



Photo: iStockPhoto

ECOMAPS approach to scalable natural capital mapping

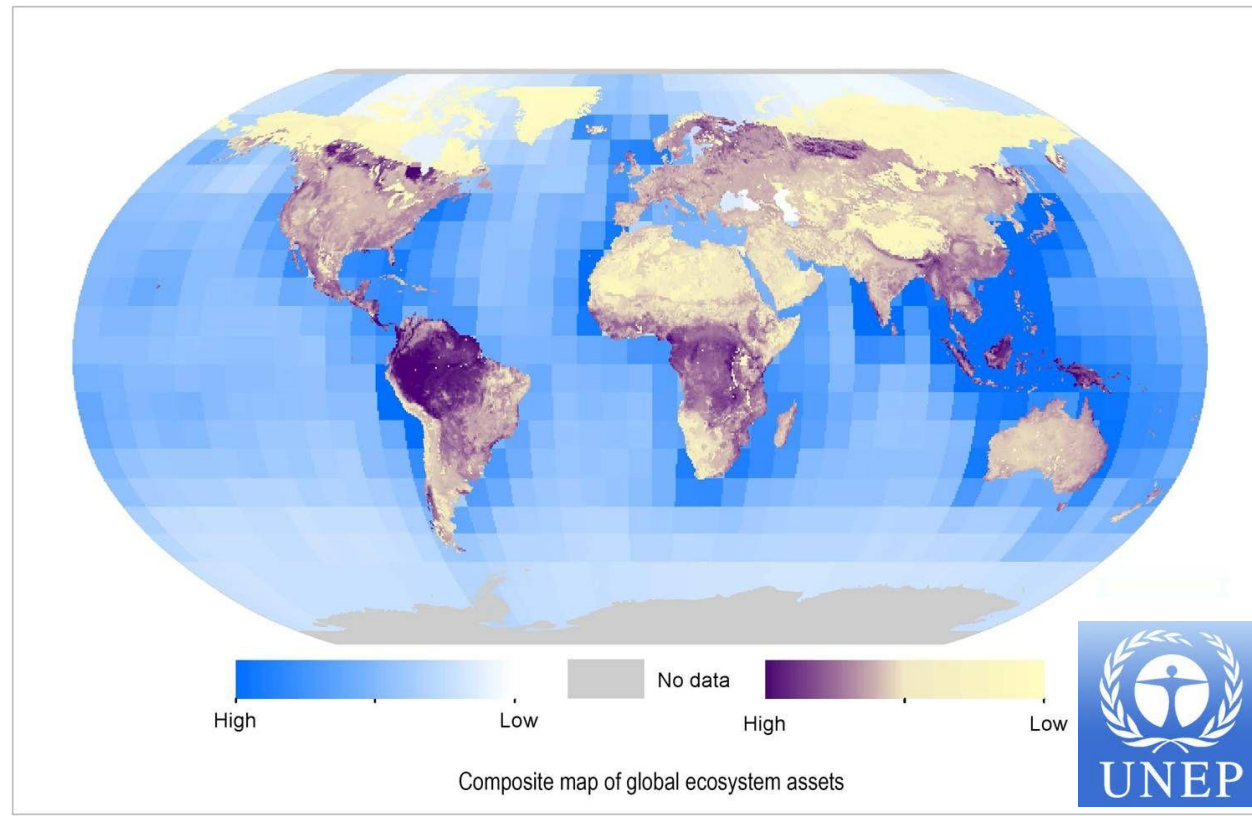
John Watkins Centre for Ecology and Hydrology

Introduction

- The development of natural capital and environmental economics concepts is leading to a demand for new information products for natural capital and ecosystem service delivery
- These products need to work across scales using site-based, earth observation and modelled data

UNEP Report Aug 2014

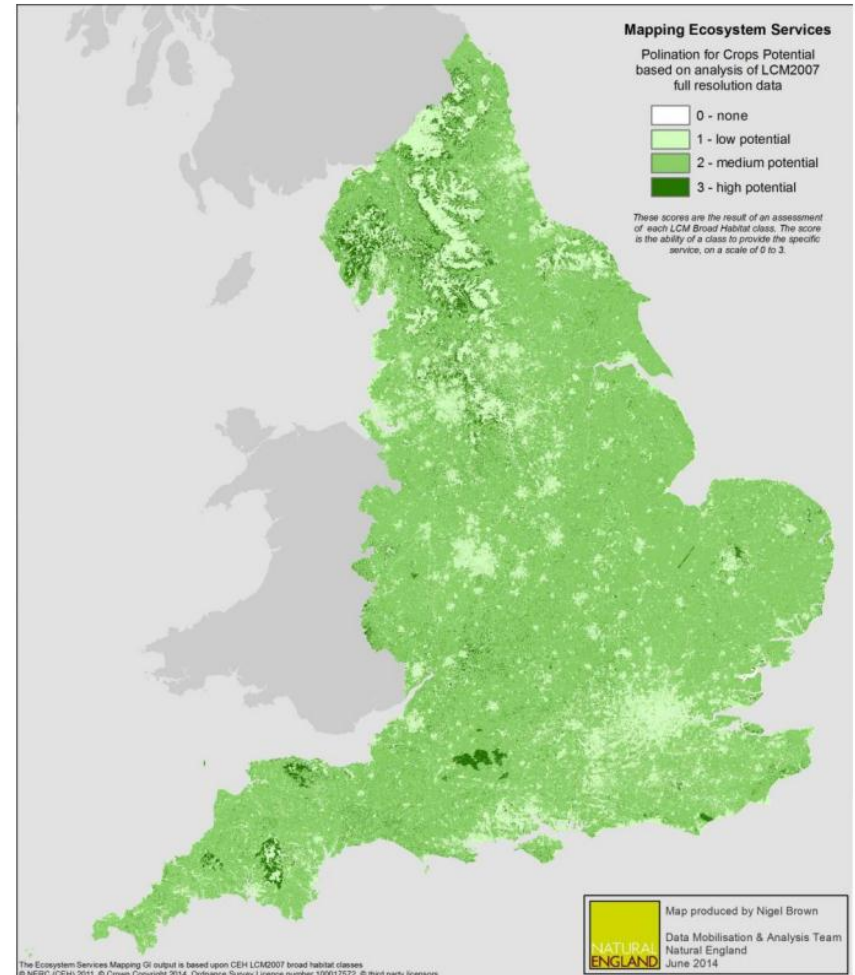
Towards a global map of natural capital



Introduction

- Maps can show metrics for state and trend in ecosystem services
- These must be derived from a range of in situ measures, regional-scale data and statistical projections
- Measures for variance and model confidence needs to be provided to assess performance

