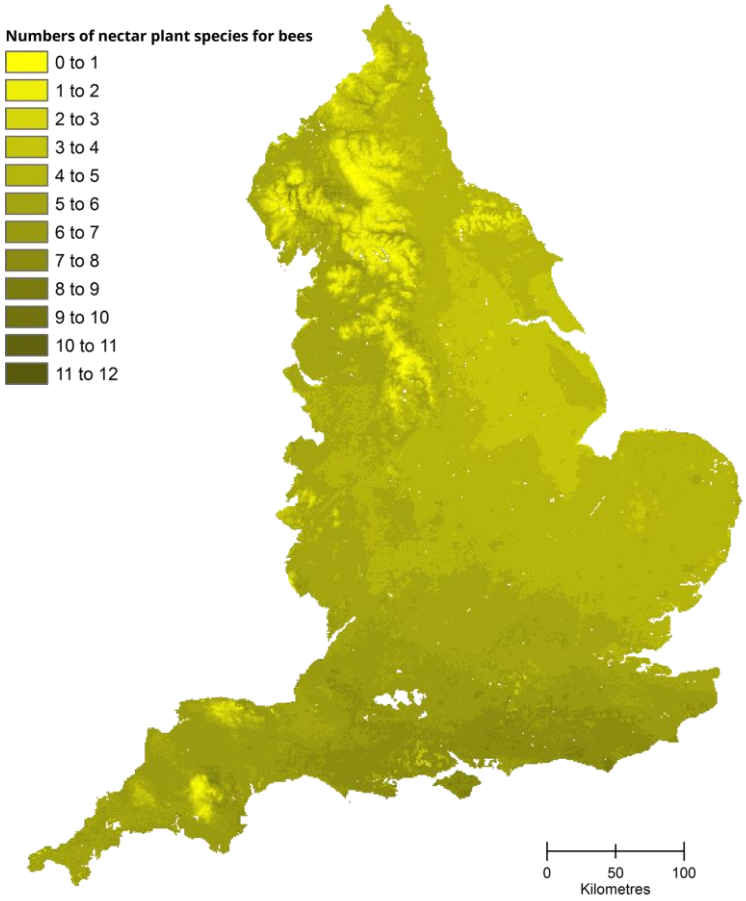
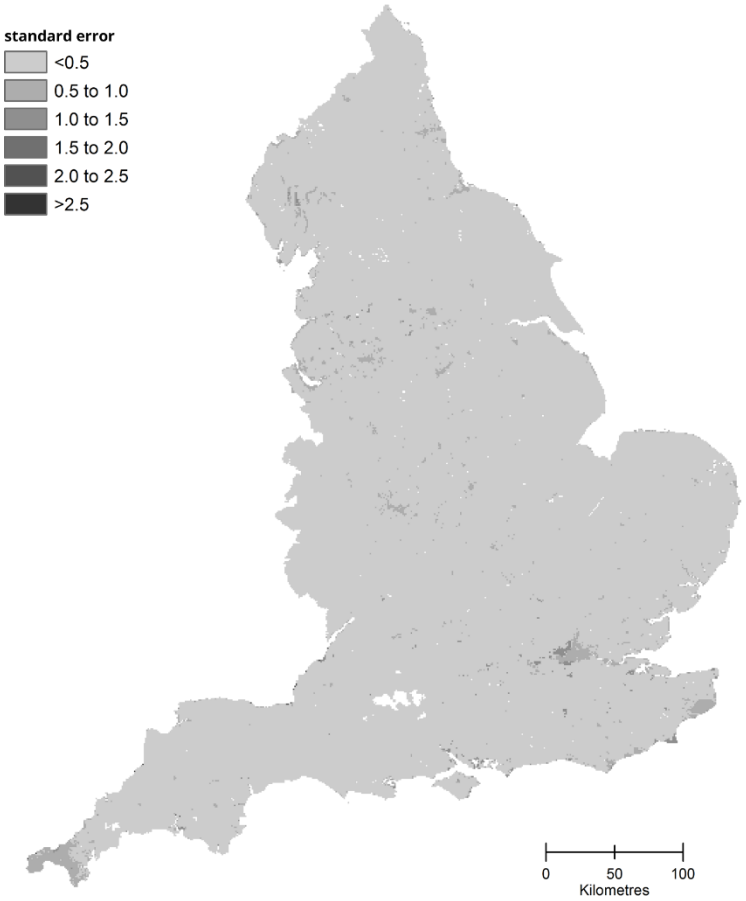
Nectar plant diversity for bees

