



Transactional Environmental Support System

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A Transactional Environmental Support System for Europe:

Who, Why, How, What?

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Funded by the European Community's Seventh Framework Programme (FP7/2007-2013) under grant agreement n° 212304 ENV.2007.4.2.1.1. Methodologies for scaling down to regional & local level the analysis of policy impacts on multifunctional land uses & economic activity



Transactional Environmental Support System

Who? 14 partners/10 countries

1	Aristotle University of Thessaloniki (Greece) Coordination
2	Bournemouth University (United Kingdom)
3	NERC Centre for Ecology & Hydrology (United Kingdom)
4	Anatrack Ltd (United Kingdom)
5	Ordenamento e Gestão de Recursos Naturais (Portugal)
6	Tero Ltd (Greece)
7	European Sustainable Use Specialist Group of IUCN (Belgium)
8	Federation of Associations for Hunting and Conservation of the EU
9	Pro-Biodiversity Service (Poland)
10	Centre for Cartography of Fauna and Flora (Slovenia)
11	Szent Istvan University (Hungary)
12	Tallinn University of Technology (Estonia)
13	Danube Delta National Institute for R&D (Romania)
14	WWF Turkey (Turkey)



Transactional Environmental Support System

Why? (TESS objectives)

Europe is losing biodiversity and ability to provide ecosystem services. **Formal Environmental Assessment processes (Environmental Impact Assessment, Strategic EA) give some protection.** However, individual local stakeholders who manage land and species also make **daily informal decisions**, within an envelope of regulations and fiscal incentives but based mainly on local environments. **The myriad small decisions summate to change land use.**

Millennium Assessment: Ecosystem Services from Land Use

**Supporting
Regulating**

*Primarily public goods,
regulated and public funded.
Biodiversity needed?*

Provisioning

*Extensively private goods, can
become livestock & intensive
crops that impact biodiversity.*

Cultural

*Science, education, recreation &
use of biodiversity all provide
incentives to de-intensify land
and restore biodiversity –
BUT HOW CAN THEY HELP?*

How can de-intensification help reverse biodiversity loss?

Understanding of causes of loss is growing.

For 30 declining bird species in UK, Prof. Ian Newton (2004, *Ibis* 146:579-600) identifies:

(i) weed control, (ii) early ploughing, (iii) grassland management, (iv) intensified stocking, (v) hedgerow loss & (vi) predation.

All can be addressed, in many cases by de-intensification measures that have low cost

BUT: who pays? – Are public funds (e.g. agri-environment) large enough? Anything else...?

Convention on Biological Diversity (NB next meeting)

Article 10: Protect & encourage customary use of biological resources in accordance with traditional cultural practices that are compatible with conservation or sustainable use requirements.

Article 11: Adopt economically and socially sound measures that act as incentives for conservation and sustainable use of components of biological diversity. (BUT: is this worth anything...?)



SPEND: Hunting
(private)

in 2006
in the EU



Angling



Watching



GEMCONBIO survey of hunting, angling, watching:
34 million adults (7% population) spend >€40 billion.

- In 2006, equivalent US spending was \$120 billion
- €40 billion is about €200 for each cultivated EU ha
- CAP budget is €57 a year, <20% agri-environment
- It costs €6 billion to run Natura 2000 (17% of EU)

How much conservation through use is possible?

We seek to complement formal assessment with an internet-based Transactional Environmental Support System that:

(a) collates all ways to leverage biodiversity enhancement, uses models to predict economic & biodiversity impacts of small-scale actions, and delivers context-adaptive decision support, so that **local people can optimise incomes from ecosystem services, in **exchange** for**

(b) information on their decisions, and monitored results, which integrate to support decisions of central assessors for adaptive governance (regulations & fiscal incentives**).**

How? An exchange between local stakeholders & central policymakers

Decision support for managers of land and species: **Councils, Farmers, Foresters, Reserve managers, Anglers, Hunters, Access Interests**

1. What does central policy and planning have?
Capability to produce complex knowledge.

e.g. Environmental Information System for Planners

A prototype demonstrator that provided Complex Knowledge to help planners apply environment data and understanding in the planning process.