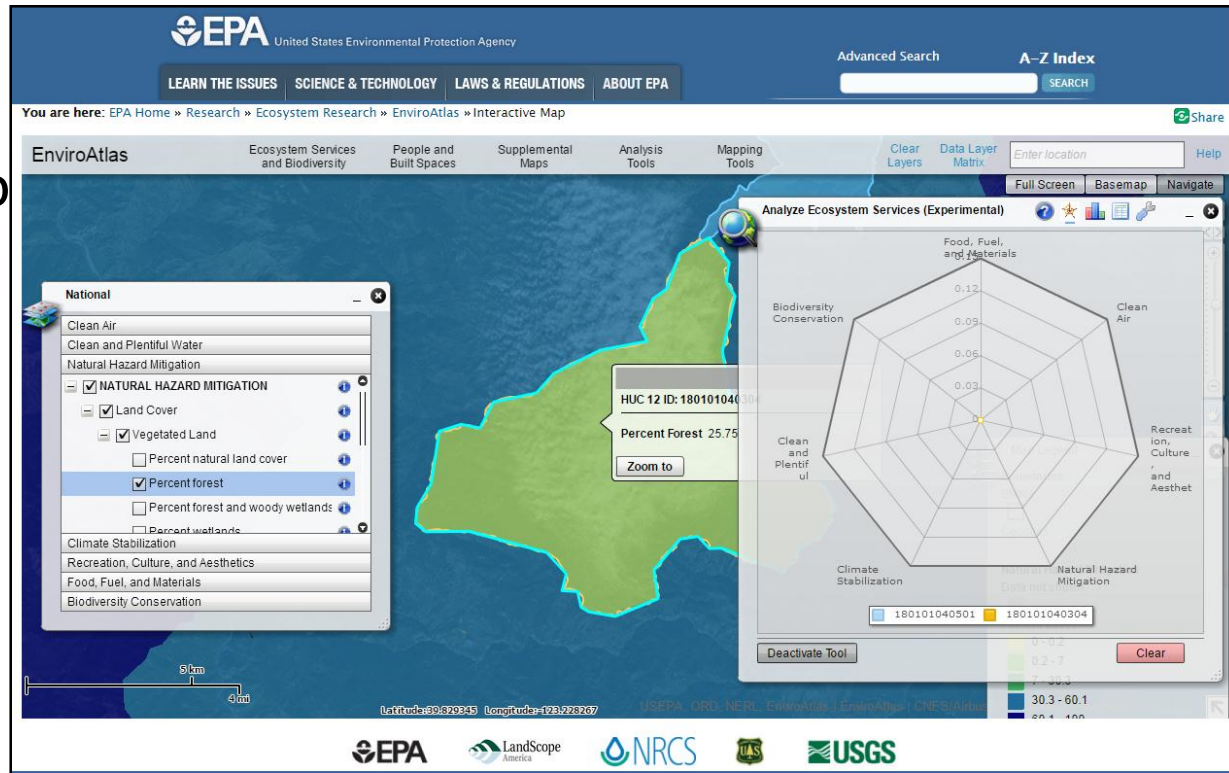
Pollination (for crops)



Introduction

- Tools are needed to interrogate the outputs at a range of scales, to understand their composition and meaning
- This includes the underlying data and how it relates to delivery of ecosystem services

EPA EnviroAtlas:
A range of tools and resources allows users to explore the many benefits people receive from nature



