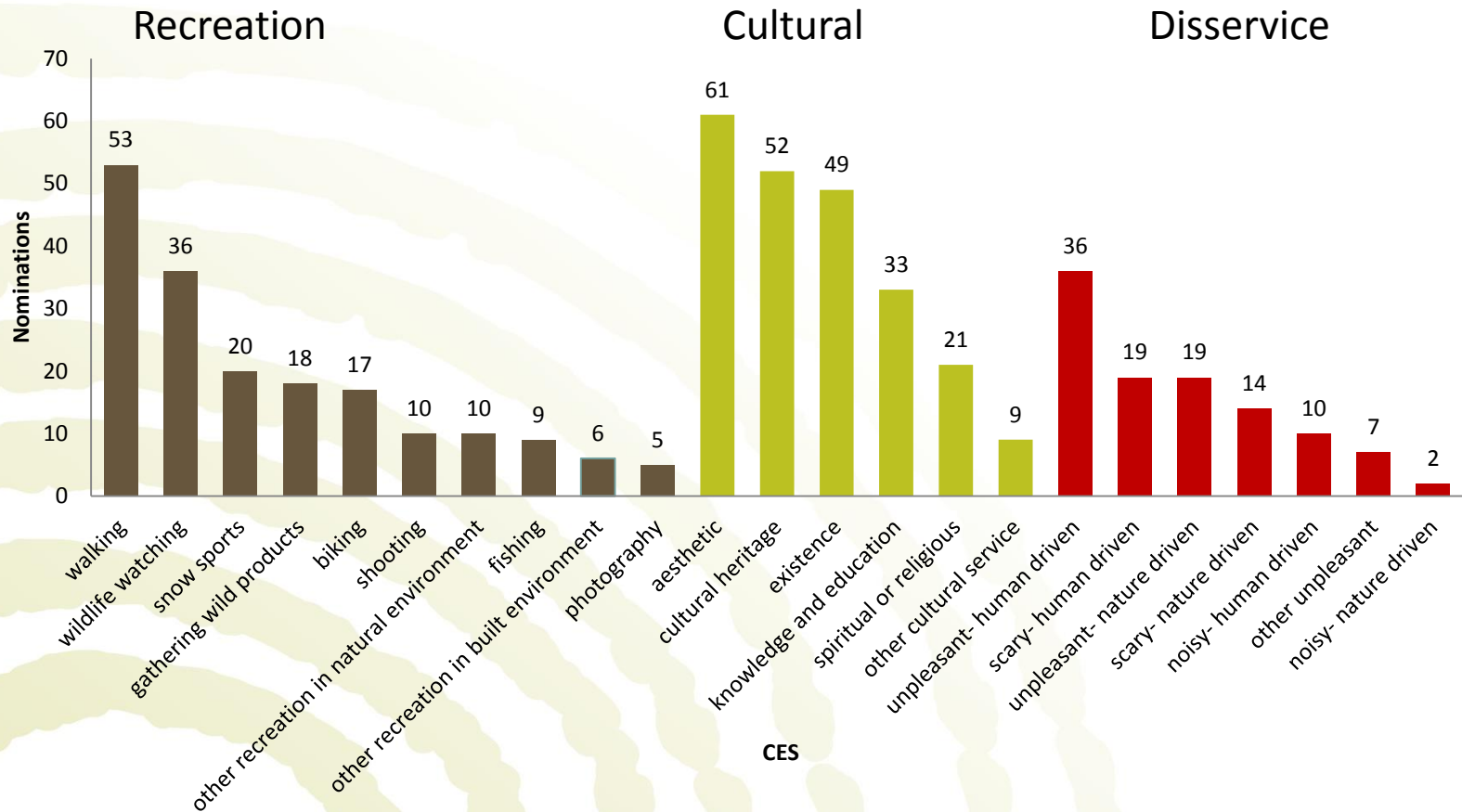
RESIDENCY (YEARS)



ANNUAL INCOME (£ AFTER TAX)