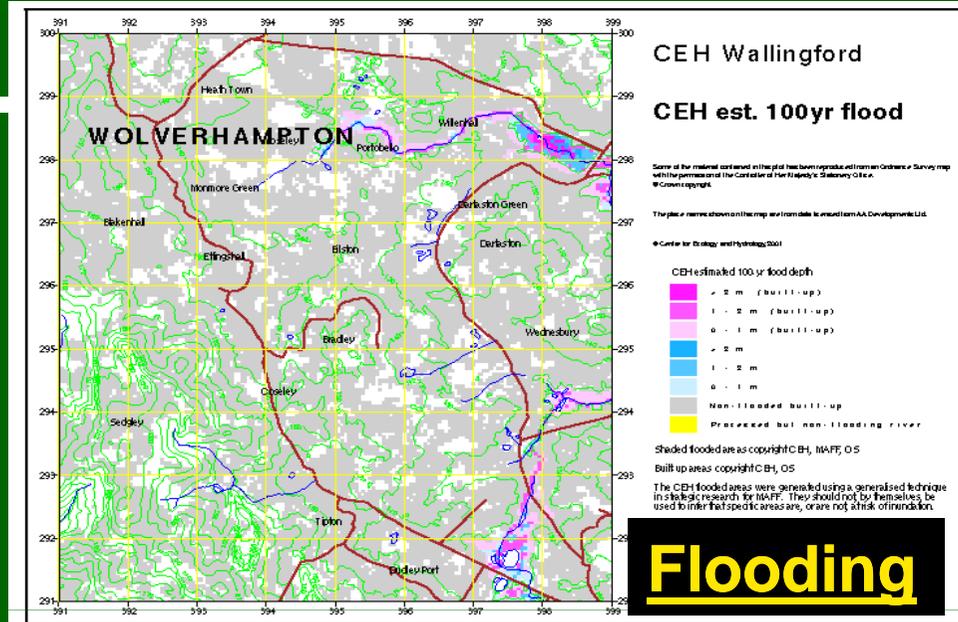


Origin: BGS, CEH and Nottingham University

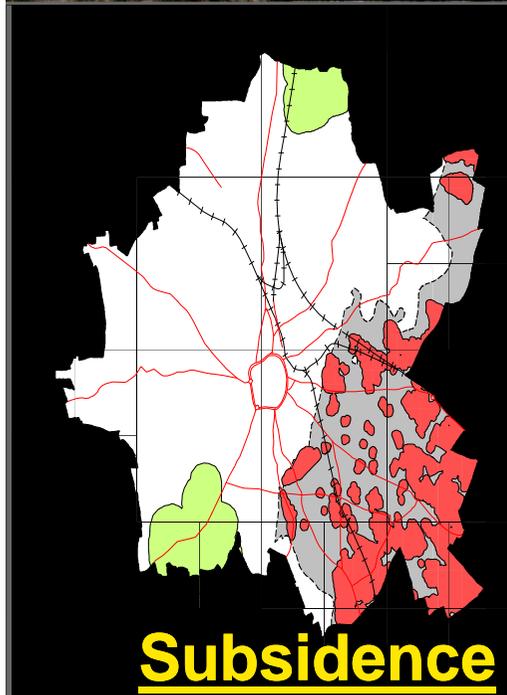
Some capabilities



Managing Waste



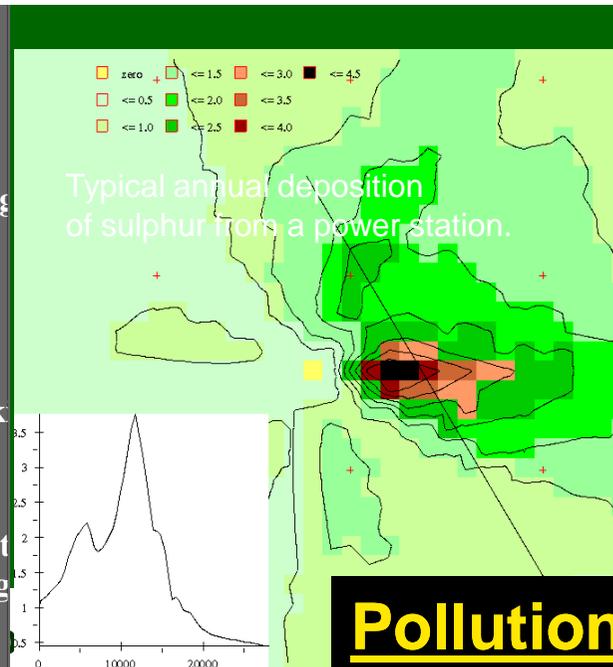
Flooding



Subsidence

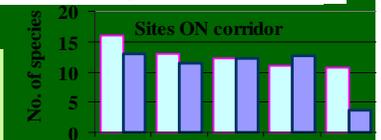
UNDERMINING

- Exposed coalfield. Risk of subsidence over former workings
- Exposed coalfield. Areas of potential subsidence over undocumented workings
- Possible minor subsidence relating to modern deep mining

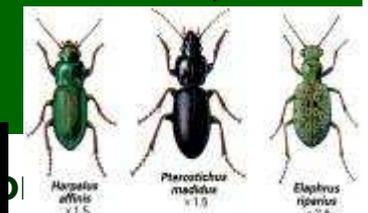
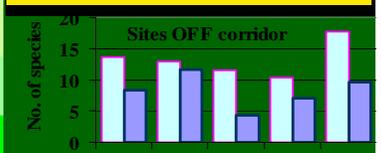