Concept for saleable mapping method

Input spatial dataset



Countryside Survey
Field data

Spatial stats
method to
create maps
and confidence
layers

1km Base datasets

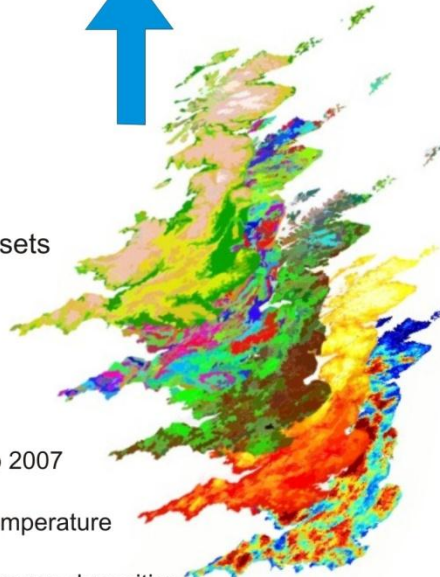
Altitude

Parent Material

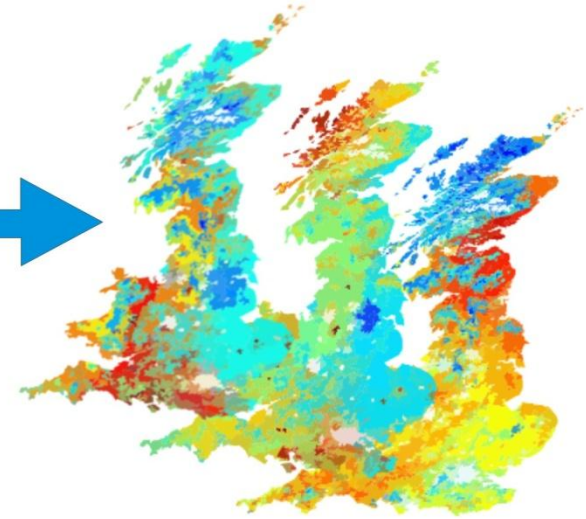
Land cover Map 2007

Mean annual Temperature

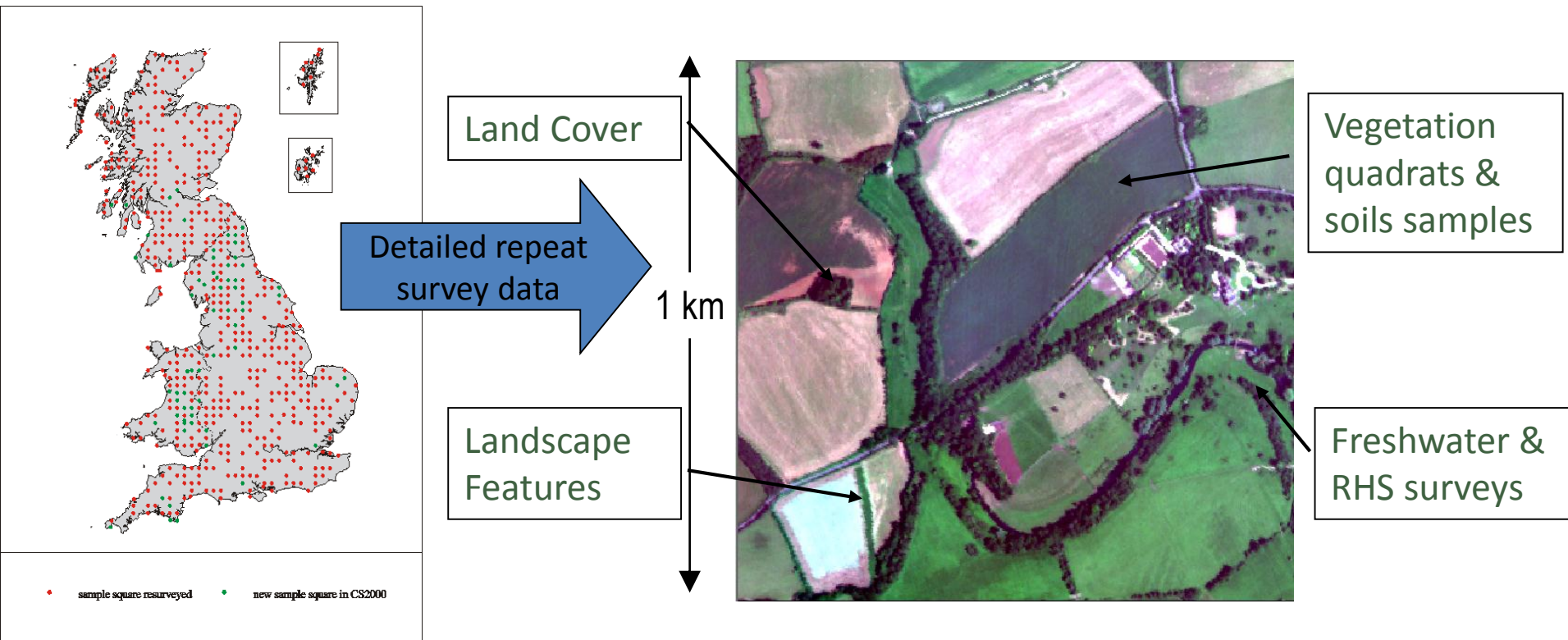
Atmospheric Nitrogen deposition



Mapped modelled output
(Including uncertainty)

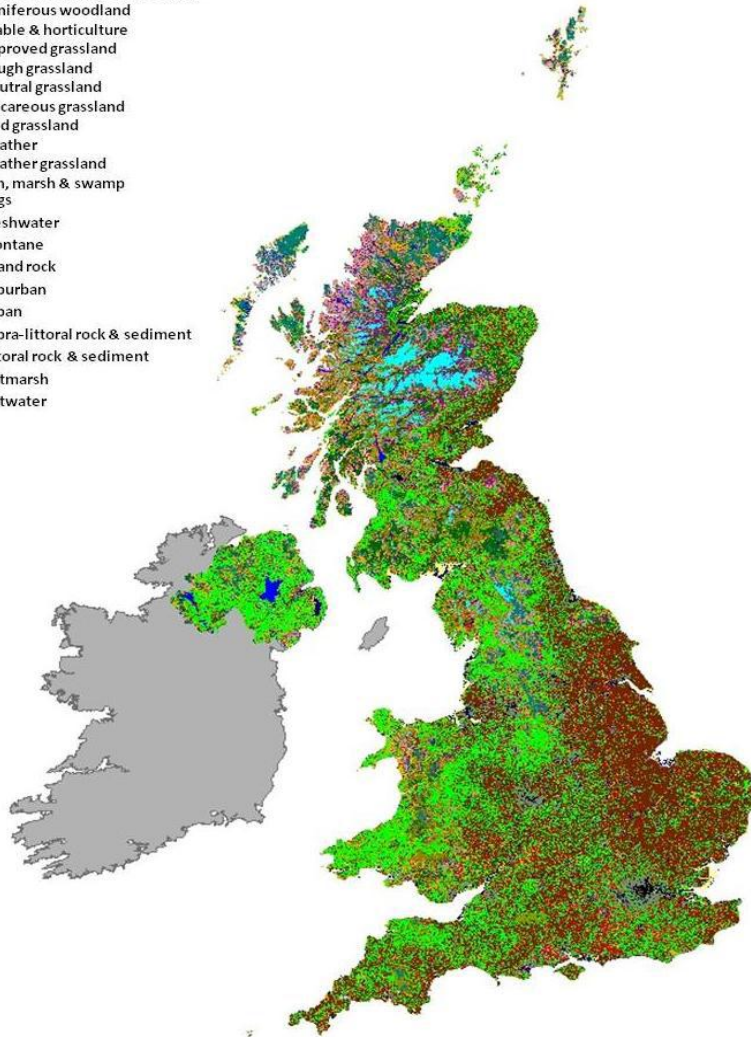


Countryside Survey field data



National-scale data sources

- Broadleaved / mixed woodland
- Coniferous woodland
- Arable & horticulture
- Improved grassland
- Rough grassland
- Neutral grassland
- Calcareous grassland
- Acid grassland
- Heather
- Heather grassland
- Fen, marsh & swamp
- Bogs
- Freshwater
- Montane
- Inland rock
- Suburban
- Urban
- Supra-littoral rock & sediment
- Littoral rock & sediment
- Saltmarsh
- Saltwater