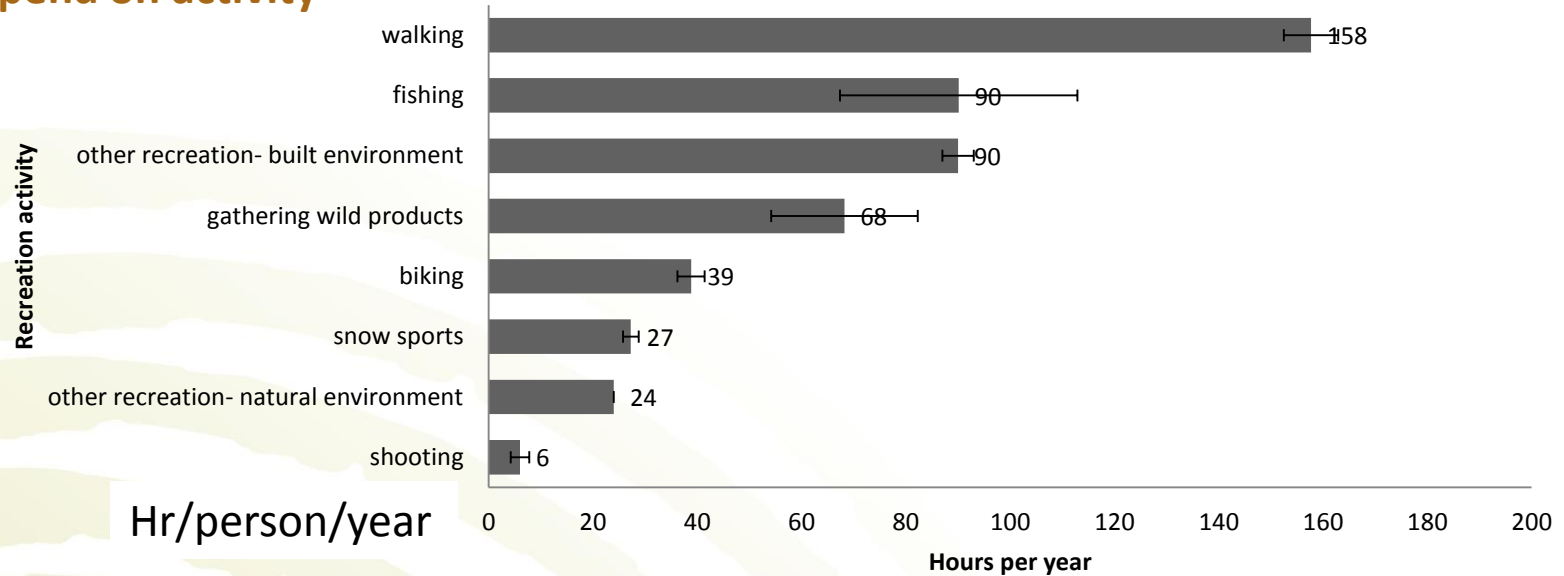


Cultural ecosystem services ranked by 69 respondents

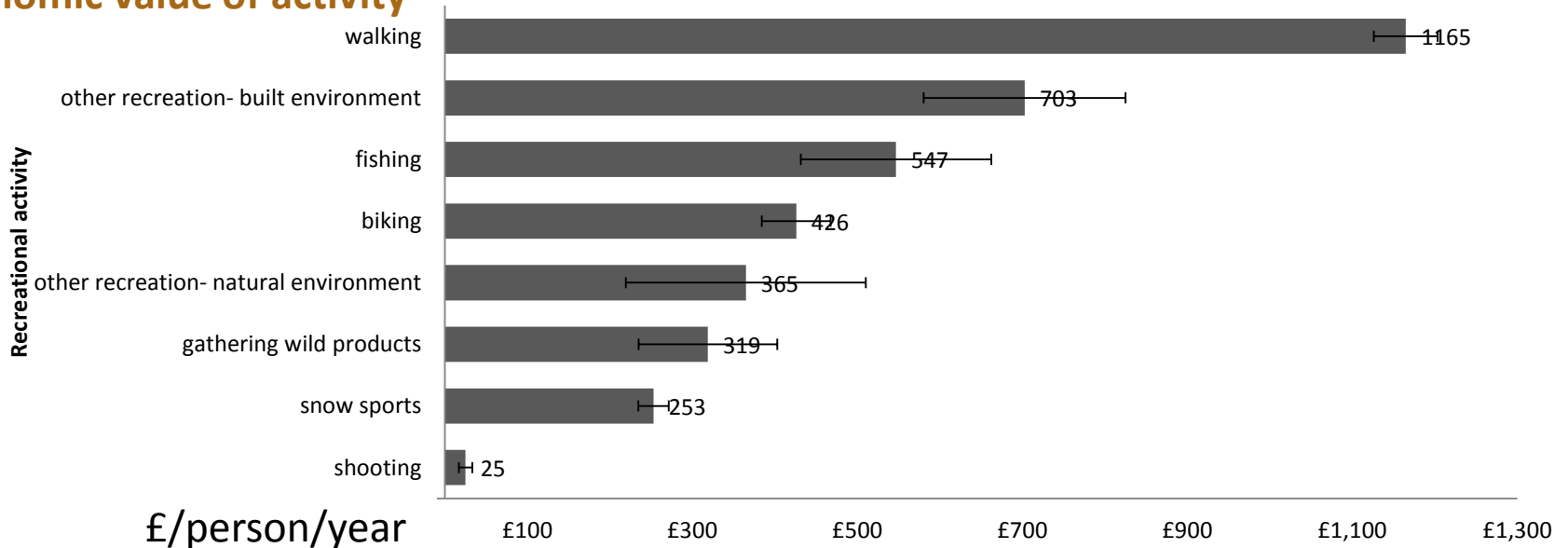


Estimating recreation social and economic value