Pollution

Specialists Generalists



Biodiversity

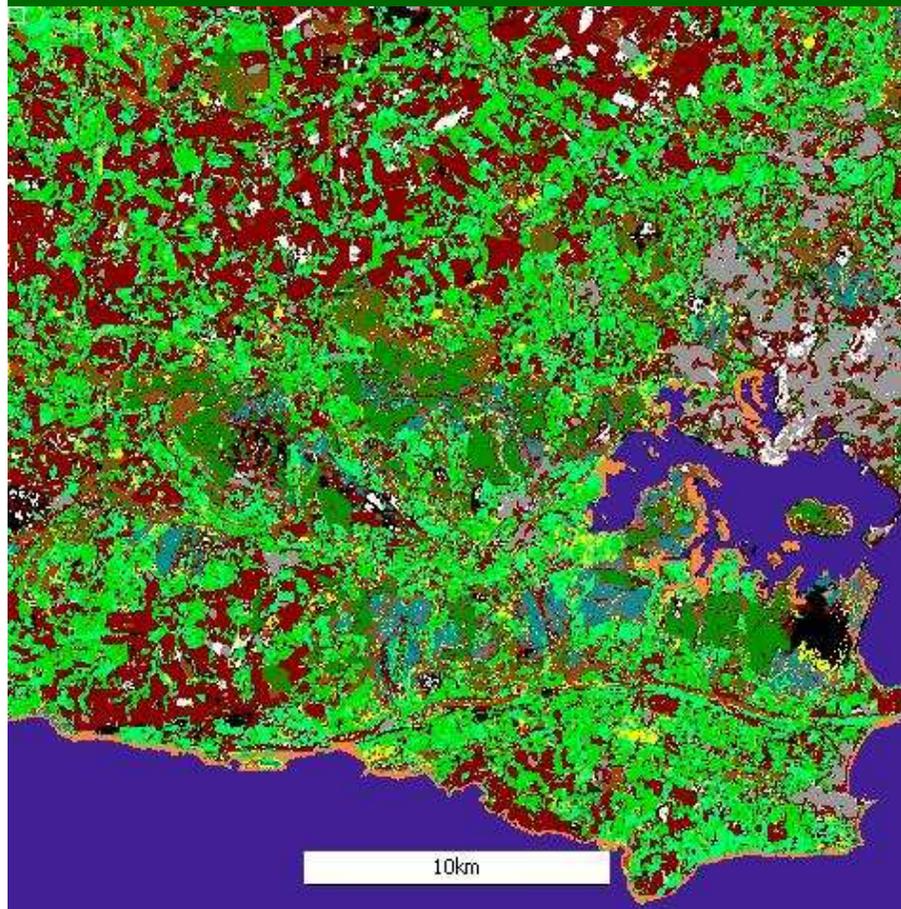


How? An exchange between local stakeholders & central policymakers

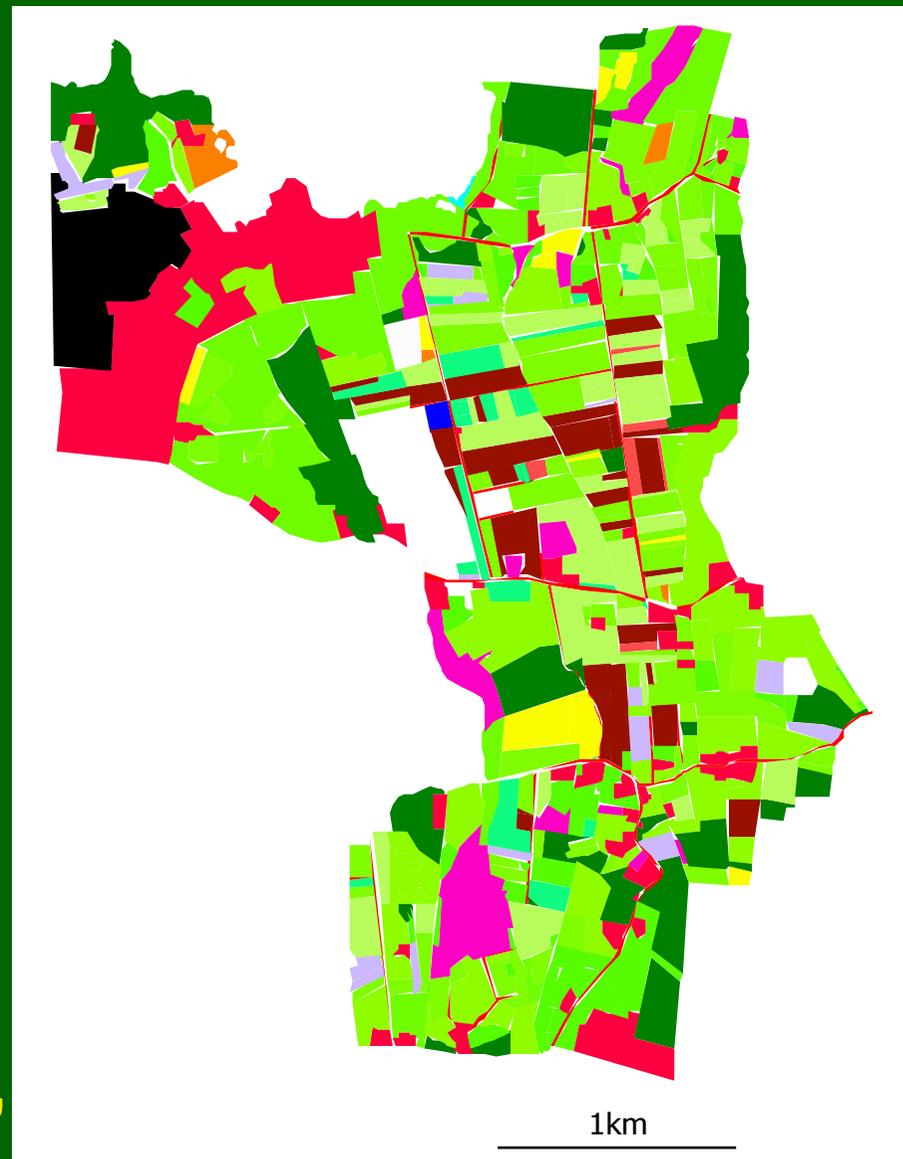
Decision support for managers of land and species: **Councils, Farmers, Foresters, Reserve managers, Anglers, Hunters, Access Interests**

1. What does central policy and planning have?
Capability to produce complex knowledge.
2. What does central policy and planning need?
Local knowledge and local actions.

Remote mapping (CEH Landcover 1990) is marvellous,
but scale restricts detail,



so is best in combination with
local mapping (eg. farm plans,
civic groups) and species
monitoring (e.g. by wildlife
watchers, hunters & anglers).



Ground-based for detail,
(by Swedish hunters, 1985)

How? An exchange between local stakeholders & central policymakers

Decision support for managers of land and species: **Councils, Farmers, Foresters, Reserve managers, Anglers, Hunters, Access Interests**

1. What does central policy and planning have?
Capability to produce complex knowledge.
2. What does central policy and planning need?
Local knowledge and local actions.
3. What do local managers of land & species have?
Local knowledge & capabilities (skill, cash, time).
4. What do local managers of land & species need?
Complex knowledge to guide their actions.



Transactional Environmental Support System

Exchanging decision-support for local knowledge and actions

<u>SCALE</u>	<u>CONTEXT / QUESTION</u>	<u>OPERATION MODE</u>
Field individual	<u>! BEEP !</u> <u>HARRIER NEST AHEAD</u> Divert harvester for 20 meters	<i>Map on communication device with GPS-auto-location capability.</i>
Farm individual	If I use my land like this in future, what happens to my income, game bags and nitrate run-offs?	<i>Auto-guides on farm plan: optimizing game, fishing and farm income.</i>
Parish community	How do we route this path to optimise views while minimising erosion and wildlife disturbance?	<i>Headland mapping GIS: walking (pay-parking), horse-riding (licence).</i>
Higher government	If trends in land-use continue for 20 years, how can we still meet planned biodiversity targets?	<i>Scenario: model subsidy payments for leveraging sustainable use activities.</i>



Transactional Environmental Support System

What knowledge is needed?

1. What policy makers want & how they want it;
Information **demand** for government assessments.
2. What local people want & how they want it;
Information **demand** for managing land & species.
3. What capabilities, models and decision-making systems exist already?
Information **supply** for government and local level.