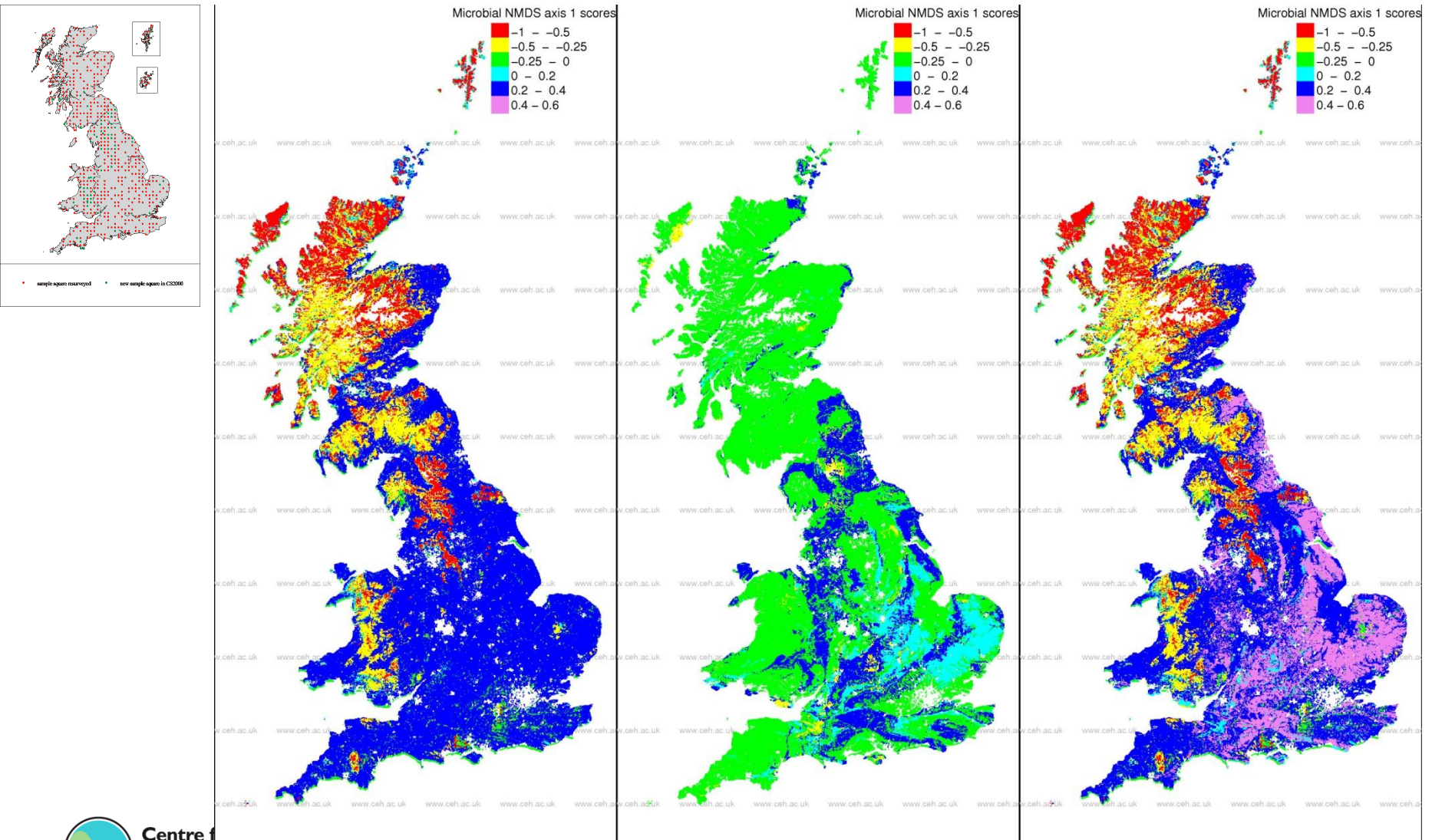


EcoMaps application development

CEH LCM 2007

BGS PMM

Combined Map