Time spend on activity



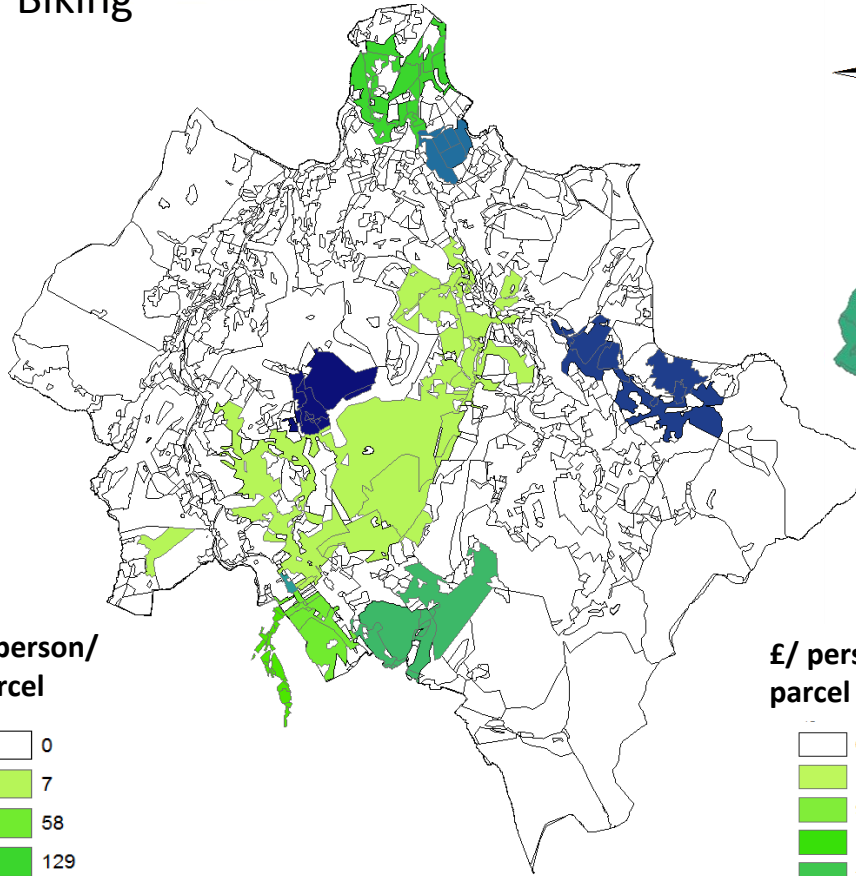
Economic value of activity



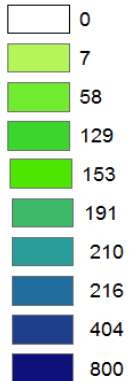
The bar is the standard error of the estimate

