British Geological Survey

NATURAL ENVIRONMENT RESEARCH COUNCIL

Mineral resource maps – an overview

Mineral resources within the UK are highly valued natural assets. Their extraction contributes 2.4 per cent of the national gross value added (United Kingdom Minerals Yearbook 2008). They are the raw materials for many key industries including manufacturing, construction, power generation, and transportation. However, mineral resources are dependant on geological conditions and can only be worked where they occur. We must make the best use of these valuable assets whilst limiting the effect their extraction has on the environment. It is, therefore, important that planners have access to information that will assist them in minimising potential land-use conflicts and facilitate the conservation and safeguarding of non-renewable mineral resources for future generations.

To provide this information the British Geological Survey (BGS) produce mineral resource maps. These aim to provide up-to-date spatial information in a format accessible by geologists and non-geologists on the mineral resources of a particular area. These maps are vital in helping planners to meet the requirements of planning policies[1].

BGS now hold a complete set of mineral resource maps, both paper and digital maps, at 1:100 000. There is also an online GIS (geographic information system) on a regional scale, for England and the Central Belt of Scotland. A project compiling a national minerals map for Wales is currently being undertaken.

A wide range of resources including aggregates, industrial and energy minerals are represented on these maps. The mineral resources displayed vary for different areas depending on the geology. A typical range of the mineral resources recorded can be seen in the legend in Figure 1, taken from the resource map for the Central Belt of Scotland.

Mineral resources are defined within a GIS environment on the basis of the BGS DiGMap dataset (digital geological linework at 1:50,000 scale). The maps are constructed by identifying lithological units which can be considered as resources. As many sources of information as possible are consulted when considering which geological units constitute a mineral resource, ranging from historic publications to consultation with geologists with specialist knowledge of the local area. The majority of decisions are based on existing BGS publications such as memoirs for geological map sheet areas, the BritPits mines and quarries database and Industrial Mineral Assessment Unit Reports. Information from local authorities' local development plans is also used where available and relevant. Stakeholder consultation is also an important input to the map and GIS development process. The views of representatives from the minerals industry, planners, campaigning groups and regional and national government are all considered.

[1] Minerals Policy Statement 1 (MPS1) in England, Minerals Planning Policy Wales (MPPW) in Wales and Scottish Planning Policy 4 (SPP4) in Scotland.

The potential mineral bearing lithologies identified in the DiGMap dataset are assigned with the relevant mineral resource classification. A lithology will only be included as a mineral resource if it is known to have suitable properties to make it a potentially viable economic resource and be economically workable at present or has been, to a large extent, historically worked and has a real possibility of potentially being worked in the future.

Several factors not taken into account when deciding what constitutes a resource are anthropogenic sterilisation (largely urban development), relationships to environmental designations and some economic factors, such as distance to markets. These factors could be subject to change with changing economic conditions and planning legislation whereas these maps endeavour to focus on purely geological constraints. Once the lithologies from DiGMap are attributed with resources, these are then separated out in a GIS environment to create a final map.

The line work shown on these maps is constrained by the best available geological information held by BGS. This has important connotations for the maps. As the maps are based on surface geology only, all boundaries are inferred and all mineral resources correspond to mapped lithological units. This can occasionally cause issues in defining mineral resources if very large geographic areas are covered by single geological units or geological units with few internal divisions. For example, the Mercia Mudstone is recorded as a brick clay resource and covers extensive areas in the East and West Midlands as shown by Figure 2. The Mercia Mudstone is an important resource and is worked for brick clay at six sites in England (Directory of Mines and Quarries 2008). However, the resolution of current geological mapping across much of the outcrop of the Mercia Mudstone Group is insufficient to differentiate economically important units from the bulk of the group, which is of no commercial value. This problem may be resolved by more detailed geological mapping.

An online GIS of the mineral resources for England and the Central Belt of Scotland along with a guide to the minerals information in the Central Belt of Scotland and a guide to mineral safeguarding in England can be found at www.MineralsUK.com

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References:

British Geological Survey. 2009. *United Kingdom Minerals Yearbook 2008*. (Keyworth, Nottingham: British Geological Survey.)

British Geological Survey. 2008. *Directory of Mines and Quarries 2008: 8th Edition.* (Keyworth, Nottingham: British Geological Survey.)