GANTT-like TESS work-packages

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WP2
Central
Survey
design

Workshop
& report

WP5

Cases

Pan-Euro
local &
central
survey

WP3

Local
Survey
design

Workshop
& report

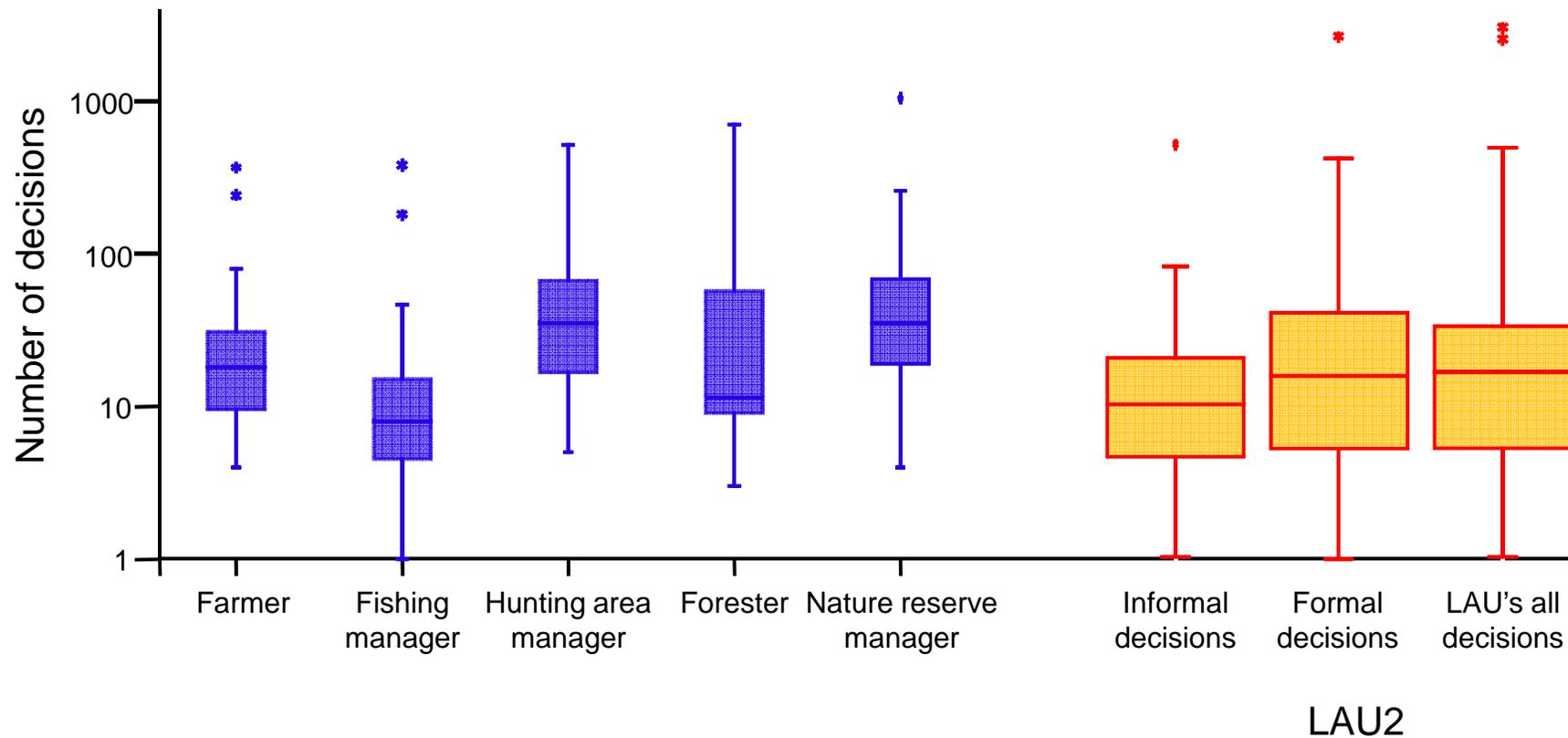
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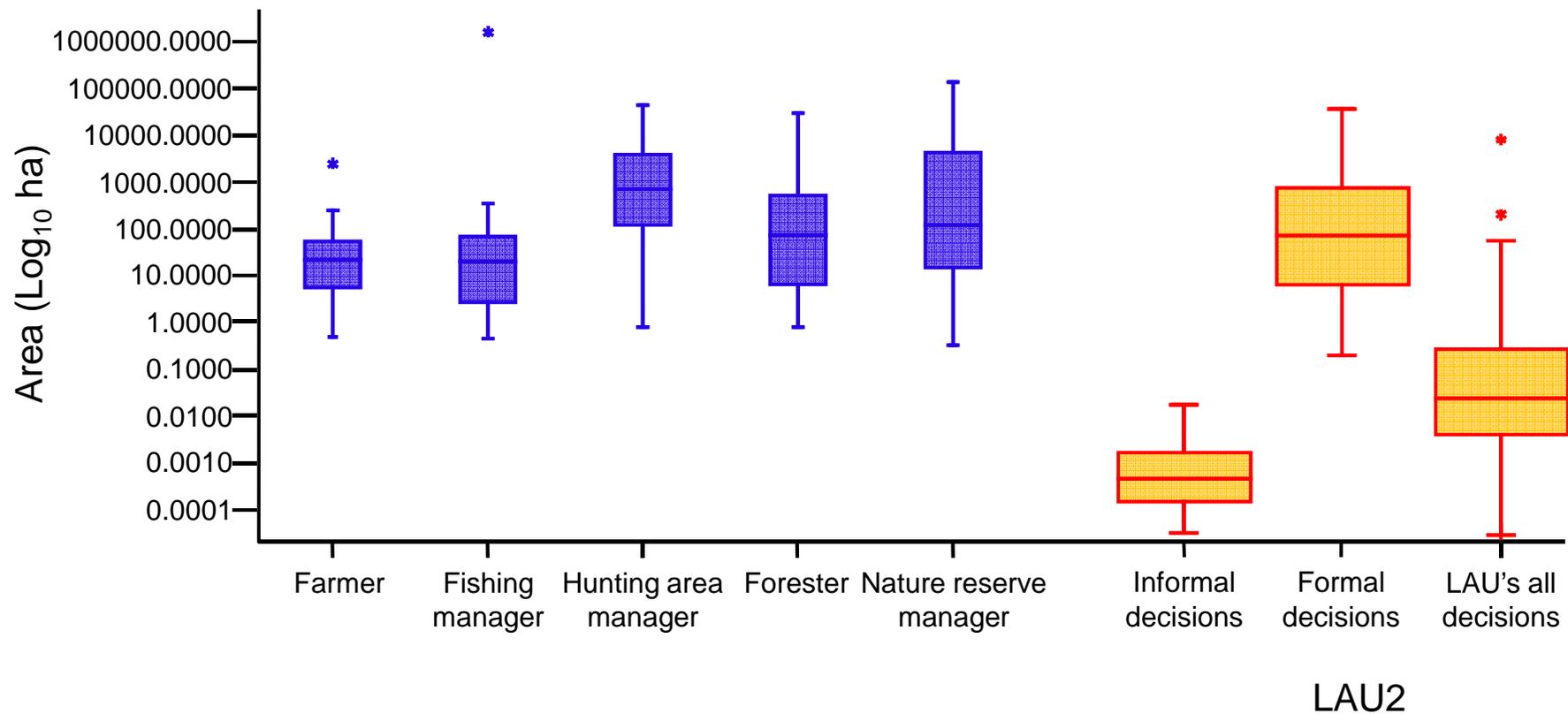
NOW