Recreational location and valuation

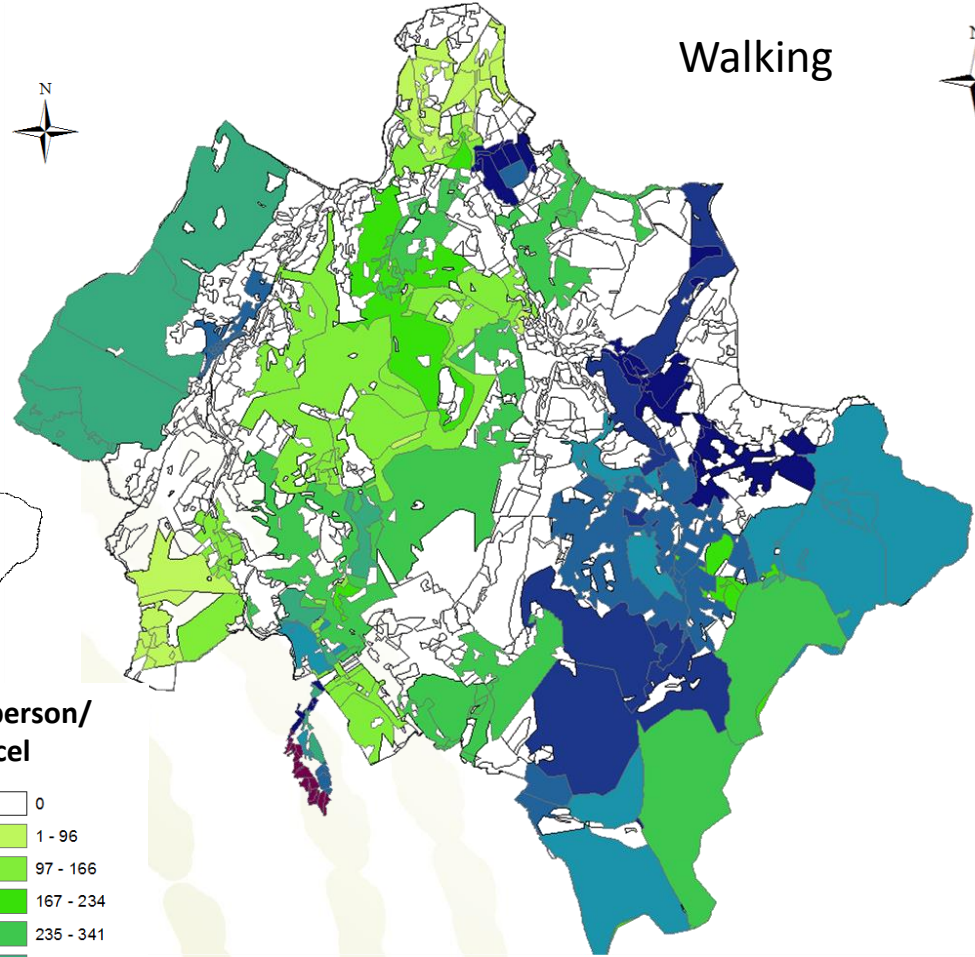
Biking



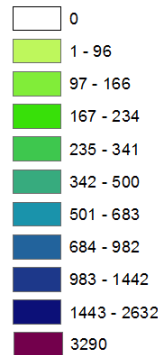
£/person/
parcel



Walking



£/ person/
parcel

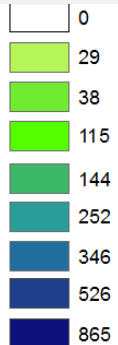


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Recreational location and valuation

Recreation-
Snow sports and other recreational activities
in built and natural environments

