**Guide to Using The James Hutton Institute 1:250,000 Soils and SSKIB Data**

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Data required:

* Soils 250K Shapefile
* Soil\_map\_unit\_proportions.xls
* SSKIB\_OCT13.xls
* Land cover data to differentiate between cultivated and semi-natural areas (e.g. LCS88)

The key to working with Hutton soils data to produce thematic maps is in resolving the two one-to-many relationships. Each soil map unit polygon has a one-to-many relationship with records in the soil map unit proportion table. Each soil series in the soil map unit proportion table has a one-to-many relationship with horizon information in the SSKIB (Scottish Soils Knowledge and Information Base) table. Each soil map unit (1:250,000 data) consists of one or more soil series up to a maximum of eight, and each series within that unit can have up to eight horizons. The location of these soil series is not mapped, but the proportion occupied by the series in each map unit is recorded in Soil\_map\_unit\_proportions.xls (field = “MAP\_UNIT\_QM\_PROP).

Topsoil organic carbon content and many other thematic attributes can be obtained from the SSKIB table, the field for the median carbon content is CARBON\_MED. The uppermost horizon for each soil series for semi-natural and cultivated soils can be identified by the value HORZ\_NO = 1 in each case

SSKIB has data for semi-natural and cultivated soils - with the 5 figure Soil Series code prefixed with ‘100’ to designate those uncultivated soils. Please note that there can be an unequal number of horizons between cultivated and uncultivated versions of the same soil series and that the attribute values differ between the two land cover types. When using SSKIB and the 1:250,000 soils mapping the soils shapefile should be intersected with a land cover data set to determine whether the semi-natural or cultivated values in the SSKIB table should be used at the location of each polygon or part-polygon. At Hutton we use a simplified version of the Land Cover of Scotland ’88 data set for this classification.

When assigning SSKIB values to 1:250,000 mapping polygons the aggregation or selection of the soil series information in SSKIB can be done in a number of ways. When making certain thematic maps choosing the dominant soil series in a mapping unit may be adequate, but care should be taken when using this method as the dominant soil series may not have the dominant attribute value (i.e. two subdominant series with the same attribute value may occupy more of the mapping unit than the dominant series). In other applications a weighted mean value should be calculated using the proportions to be found in Soil\_map\_unit\_proportions.xls. This can be done in a number of ways, using either a spreadsheet or GIS functionality.

One GIS method that we have used is to create a revised version of the soils polygons data that has one polygon for each series in a map unit. As an example, map unit 1 has six soil series: 01540, 01541, 01542, 01543, 01544, 01546. In this revised shapefile each occurrence of map unit 1 will have six identical polygons, however the six instances of the polygon will each have a different soil series attribute and the associated proportion of the map unit that soil series occupies. A revised area is calculated for the polygons equal to

calculated geometric area \* the proportion occupied by the series within that unit

When combined with a land cover data set this modified soils data can be readily joined to the SSKIB data (subject to the creation of suitable join fields, which should incorporate a horizon and a land cover identifier). As mentioned above, not all soil series are present as both cultivated and semi-natural in SSKIB so care must be taken to examine the soils/land cover data set to identify cases where invalid combinations have resulted and then make appropriate changes. The resulting polygon data set can be used to generate summary or thematic maps using GIS statistic tools to resolve the areas of the coincident polygons.

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