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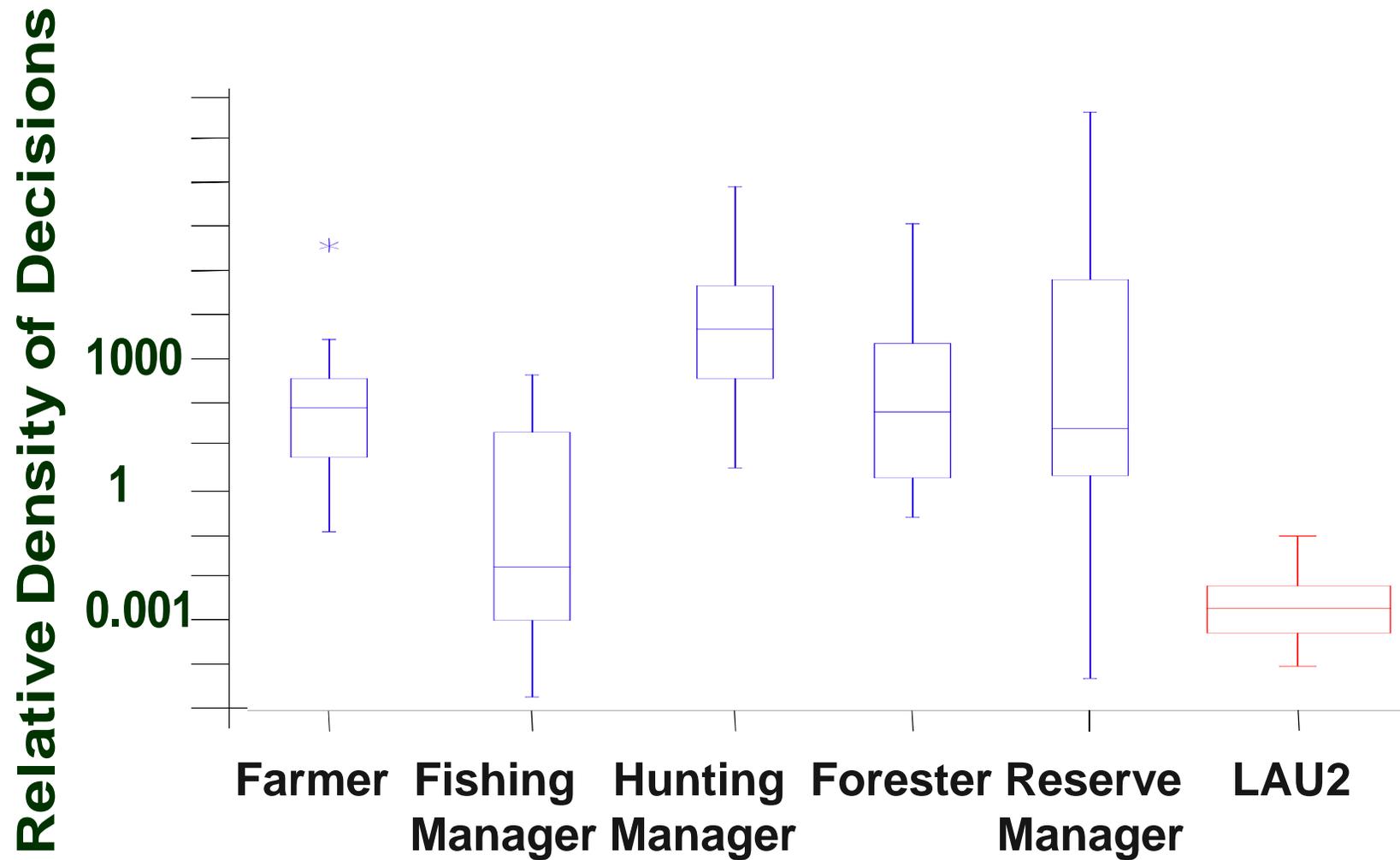
Annual environmental decisions



Size of area affected by environmental decisions



The decision density, taking account of (a) decision numbers per management unit, (b) area covered by each decision and (c) relative abundance of different management units.



There is greater importance of private than state decisions.