£/ person/parcel



Other recreational activity in natural environment

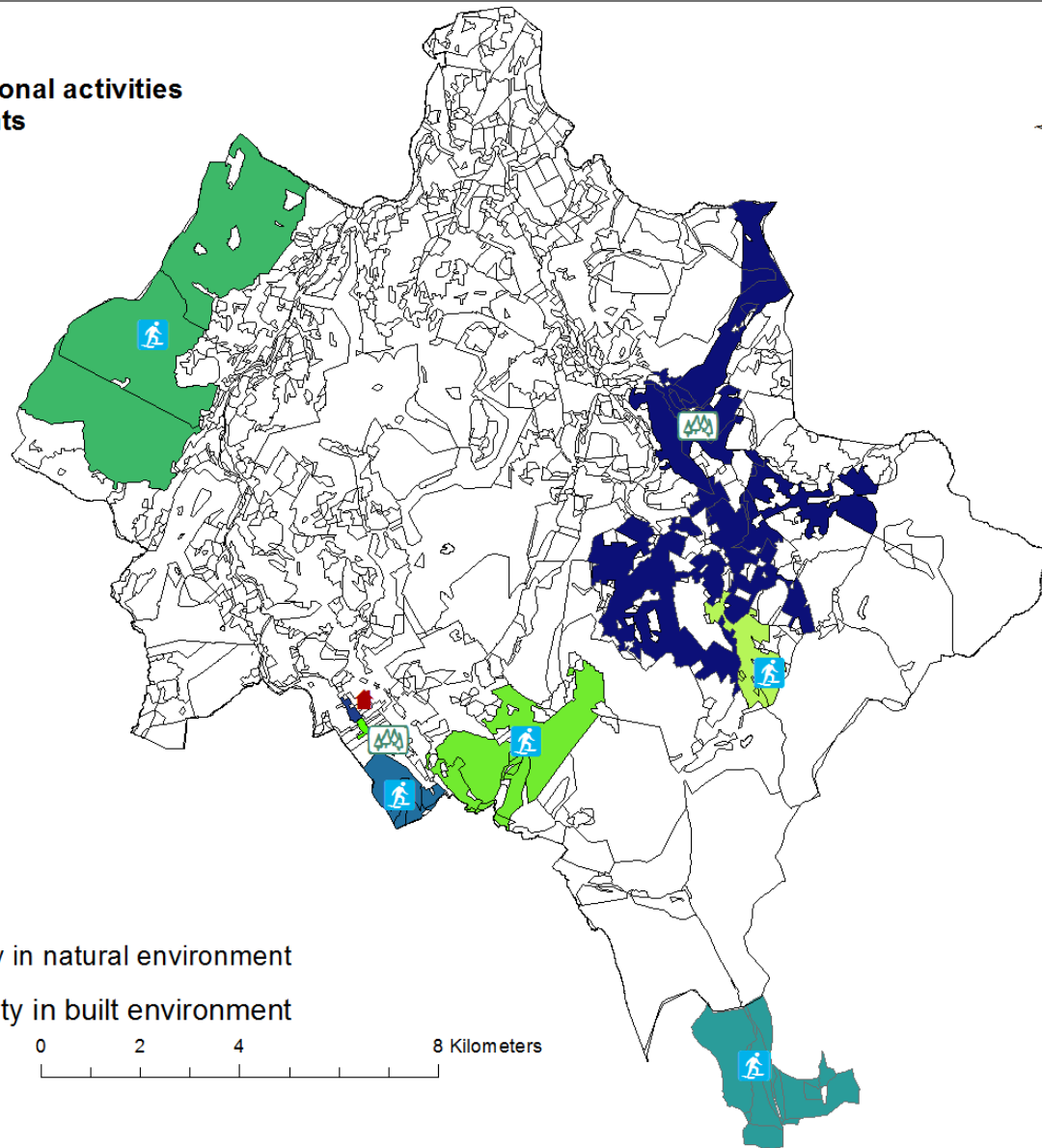


Other recreational activity in built environment



Snow sports

0 2 4 8 Kilometers

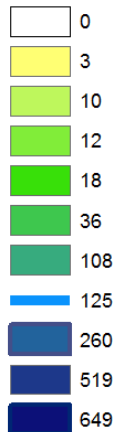


Recreational location and valuation

Recreation-
Shooting, fishing and gathering wild products