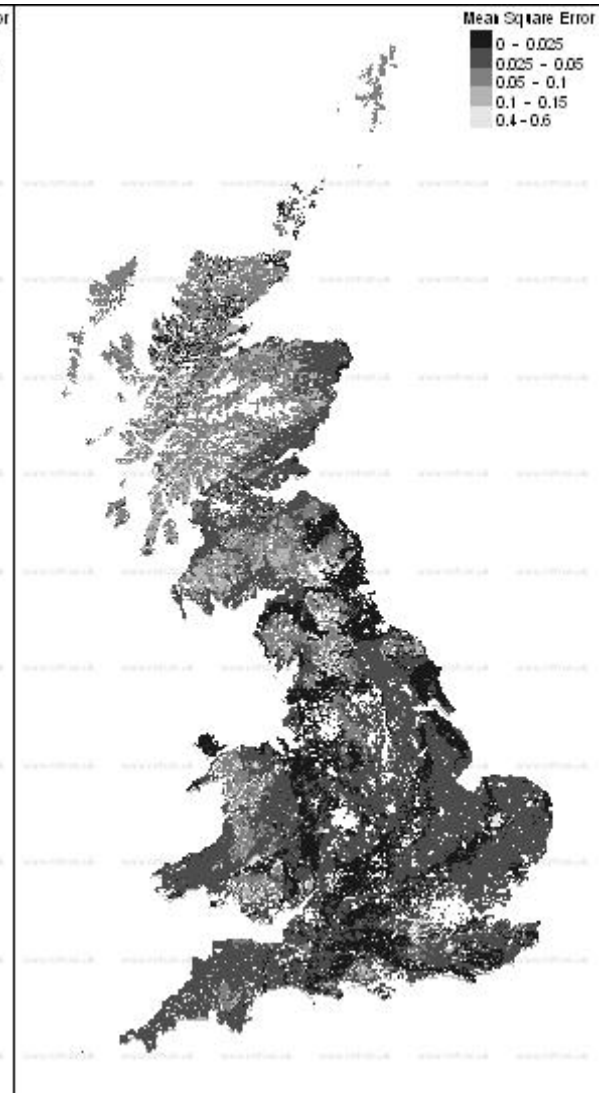
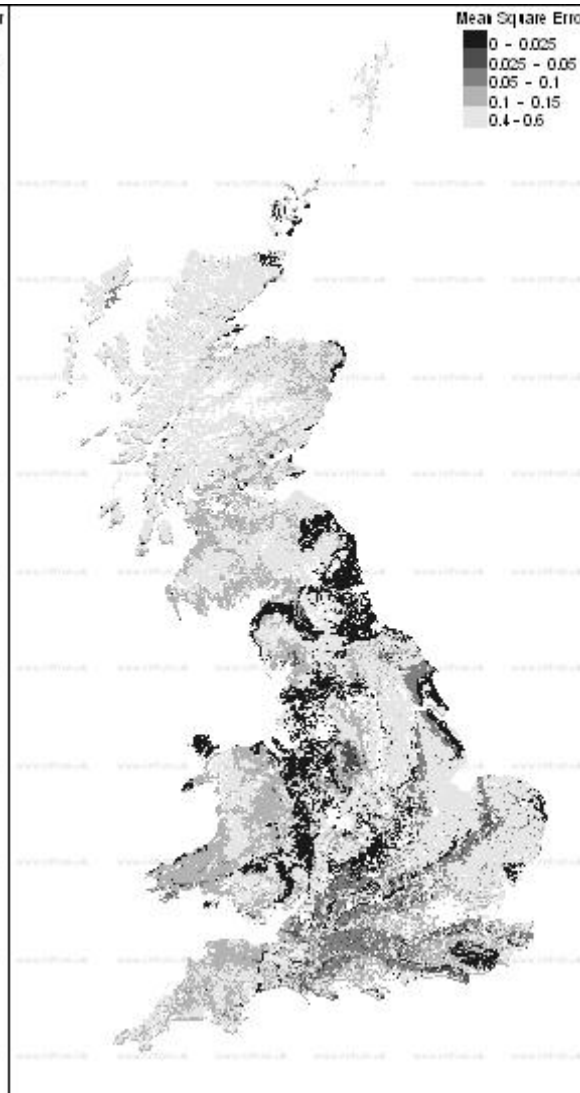
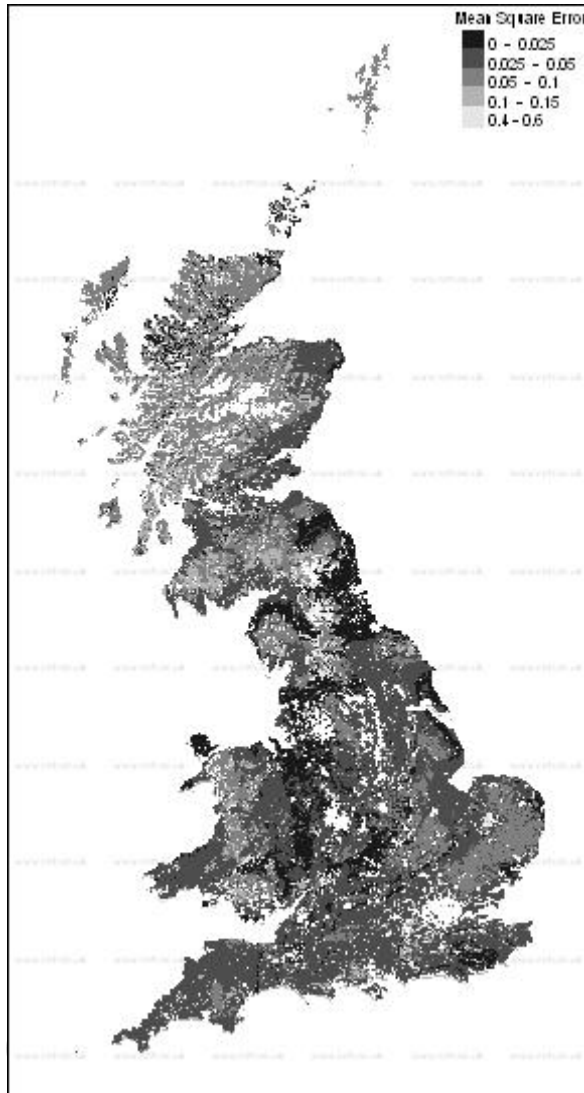