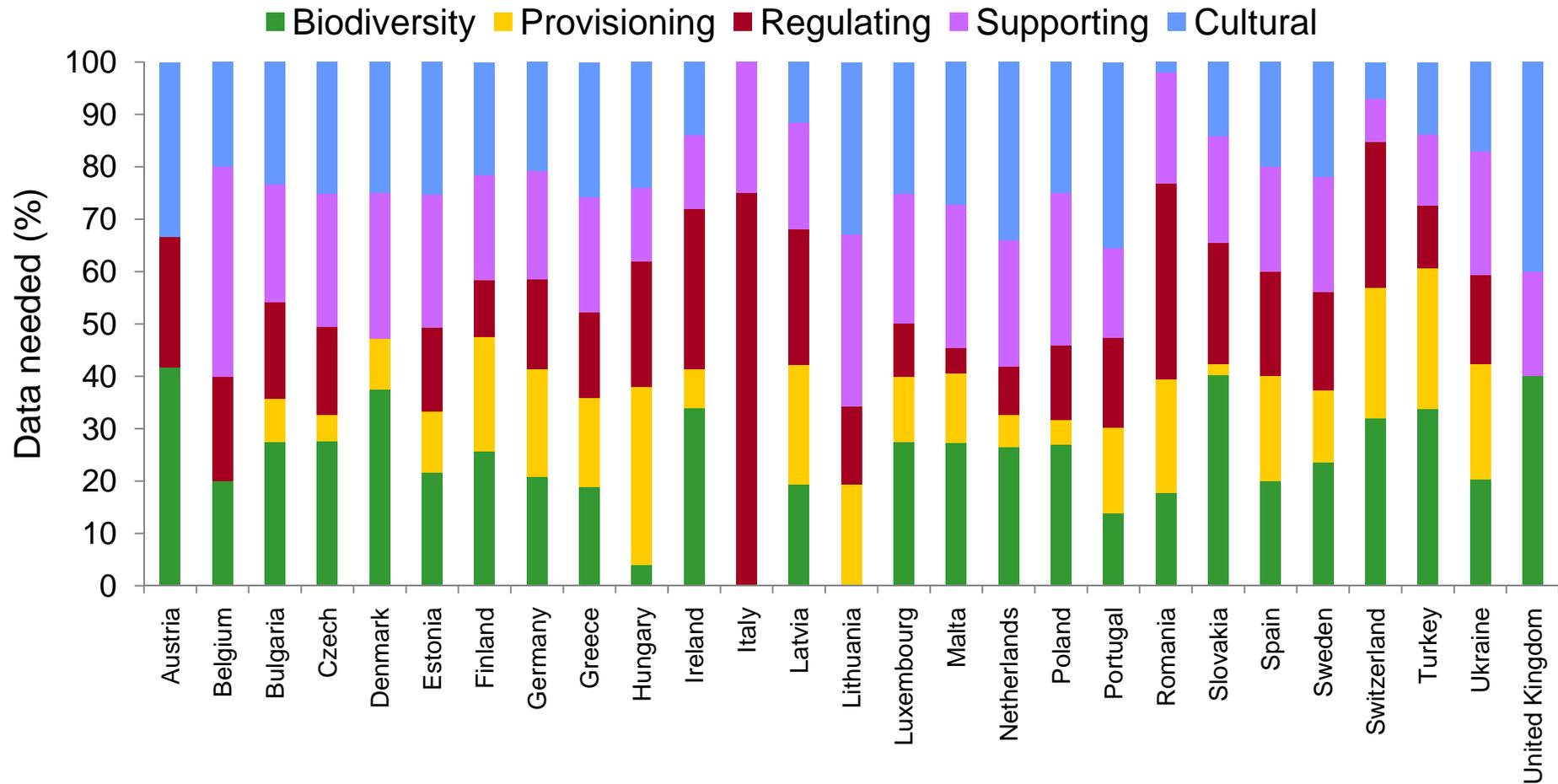
Different needs for formal and informal decision-making

Improving formal environmental assessment & decisions (analysis of EIA & SEA practises best for biodiversity & ecosystem services), including feedback for adaptive governance.

Innovating a system for guidance and nudge-potential¹ of the much more frequent and pervasive informal decisions on what to grow, when to mow, etc.

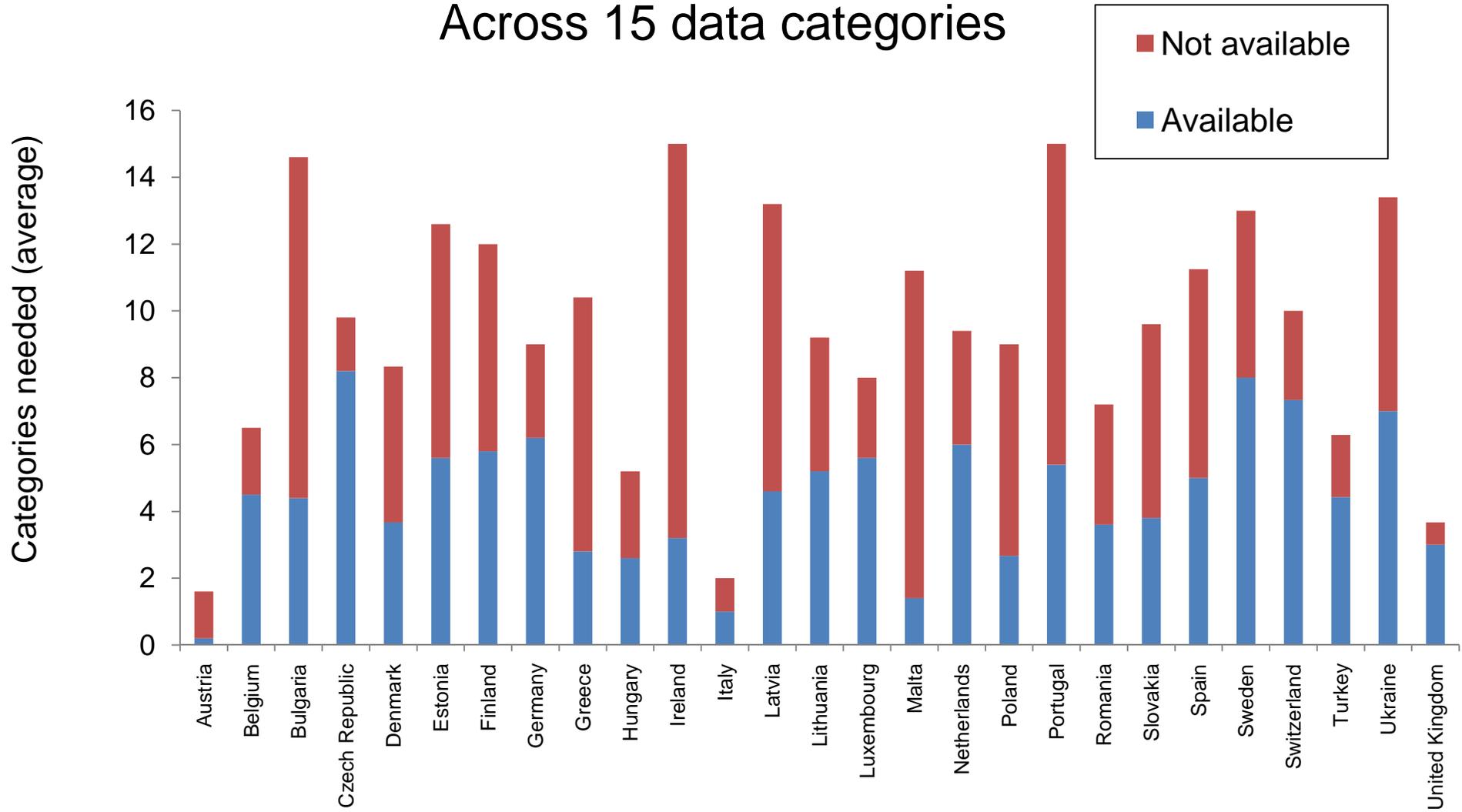
¹Thaler, R.H. & Sunstein, C.R. 2008. Nudge – Improving decisions about health, wealth & happiness. Penguin.