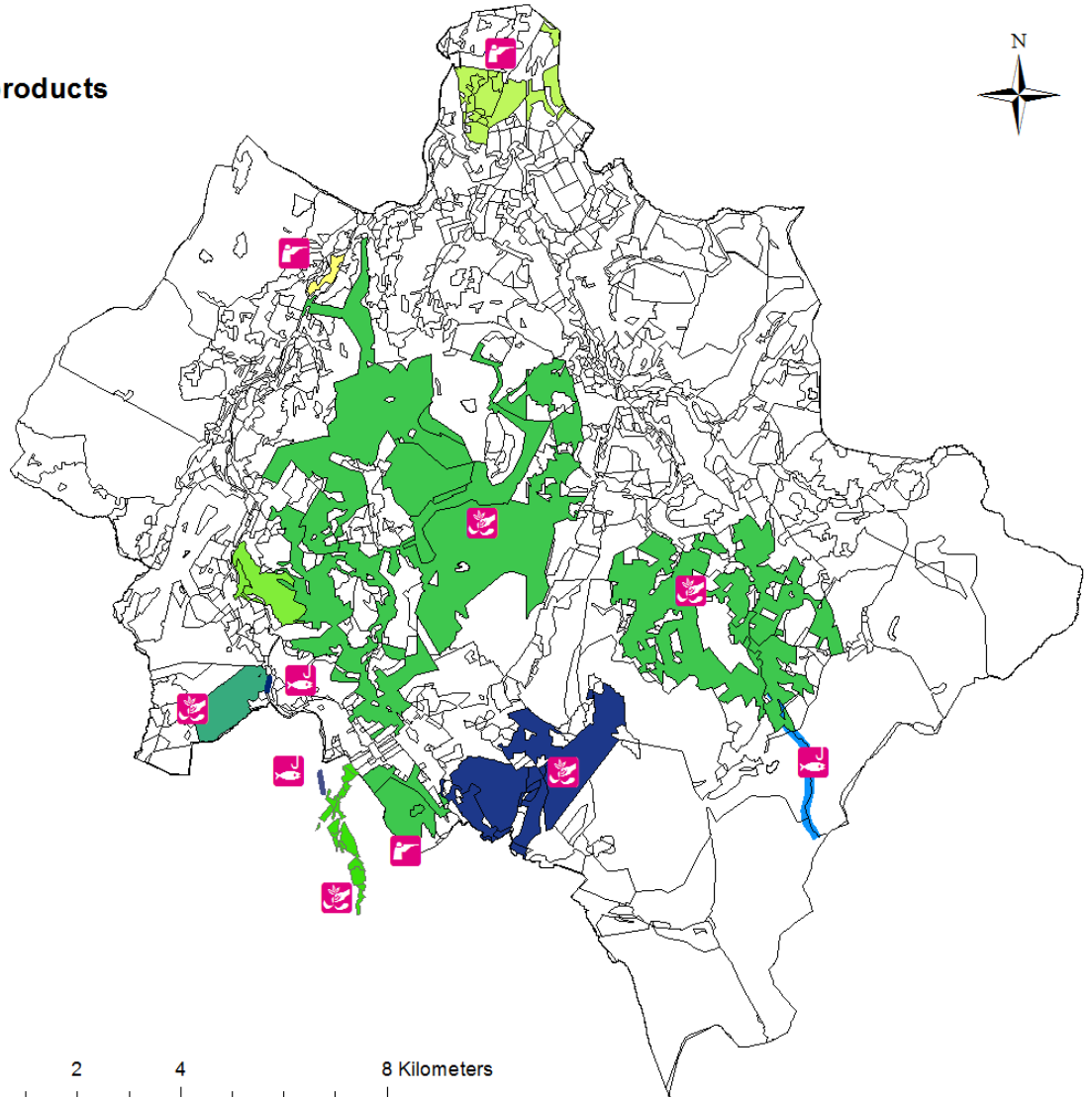


£/ person/
parcel



- Gathering wild products
- Shooting
- Fishing

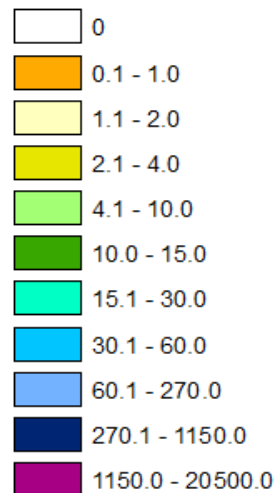
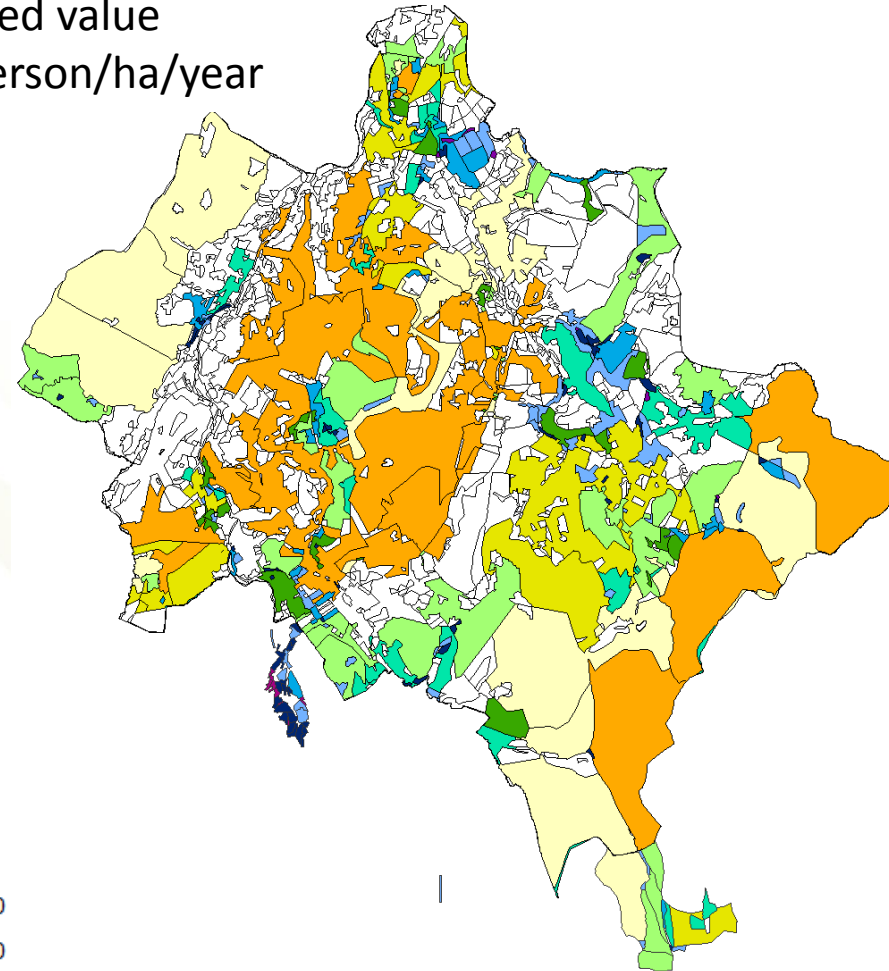
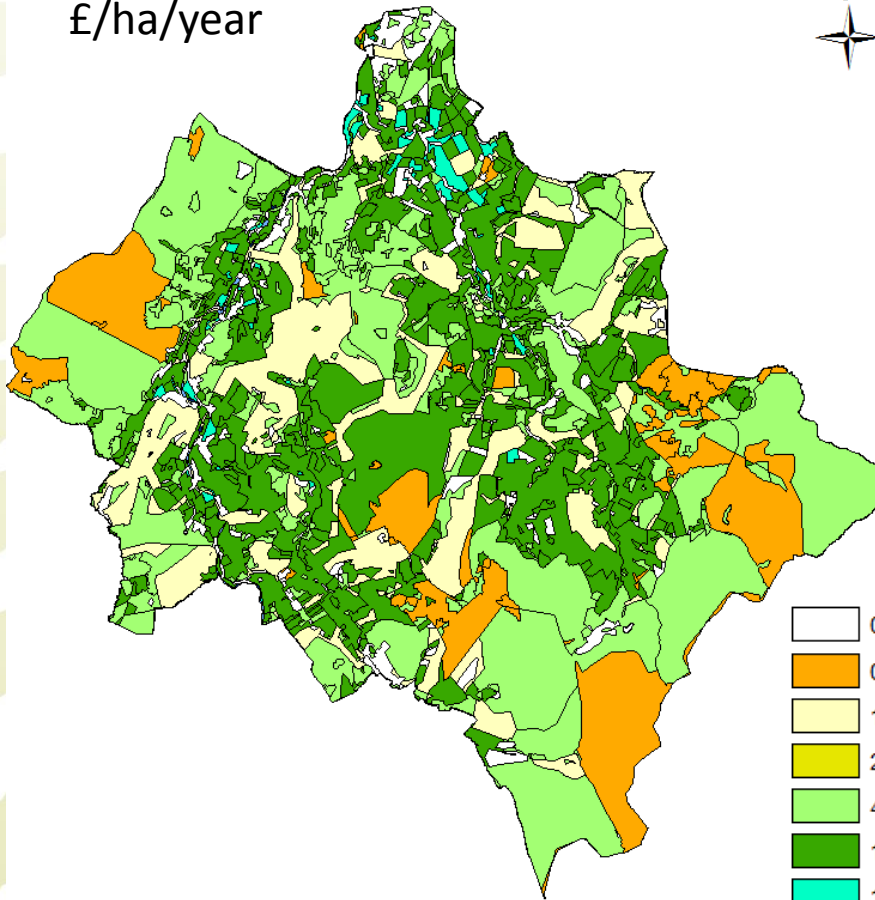
0 2 4 8 Kilometers



Comparing rental income and added value from all recreational activities

Rental income
£/ha/year

Added value
£/Person/ha/year



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Evaluation



The accuracy of the maps

The quality and easy of interpretation of the maps

The data utilized (completeness, availability, robustness)

The technical ease of use.

Thank you for your attention!



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