Estimating confidence

CEH LCM 2007

BGS PMM

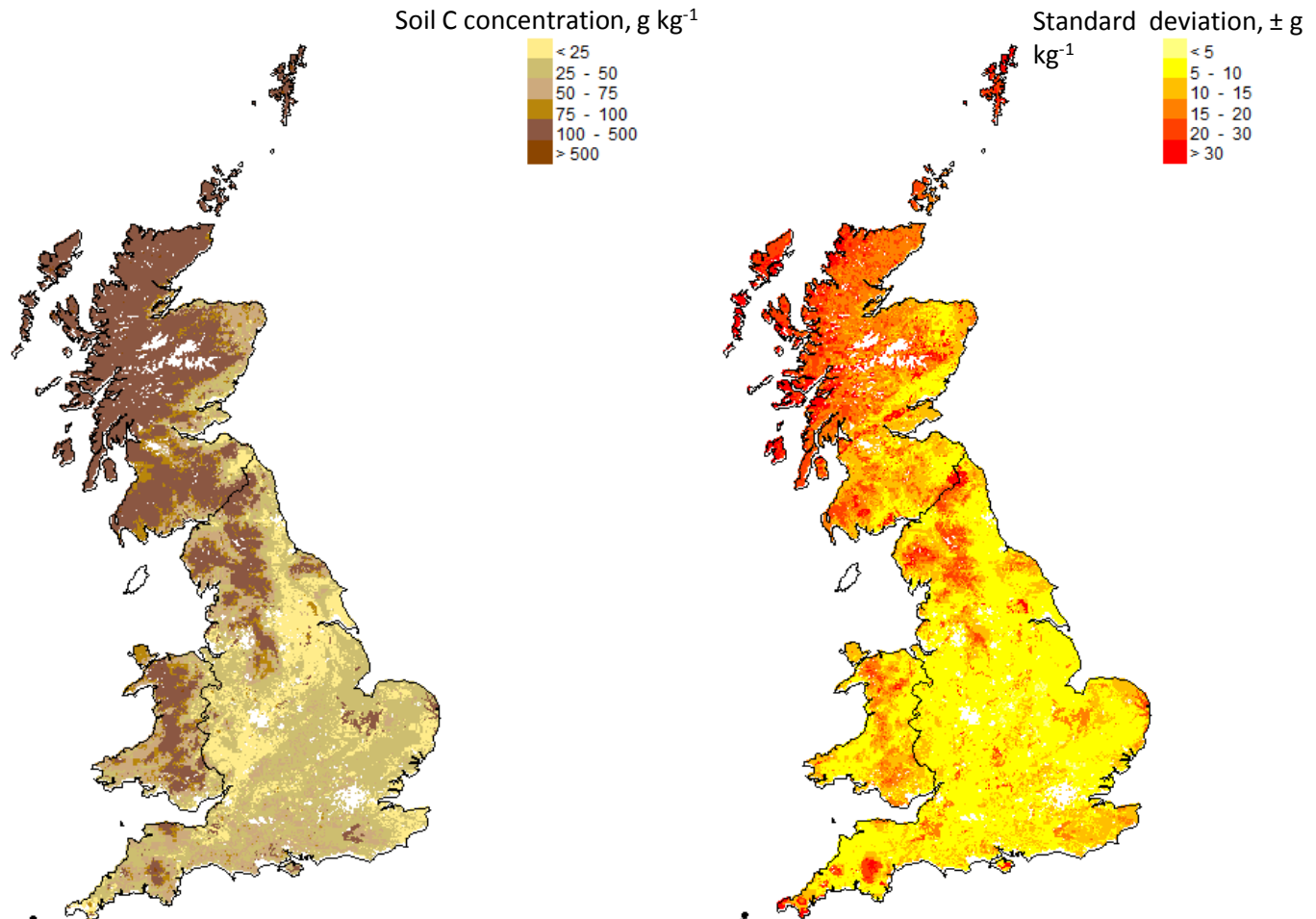
Combined Map



Development of specific spatial models

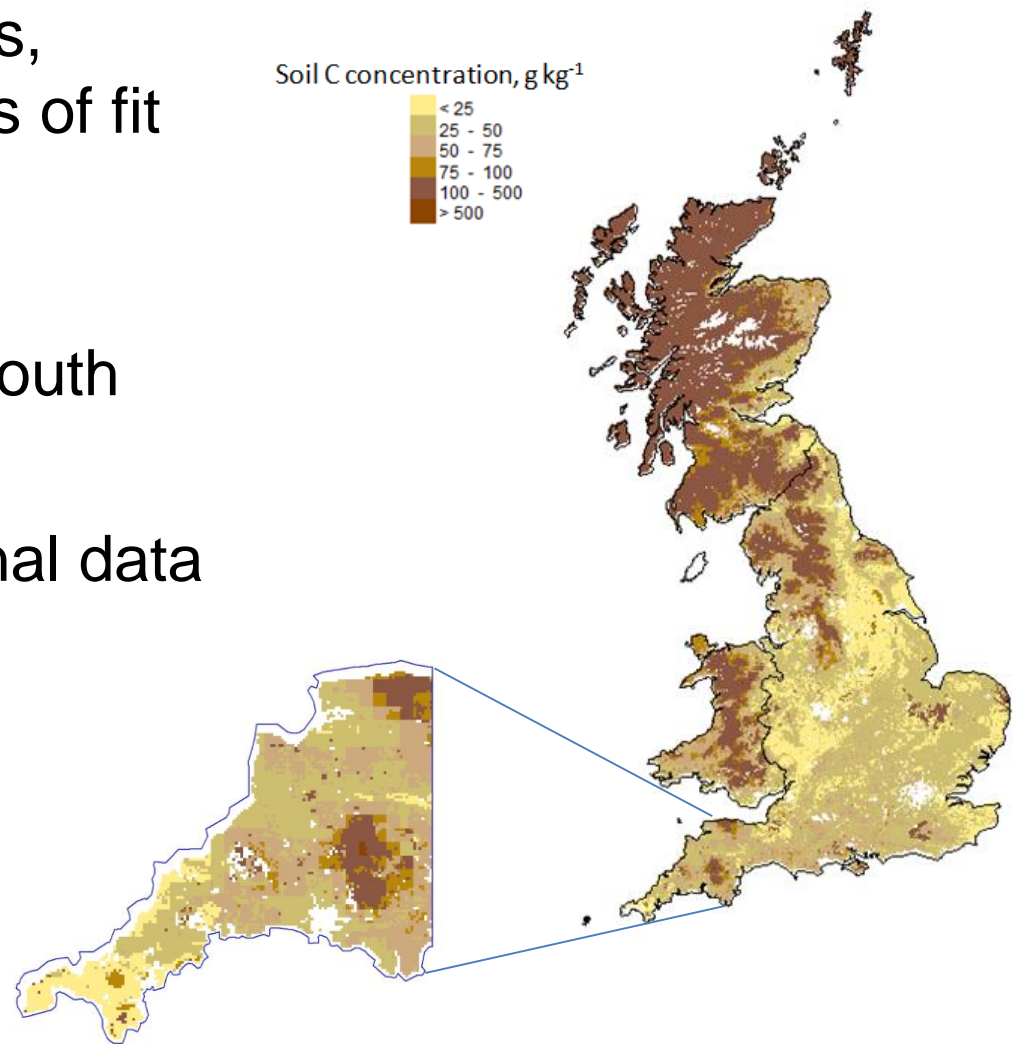
Soil Characteristics predicted using:

- Land cover, Climate, deposition, geology

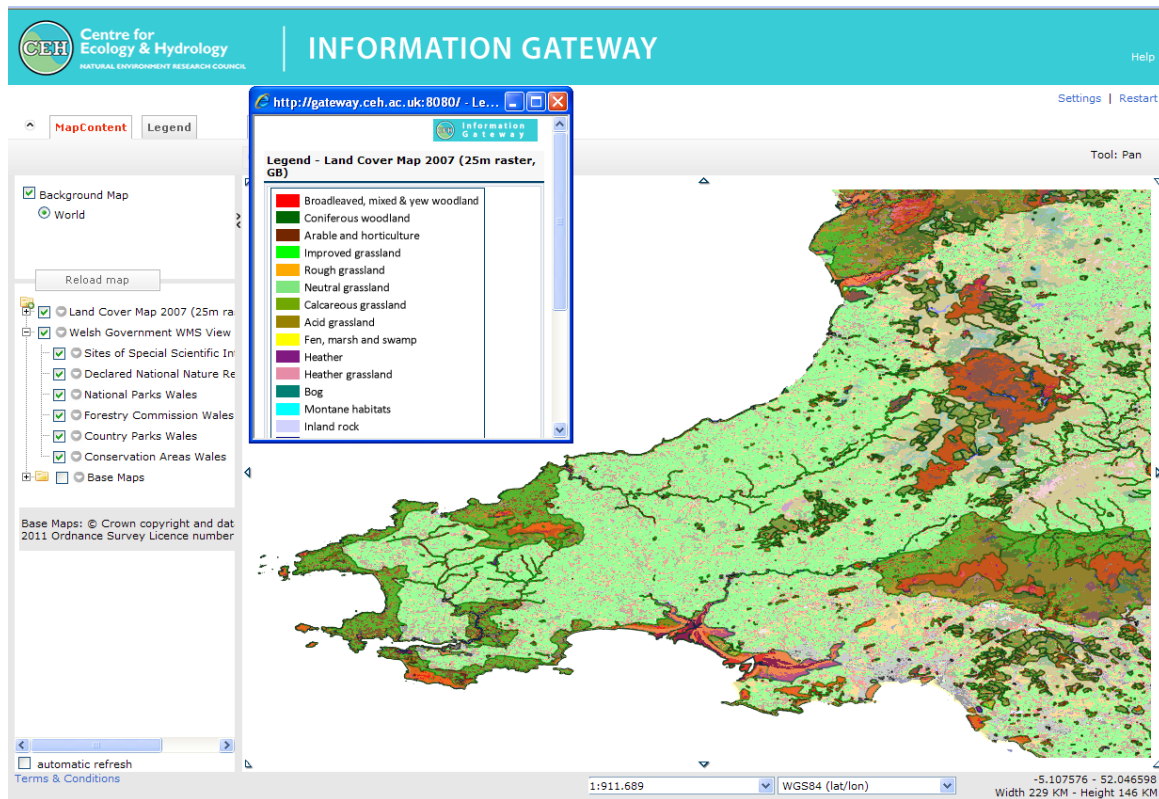


Concentration of Soil Carbon results

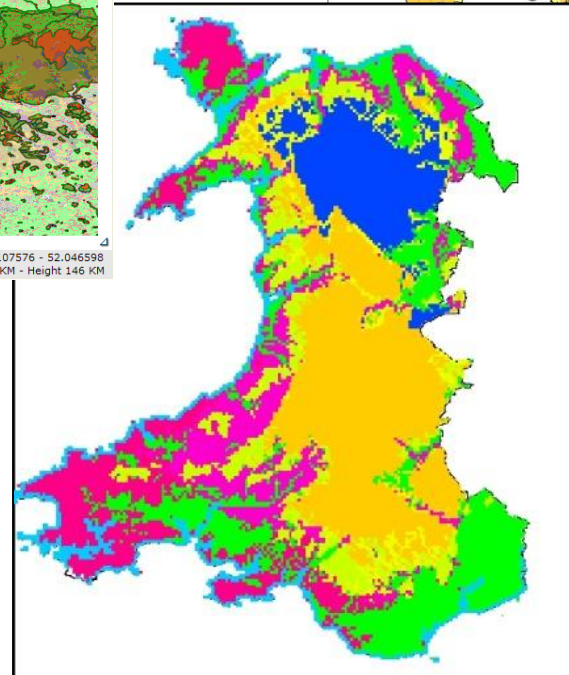
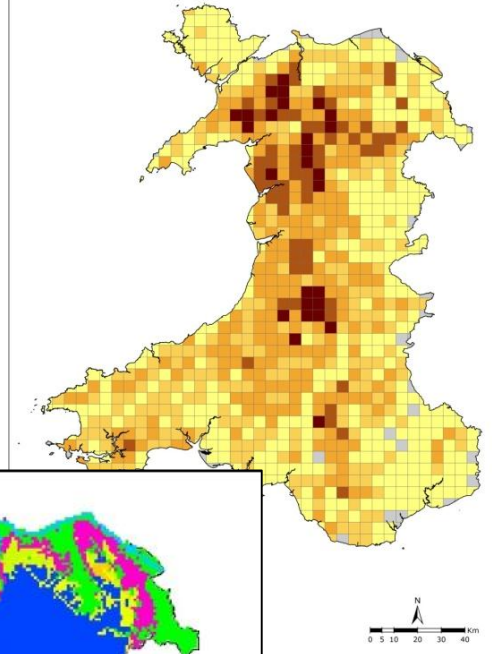
- Model produces means, variance and goodness of fit measures
- This can be applied at different scale – e.g. South West
- However, use of national data produces best models



Regional Mapping for Welsh Glastir



Density of Tir Gofal agreements



EcoMaps application development

EcoMaps

Explore

New Analysis

My Ecomaps

About

Map server status **OK**

Log out

Welcome, John

Use the links below to get started

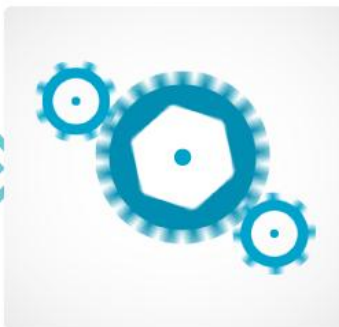
Explore

Look at map data in the web viewer



New Analysis

Run a model on map datasets



My Ecomaps

Review existing analysis results, publish results to the public repository



Create Analysis


Be aware!

This is some health warning text




Name of Analysis:

Choose Model to Run:

LCM Thredds Model 

Choose coverage data:

Land Cover Map 2007
LandCover
CHESS Annual Precipitation
precip 

Choose point data:

LOI Point Data  [Preview](#)

Time Column:

year 

Grouping Column:

SERIES_NUM 

Model Variable Column:

loi 

Data Type:

Continuous 

Description:

Description 

Run





Please wait

Analysis in progress

More info:

- ✓ Checking progress...
- ☰ Setting up the analysis: precip

Be aware!

This is some health warning text

John_test1

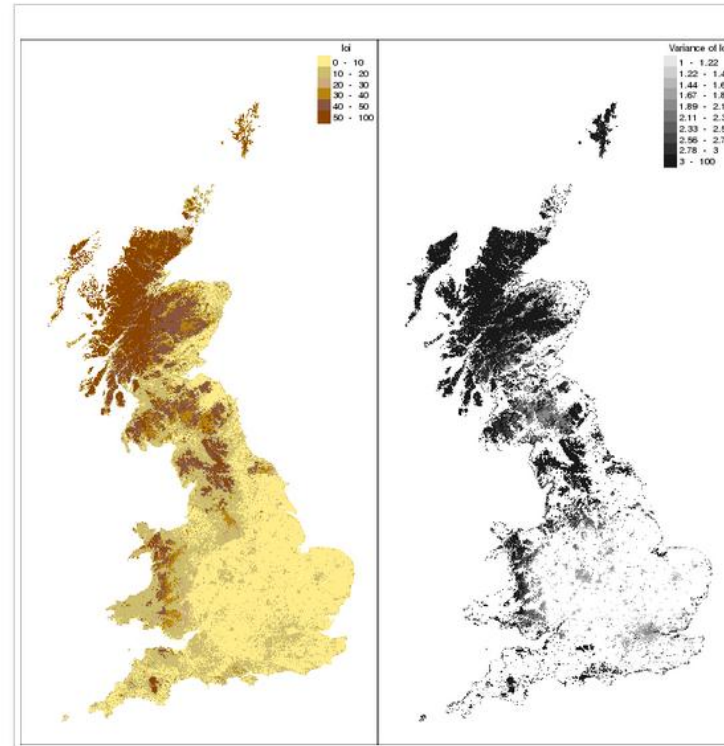
Run by Watkins, John W. on 31-Mar-2014 12:34

Actions

- [Publish](#)
- [Re-run Analysis](#)
- [Download](#)
- [Delete](#)

[Map Results](#)[Fitting Results](#)[All results](#)

Result	Value
Geospatial Longitude Min	-7.55715984208
Geospatial Longitude Max	3.63202051545
Geospatial Latitude Min	49.7668072319
Geospatial Latitude Max	61.4645902326



John_test1

Run by Watkins, John W. on 31-Mar-2014 12:34

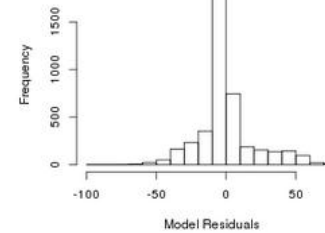
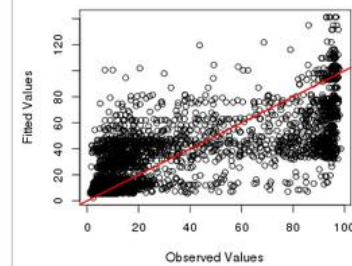
Actions

