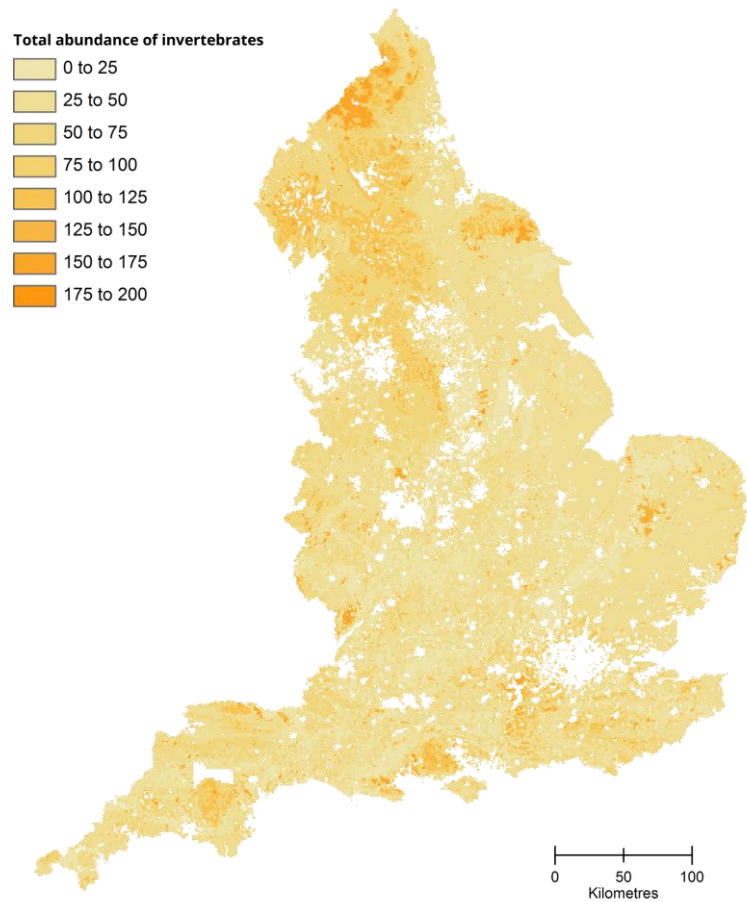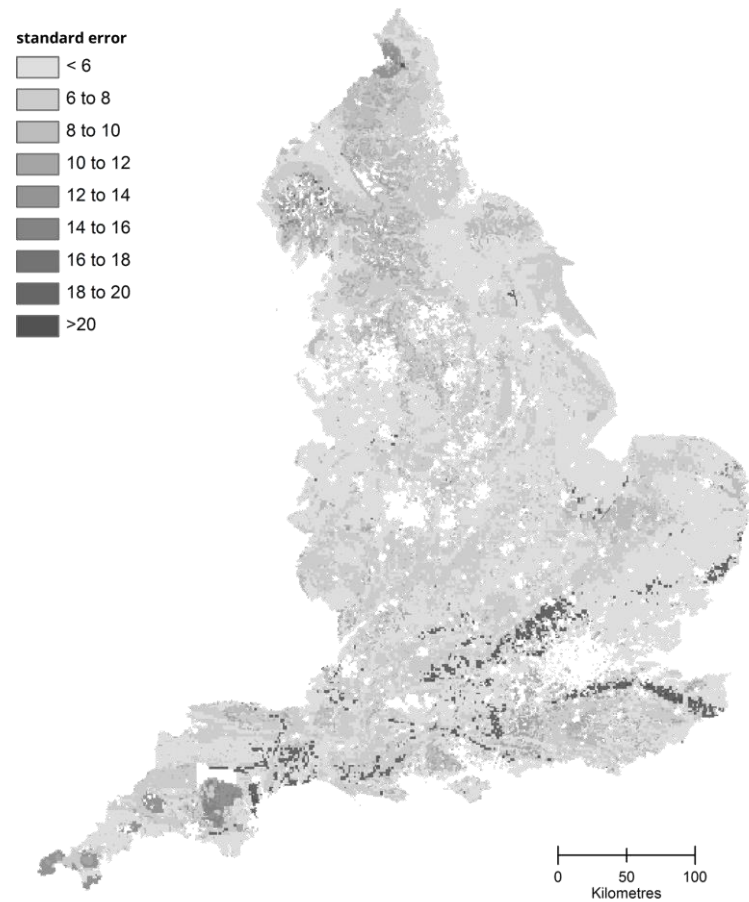# Soil invertebrates