Different types of data needed

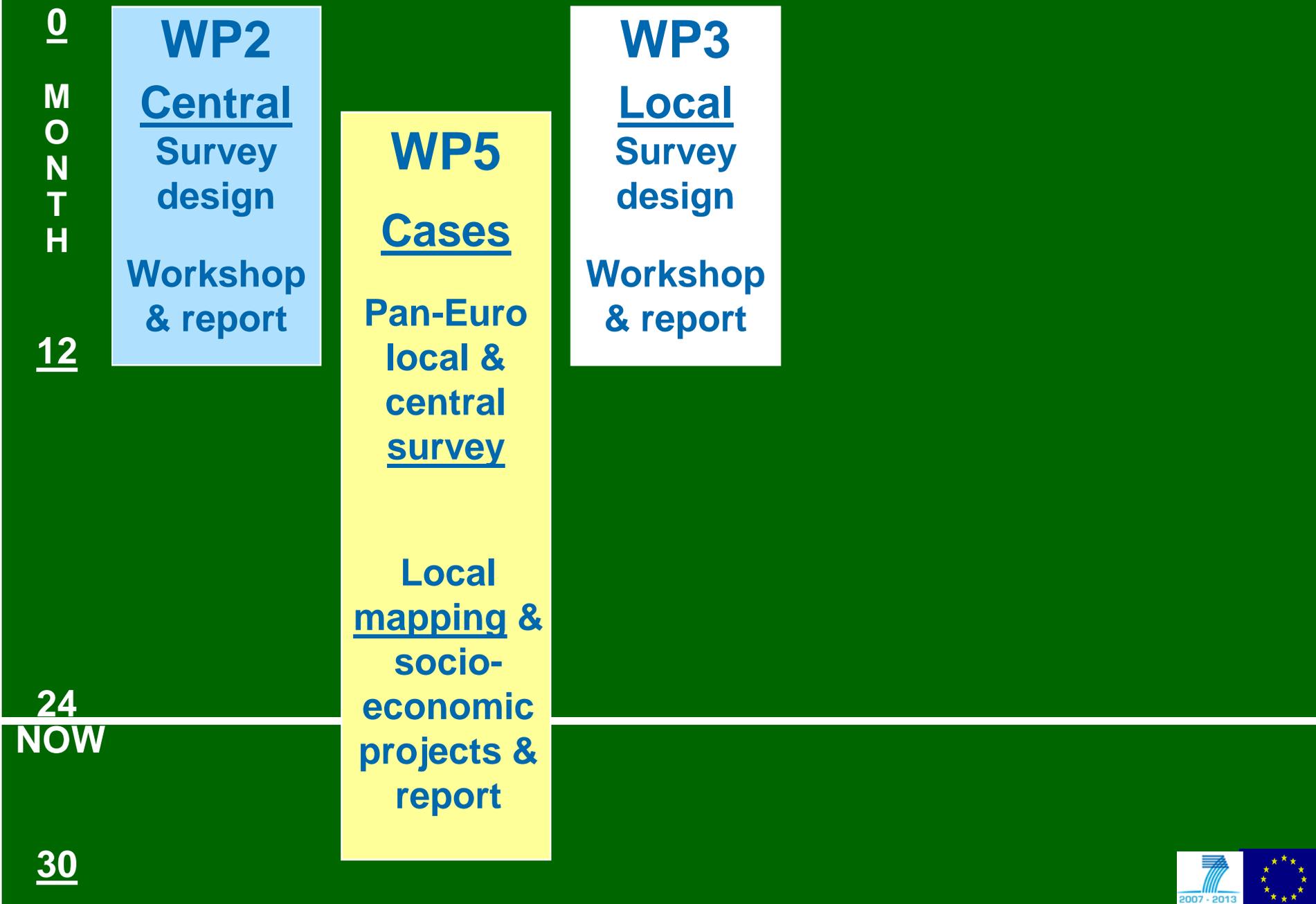


WP5 - ecological capacity: data requirements at local level

Across 15 data categories



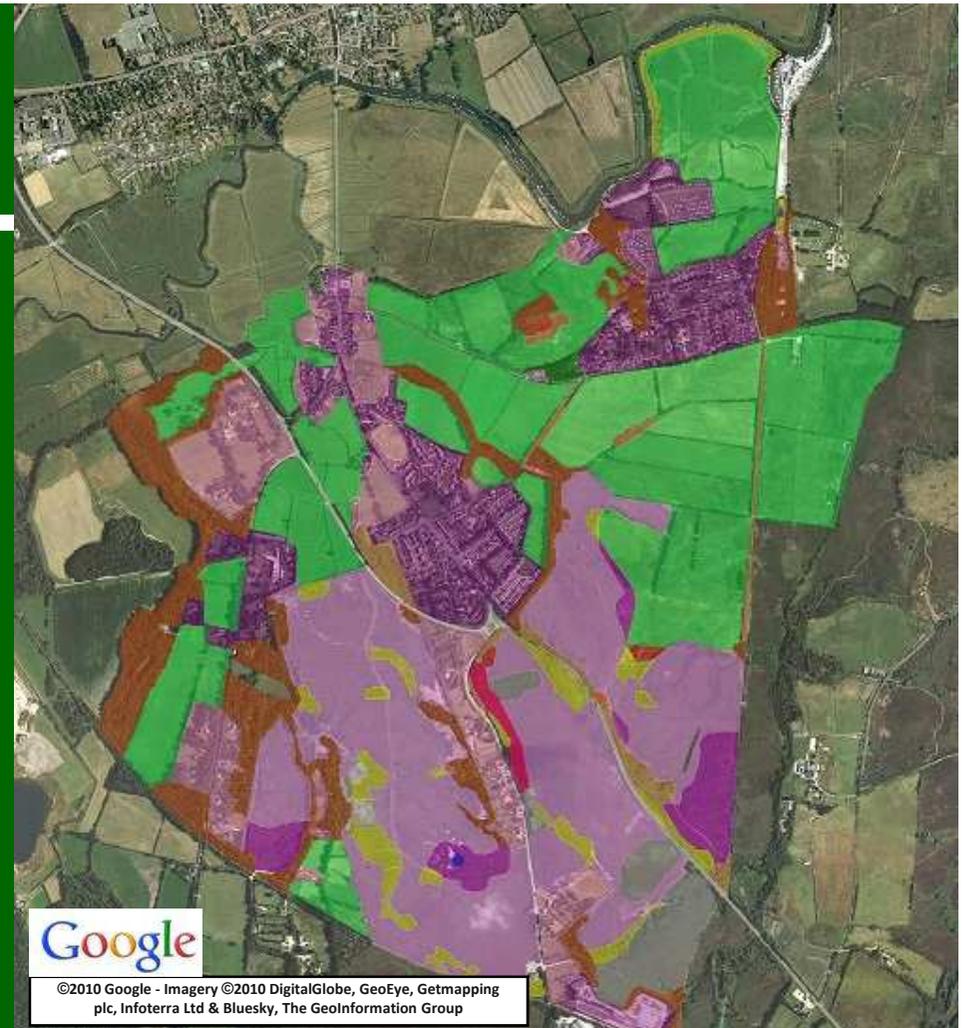
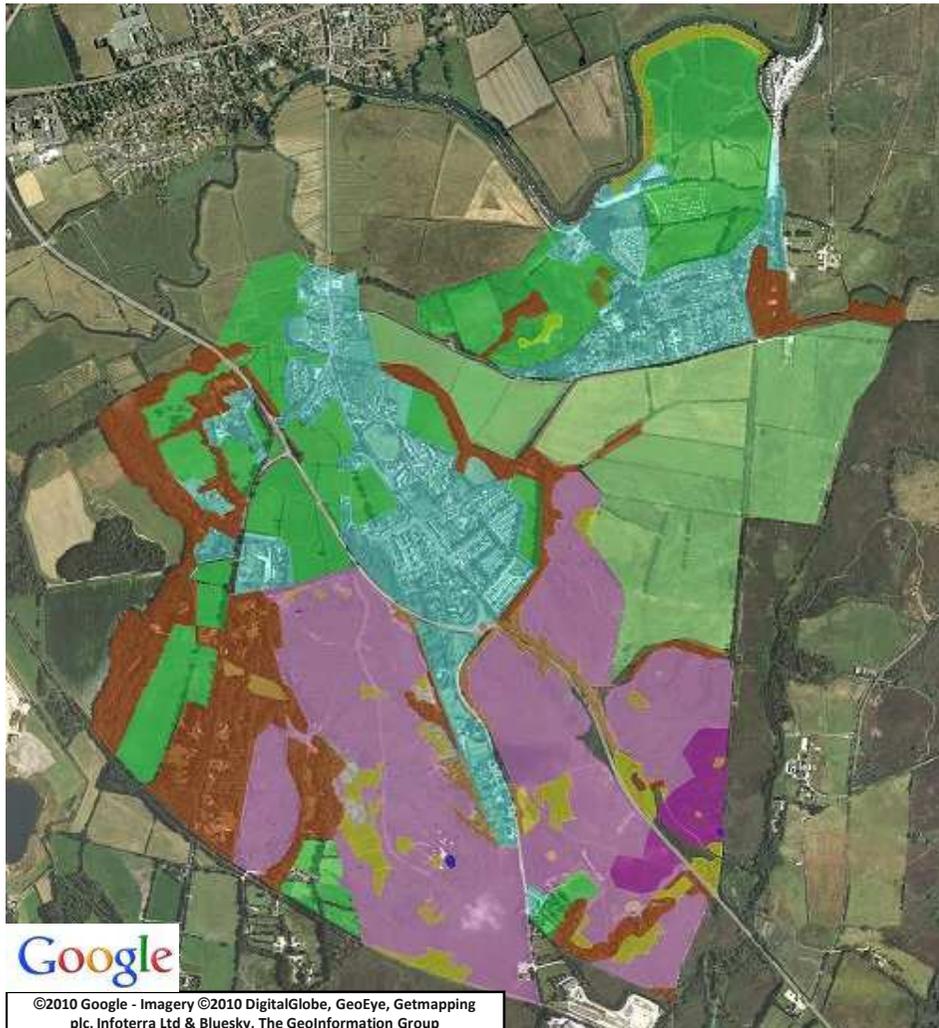
GANTT-like TESS work-packages



Mapping

1. Screen: read in sunlight.
2. Portable: by children.
3. Robust: **sealed (e.g. water)**
4. Internet-enabled: 3G Mobile
5. GPS: available, integral.
6. Camera: pictures to identify species.
7. Battery life: **at least 5 hours.**
8. Processing: **speed/memory for mapping**
9. Price: **€800**





Mapping by Scout team

Mapping by post-doc Biologist

There is very good correspondence in the mapped shapes; some differences in habitat class (colour) could easily be resolved by training.

GANTT-like TESS work-packages

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WP2
Central Survey design
Workshop & report

WP5
Cases
Pan-Euro local & central survey

Local mapping & projects & report

WP3
Local Survey design
Workshop & report

WP6
Policy + Internet
Survey, analysis, policy document
TESS internet design & report

WP4
Models
Audit of models
Database complete, reported
Gap analysis

24

NOW

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Brussels Conference

CONCLUSIONS

- Europe is losing ability to provide ecosystem services based on wild biodiversity.
- Regulations give some protection but not for most of the myriad decisions of individuals that change land use outside strictly protected areas.
- TESS aims to collate & automate local delivery of all ways to leverage biodiversity enhancement, to (i) predict impacts of small-scale actions on incomes & biodiversity, (ii) support decisions & monitor results so that (iii) central assessors can adapt governance (regulatory & fiscal incentives).



**Thank you
for listening**

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