- [Publish](#)
- [Re-run Analysis](#)
- [Download](#)
- [Delete](#)

[Map Results](#)[Fitting Results](#)[All results](#)

Fit values

AIC 20.4322129219
RMS Error 0.580992597764
R²



Ecomaps Datasets

COVERAGE

Land Cover Map 2007

CHES Annual Precipitation

RESULT

PJ Test 1

Susan 1

Susan 2

Susan 4

Susan 5

Aidan_test1

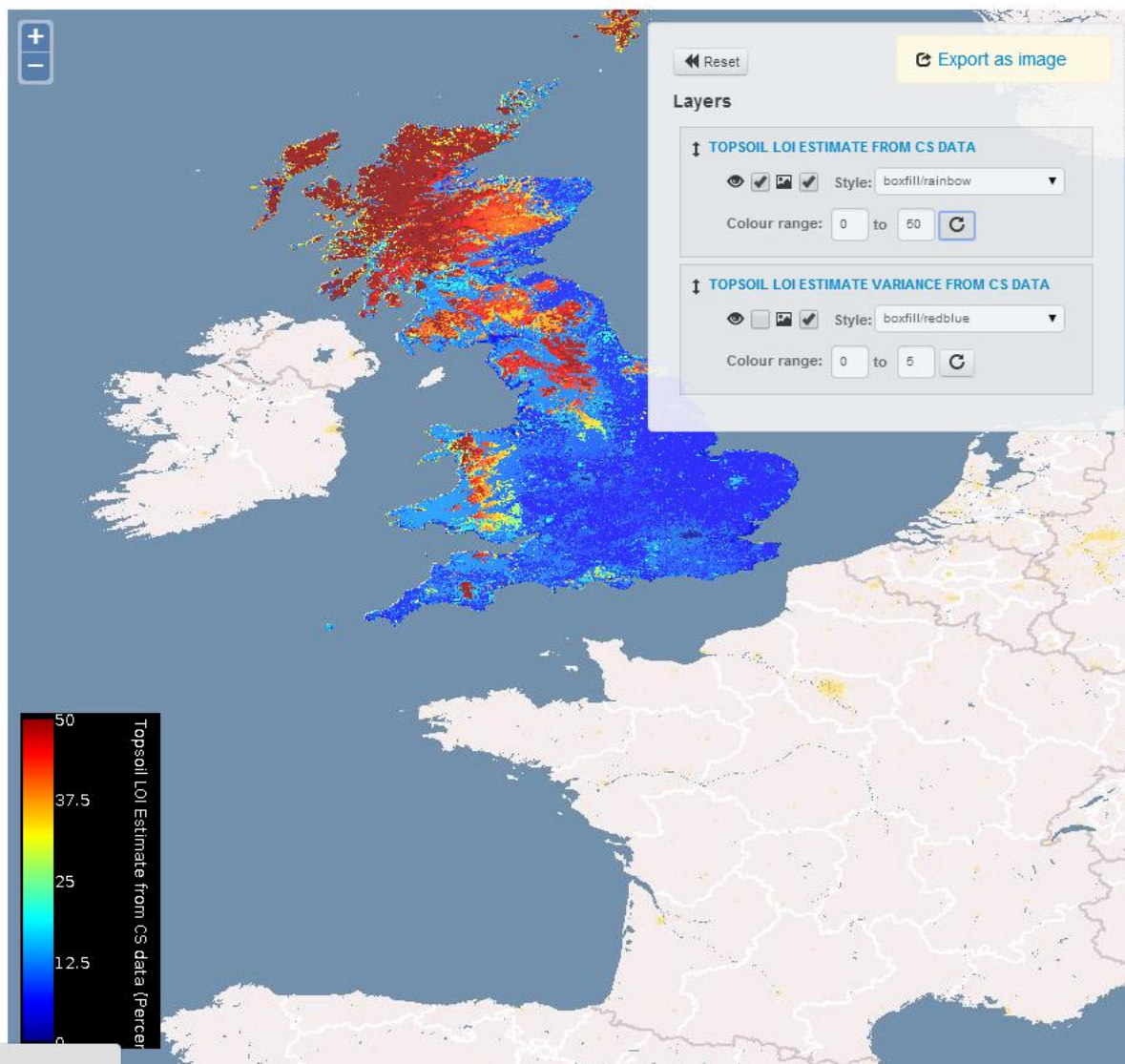
Aidan_test2

Lindsay

John_test1

POINT

LOI Point Data



Map Layers in UKSO and other portals

The screenshot displays the UKSO Soils map viewer interface. On the left, a blue sidebar contains the UKSO logo and two numbered instructions: 1. Choose where you would like to investigate by navigating the map, or searching for a location below; 2. Use the map layers tool to learn more about the different soil properties in the United Kingdom. A search bar is provided for the first instruction. The main map area shows a detailed soil map of Devon, with various colors representing different soil types. A 'Map Layers' panel on the right lists two active layers: 'CS Topsoil Carbon – Carbon density' and 'TellusSW Magnetic: TMI AS (SW only)'. Both layers have checkboxes and icons for adding or removing them. A plus button is at the top of the panel, and a note says 'Click on plus button to add layers to the map.' At the bottom left, there are zoom in (+) and zoom out (-) buttons. The bottom of the interface features a blue bar with links for 'Contribute', 'Basemaps', 'Create PDF', and 'Mobile'. The bottom left corner lists data sources: Esri, HERE, DeLorme, FAO, USGS, NGA.

UKSO [?]
Soils map viewer

1. Choose where you would like to investigate by navigating the map, or searching for a location below

Q Enter placename or postcode

2. Use the map layers tool to learn more about the different soil properties in the United Kingdom

Map Layers

☒ CS Topsoil Carbon – Carbon density ✖

☒ TellusSW Magnetic: TMI AS (SW only) ✖

Click on plus button to add layers to the map.

Esri, HERE, DeLorme, FAO, USGS, NGA

Contribute Basemaps Create PDF Mobile

Summary

1. Natural Capital mapping requires access to comprehensive site-level data as well as national coverage data sets
2. Metrics for Natural Capital and extrapolation models have been developed to produce scalable national maps
3. These maps need to be investigated to understand the variability and power of the underlying predictions
4. The ECOMAPS application has been developed to enable researchers to produce and explore models and maps in this way

Thank you and any questions?