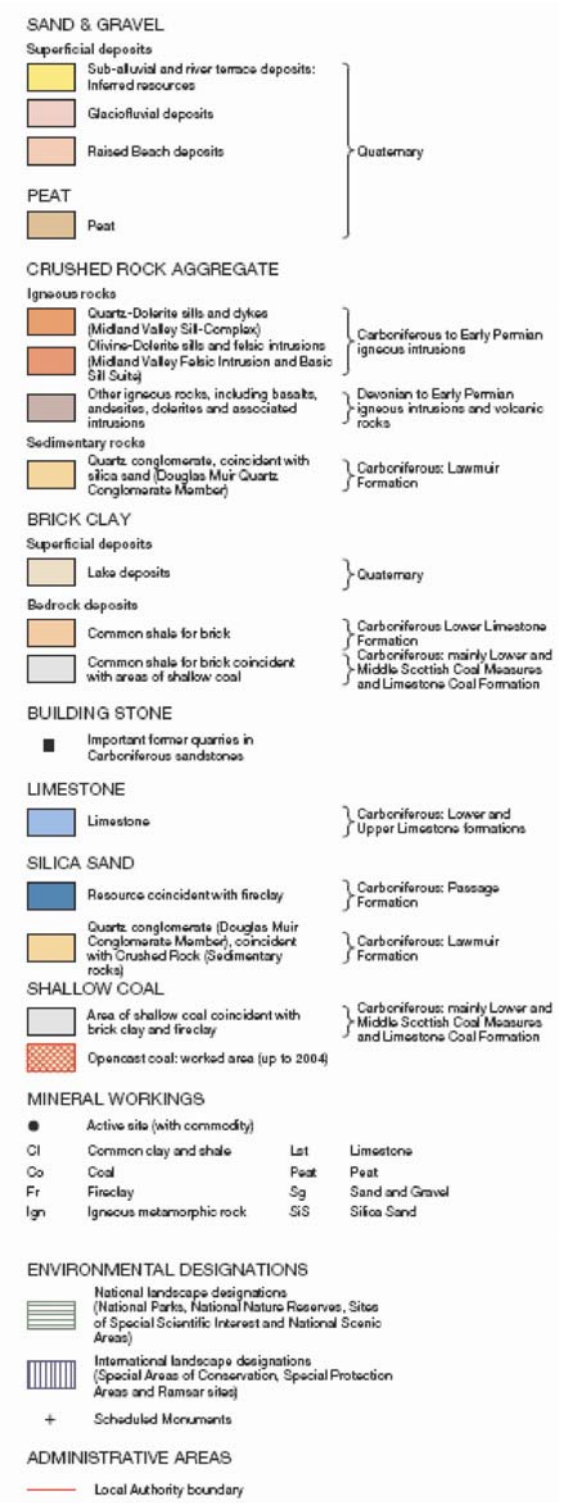

Figure 1, A typical resource map legend from the Central Belt of Scotland, displaying the range of mineral resources across the area

This legend is provided for illustrative purposes only. BGS legends are only to be used with specific BGS maps and prior permission to reproduce this legend must be sought from the BGS.

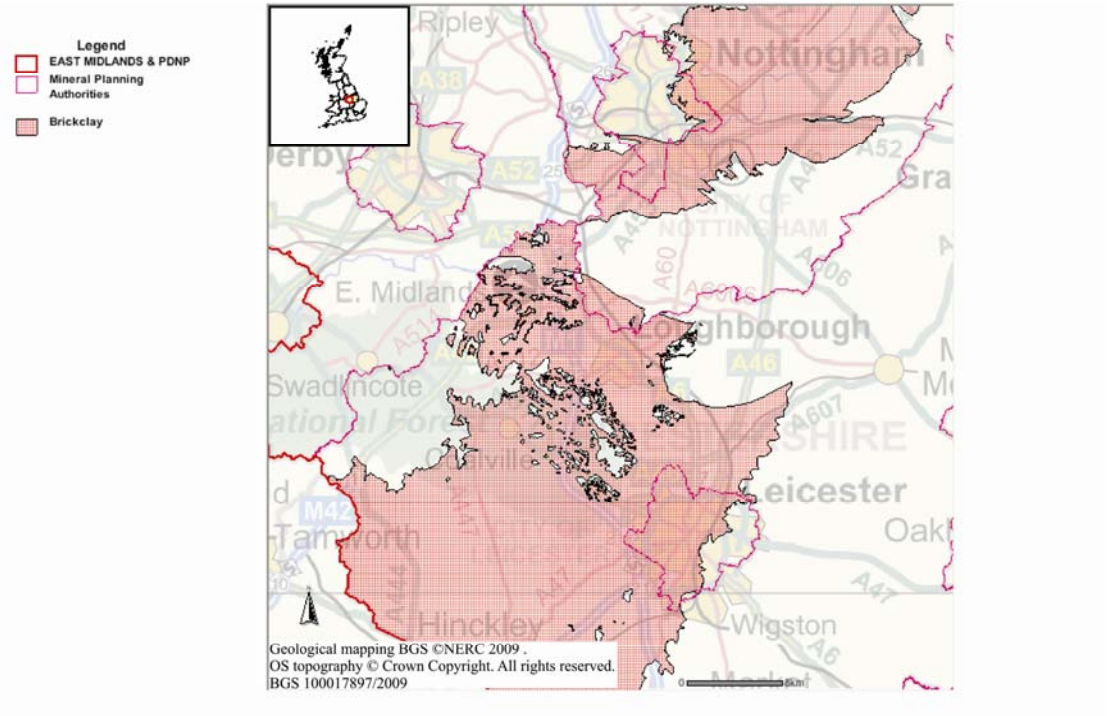

Figure 2, A screen capture of the online mineral resource GIS showing brick clay resources in the East Midlands