Prepared by B A Emmett, Leader of CS Work Package 4 (Soils)
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Quality Assurance for Countryside Survey 2007 Soils

All information regarding the work carried out for soils work within Countryside Survey 2007 is documented in:

Emmett, BA, BA Emmett, ZL Frogbrook, PM Chamberlain, R Giffiths, R Pickup, B Reynolds, E Rowe, D Spurgeon, P Rowland, J Wilson, C Wood (2008) Countryside Survey Technical Report No. 3/07: Soils Manual.

This will be available on the CS2007 website on the launch date 18th November 2008. Within this document details on the sampling strategy, policy drivers, protocols for field and laboratory procedures including QC procedures, archiving protocols and data manipulation. A summary of key issues are outlined here:

Sampling strategy
The sampling strategy for soils is based on the underlying rigorous, statistical sampling design of Countryside Survey as a whole. Great Britain was stratified first into Land Classes based on the major environmental gradients across the countryside. This permitted the sample to be structured to give reliable national statistics and also ensured that the sample is representative of the range of different environments found in Great Britain (England, Scotland and Wales). The sample consists of a set of 'sample squares' measuring 1km x 1km, selected randomly from the Ordnance Survey grid within the various Land Classes. Altogether, 591 sample squares were surveyed in 2007; 289 were in England, 107 in Wales, and 195 in Scotland.

As part of the 1978 Countryside Survey, soil samples from the top 0-15cm were collected 15cm south of the southern corner of the five Main Plots in a sample of 256 x 1km squares. Samples from later Countryside Surveys were collected from the other corners resulting in soil sample locations approximately 2 to 3m apart between Countryside Surveys. These plots were re-sampled in 1998, whilst in 2007 soils were collected in all 591 x 1km squares, from the western corner of Main Plots. Sufficient sample squares were selected from each geographical region, to enable reliable statistical reporting for Great Britain as a whole and for each separate country.

Sample Number
As square numbers have increased at each survey and resources are limited, power analyses were carried out prior to the sampling in 2007 to ensure sufficient samples were taken to enable reporting for all major Broad Habitats and for individual countries. For major measurements such as pH and loss-on-ignition (a conversion factor is used to convert to soil carbon concentration) all samples were analysed in 2007 and the power analyses confirmed this would enable change to be reported at the required confidence level for reporting units required. For other analytes such as

metals, the power analyses confirmed a reduced sample number could provide the confidence level required by funders.

Sample collection and processing
Field surveyors were provided with a field sampling protocol. Protocols were also provided to cover all aspects of processing of the soil cores from logging in of cores as they arrived at the laboratory to basic measurements, chemical analysis and archiving the final samples.

Quality control
Standard samples and blind replicates were included in all analytical runs. In addition, all methods were cross-checked where methods had to change. All samples were re-analysed using original methodology (e.g. Loss-on-ignition) or in a different laboratory where problems were identified. Accreditation status of the laboratories for each analyte is available in the documentation.

Statistical analysis
Statistical analysis has been carried out by a Chartered Statistician following procedures agreed by the CS Project Board.

Documentation
All of above protocols, outcome of cross-comparison testing, power analyses, statistical approach etc are documented in Emmett et al. (2008) Countryside Survey 2007 Soils Manual (Countryside Survey Technical Report No. 3/07.