Mean estimates of number of nectar plant species for bees per 2×2m plot



Uncertainty: Standard error from the mean estimates



Nectar plant diversity for bees
Mean estimates of bee nectar plant species richness measured as number of nectar plant species for bees per plot

What does this map show?

Mean estimates of numbers of nectar plant species for bees, in 2m × 2m vegetation plots.

The value of pollinators and pollination services is significant, both for food production and for wildflowers. Some crops are pollinated by managed imported bumblebee populations (e.g. strawberries, tomatoes), others are more effectively pollinated by wild pollinators (e.g. apples, field beans) and there is a significant requirement for service provision by wild pollinators [1]. Wildflowers make a significant contribution to cultural ecosystem services such as aesthetic value, and biodiversity and are dependent upon insect pollination. This map provides an important element of the natural capital relating to pollination: the distribution and abundance of nectar plants for bees across the landscape [2,3]. Studies have shown a causal link between declines in pollinators and declines in nectar producing plants [4], so a spatial representation of nectar plant distribution provides valuable information to aid protection of high quality pollinator habitat and provision of resilient landscapes.

This map shows that bee nectar plant richness is higher in the south, south west and through western England. This is likely to be related to habitat type (and hence climate and soil type), the highest richness of nectar plants tends to be in calcareous and neutral grasslands [5], although may also occur where there is high habitat diversity.

How was this map produced?

This map was produced by using the count of bee nectar plants per 2m x 2m vegetation plot in the Centre for Ecology & Hydrology Countryside Survey (2007), at 7408 sample locations, across Great Britain within 591 1km squares. Measurements were extrapolated up to a national level using statistical analysis. This extrapolation was based on relationships between nectar plant species richness, broad habitat type, air temperature, nitrogen deposition, precipitation and altitude (as key variables affecting nectar plant richness).

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. 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.

3. The values for each 1 km square are generated from a statistical model of samples from approximately 591 1 km squares. Hence the map does not show direct measurements at all locations.

4. The map was created by using broad habitat from the Land Cover Map., This means that only plots from areas of broad habitats were used, rather than linear features such as hedges. Linear features could be important sources of nectar plants particularly in more intensive landscapes. In future, when national data on linear habitats are available, it will be possible to scale up by linear habitats also.

Further detail on the steps for creating this map

1. Lists of nectar plant species for bumblebees and solitary bees were compiled through expert consultation and data analysis [2,6].

2. Data was taken from Countryside Survey 2007 which surveyed 591 1km squares as part of a stratified random sample across GB. This was stratified by land class which is based on topography, geology, soils and climate [7]. A series of 2m x 2m vegetation plots were located within each 1 km square [8]. Each vegetation plot was assigned to a broad and priority habitat type [9,10]. Within each vegetation plot all vascular plants were recorded (nomenclature followed [11]). For this analysis only area plots were used, rather than plots of linear features.

3. The number of nectar plant species in each 2m x 2m vegetation plot was calculated using the list mentioned above.

4. Using a statistical model (a generalized additive model), a mean estimate of nectar plant richness for each habitat, was extrapolated across the whole of England using the additional variables of air temperature, nitrogen deposition, precipitation and altitude.

5. 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.

You must cite:

> Maskell, L.; Henrys, P.; Norton, L.; Smart, S. (2016). Bee nectar plant diversity of Great Britain. NERC Environmental Information Data Centre. http://doi.org/10.5285/623a38dd-66e8-42e2-b49f-65a15d63beb5

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