Mean estimates of total abundance of invertebrates in topsoil (0-8cm depth)

Uncertainty: Standard error from the mean estimates

Total abundance of invertebrates
- 0 to 25
- 25 to 50
- 50 to 75
- 75 to 100
- 100 to 125
- 125 to 150
- 150 to 175
- 175 to 200

standard error
- < 6
- 6 to 8
- 8 to 10
- 10 to 12
- 12 to 14
- 14 to 16
- 16 to 18
- 18 to 20
- >20

Soil invertebrates
Mean estimates of total abundance of invertebrates in topsoil.

What does this map show?
Mean estimates of total abundance of invertebrates in topsoil (0-8cm depth). The activities of the soil biota are critical for the provision of many important soil functions including biomass production and storing, filtering and transforming nutrients. Because they are intimately involved in many important soil functions and are fundamental to maintaining soil quality, the biological components of soils have considerable potential as indicators of soil quality.

The UK National Ecosystem Assessment (UKNEA 2011) recognises the importance of soil invertebrates as a component of natural capital for supporting ecosystem services, in particular nutrient cycling, soil formation and primary production. The supporting services underpin the delivery of provisioning and regulating ecosystem services; soil invertebrate abundance is particularly important for soil quality, which is linked to almost all the other regulating services.

Soil invertebrates tend to be found in higher densities in semi-natural less intensively managed habitats such as woodland, acid grassland and dwarf shrub heath. Soil invertebrates are found at lower quantities in more intensively managed habitats such as arable, improved and neutral grassland [1]. The map shows higher densities in the north and west of England with lower densities in the South East. Small patches of higher density may be related to the presence of semi-natural habitats. The standard error map gives an indication of the uncertainty in the estimated values shown on the total abundance map; the greater the standard error the greater the uncertainty

How was this map produced?
This map was produced by using measurements of total number of invertebrates extracted from soil cores in the Centre for Ecology & Hydrology Countryside Survey (2007) at 927 sample locations across GB within 238 1km squares. Measurements were extrapolated up to a national level using statistical analysis. This extrapolation was based on the total number of invertebrates extracted associated with a combination of habitat type and soil parent material: the geological material, bedrock, superficial and drift, from which soil develops.

What are the limitations of this map?
1. Areas such as urban and littoral rock are not sampled by Countryside Survey and therefore have no associated data. These areas are shown in white on the map.

2. In some circumstances sample sizes for particular habitat/parent material combinations were insufficient to estimate mean values. These areas are also shown in white on the map.

3. The map shows mean values at a 1 km square resolution. The standard error attributed to the mean estimates is only valid at 1km square resolution. The standard error at different resolutions is unknown.

4. The values for each 1 km square are generated from a statistical model of samples from approximately 238, 1 km squares. Hence the map does not show direct measurements at all locations.

Further detail on the steps for creating this map

1. Top soil (0-8cm depth) cores were taken from 927 Countryside Survey sample locations within 238 1km squares [1,2].

2. Soil invertebrates were extracted from cores using a dry Tullgren extraction method, which heats the surface of soil cores to extract the invertebrates. Once collected, soil invertebrates were identified to major taxa and counted [1,2].

3. Areas of each unique combination of broad habitat (as documented by JNCC [3]) and parent material were identified using data derived from the Land Cover Map 2007 [4] and Parent Material Model 2009 [5], respectively for each 1km square.

4. Values for total abundance of invertebrates from Countryside Survey sampled locations were then combined with habitat/parent material data.

5. Using a statistical model (a generalized additive model [6]), a mean estimate of total abundance of invertebrates for each unique combination of habitat and parent material, was extrapolated across the whole of England.

6. The statistical model was also used to produce an associated standard error map. High values reflect high variability and hence greater uncertainty in the mean estimates.

How to obtain the data

Data can be downloaded from https://eip.ceh.ac.uk/naturalengland-ncmaps.

Reuse of the data is subject to the terms of the Open Government Licence and you must cite:

Henrys, P.A.; Keith, A.M.; Robinson, D.A.; Emmett, B.A. (2012). Model estimates of topsoil invertebrates [Countryside Survey]. NERC Environmental Information Data Centre. http://doi.org/10.5285/f19de821-a436-4b28-95f6-b7287ef0bf15

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