

Minerals GIS

An essential tool for minerals planning

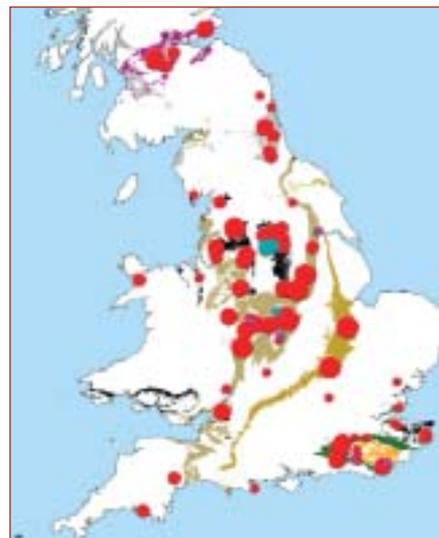
by Jo Mankelow, *Keyworth*

Changes in economic, social, regulatory and technological factors are shaping the interfaces between the minerals industry, government and the public, resulting in changing requirements for information, knowledge and policy related to the sustainable management of mineral resources. In the past decade, there has been a significant shift in the way that land and mineral resource information is collected, analysed and presented. Data collection has been accelerated using advanced digitising, scanning and vectorising routines; Geographical Information Systems (GIS) and integrated database technologies allow rapid analysis of such data, which can then be published quickly in map or table form to a global audience via Internet technologies. The Economic Minerals and Geochemical Baseline programme has been using such technology while undertaking investigations into minerals planning at the local, regional and national level.

At the local level, GIS technology was used to assess the sustainable development options for the ball clay resources in the Wareham Basin of East Dorset. Ball clay is an important ceramic raw material, but has a limited occurrence both nationally and internationally. The UK is a leading world producer and exporter. Prior to the study there was little impartial and comprehensive information on the distribution and quality of the mineral resources of the Wareham Basin and their spatial relationship to environmental designations (22 per cent of the Wareham Basin is designated for international and national conservation value). This lack of information created severe difficulties for the planning process. The system developed allows information essential to land-use planning to be

displayed and analysed. Mineral resource extraction, tourism, preservation or conservation of the environment, and military training can all have an actual or perceived value placed upon them, so that decisions can be made in the light of the best possible information.

At the regional level Geographical Information Systems are being used to host and interrogate mineral resource information maps. These maps delineate mineral resources of current or potential economic interest, the extent of mineral planning permissions and the location of mineral workings, and relate them to national planning designations which may represent constraints on the extraction of minerals. Resource information



The location of brick, pipe and tile production sites in Great Britain, together with the distribution of the principal brick clay resources. Size of circle denotes approximate brick clay consumption by site: red = bricks; purple = tiles; blue = pipes.

is essential to support mineral exploration and development activities, for resource management and land-use planning, and to establish baseline data for environmental impact studies and environmental guidelines. Areas where work has been completed include the West Midlands, North East England, and East Midlands as well as several other Mineral Planning Authority (MPA) areas. When all the MPAs within a region have been completed, a regional GIS is developed.

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GIS technology has been used for a number of national minerals-related investigations. An example is a study of brick clay resources and supply issues. Strong demand for a wide range of bricks alongside a combination of environmental concerns, commercial pressures and technological developments are changing the pattern of demand for brick clay. GIS was used in planning the future sustainable development of this mineral resource. Aggregate minerals surveys, based at four-yearly intervals, provide an in-depth and up-to-date understanding of regional and national sales, consumption, distribution and permitted reserves of natural aggregates. These surveys are used to inform government on the production and movement of aggregates in order to review aggregates planning policy. Using the results from the 1997 and 2001 surveys, a minerals GIS was used for the rapid compilation and visualisation of the sales, consumption and reserves of aggregate for each region in England and Wales and also inter-regional flows. Such data are used to underpin strategic minerals planning.

The analysis of complex spatial and non-spatial data-sets in an integrated manner forms the major part of a GIS's capabilities. Integrated minerals information systems have a key role in the understanding of, and planning for, continued minerals development. Over the next few years the BGS is keen to improve the synthesis, organisation and redistribution of minerals information to a wider audience using Internet technologies.

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