

Foot-and-mouth

The BGS's response to a national crisis

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In mid-February 2001, foot-and-mouth disease was confirmed in Northumberland and Essex. In the following weeks it rapidly spread to southern Scotland, Cumbria, parts of the Midlands, Wales, and south-west England, with isolated outbreaks scattered across the country. Outbreaks peaked by April and by the beginning of the summer the disease had been largely controlled (*see chart*). In early July, within the 'tail' of the outbreak, only isolated hotspots were recorded, with an average of three to four confirmed cases a day in areas such as Devon, Brecon, and Yorkshire.

From the outset, Government policy required the immediate disposal of infected animal carcasses in a rapid, safe, and efficient manner. But, within a matter of weeks, it became apparent that major problems would be encountered with the disposal of large volumes of carcasses, particularly as disease control measures would require the slaughter of healthy animals within contiguous zones around confirmed outbreak locations. The BGS immediately offered its services to assist in the identification of suitable burial and pyre (burning) disposal sites. Although some burial had already taken place, the Environment Agency (EA), covering England and Wales, the Ministry of Agriculture, Fisheries and Food (MAFF), the Scottish Environmental Protection Agency (SEPA), and the military authorities readily accepted the BGS's offer.

It was evident that the BGS would have to react rapidly to requests for geological information, producing reports in a turn-around time of a few hours. A task force was set up with a number of teams

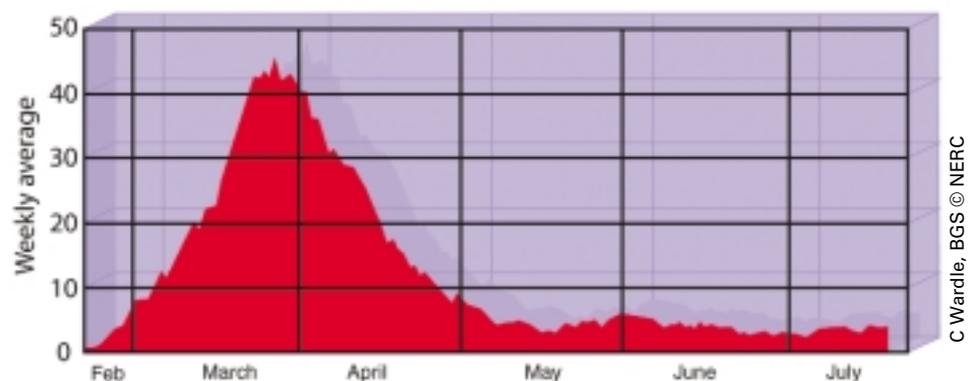
operating on a rota. These teams were on call for 24-hour periods, including weekends and bank holidays. The first enquiry was received on 26 March and requests escalated rapidly so that staff at Keyworth, Edinburgh, Wallingford, and Exeter were soon deeply involved. In one hectic three-day weekend period, geoscientists at Edinburgh and Wallingford responded to ten enquiries for geological and hydrogeological advice. Requests came mainly from the EA and the SEPA, the bodies responsible for licensing sites for carcass disposal. The EA calls originated from their regional offices, and requested assessment of sites for both mass burial and smaller farm burial pits. Good working contacts with BGS Edinburgh meant that SEPA officers (working alongside vets and farmers) were frequently in direct communication with BGS geologists and hydrogeologists during the decision-making process with verbal summaries of the local geology facilitating on-site selection of burial



R A Waters, BGS © NERC

Excavation for mass burial of foot-and-mouth disease infected carcasses.

sites. This operation also demonstrated and tested the effectiveness of communications between the various BGS sites as geological and hydrogeological information was often intimately linked. Colleagues at the Geological Survey of Northern Ireland also held discussions with the Northern Ireland Government. Concerns over any possible earthquake hazard resulted in enquiries to the BGS Seismic Monitoring Network Programme on mass burial sites in southern Scotland and South Wales. Requests for information and summary reports were also received from several engineering and environmental consultants engaged on follow-up risk assessment studies at the major sites.



C Wardle, BGS © NERC

Weekly averages of daily FMD outbreaks. Information from MAFF/DEFRA daily updates as presented on the Royal Agricultural College website.

To assist the authorities in identifying and determining the suitability of disposal sites, BGS data were collated from a variety of sources (fieldslips, published maps, borehole and well records, mine plans, and hydrogeological data) and provided in a standard report format. The reports were directed particularly at indicating the risk of groundwater pollution, taking into account local geological and hydrogeological factors. For example, an aquifer may have been protected by the presence of a thick layer of low permeability superficial deposits or, conversely, may have been vulnerable to contamination because permeable layers in superficial deposits provided a pathway for contaminants. Basic hydrological factors were also covered where it was thought that drains and natural waterways may provide paths for off-site pollution.

In addition to the standard site-specific reports, which were mostly produced within three hours of initial request and e-mailed or faxed back to the client, three strategic studies were undertaken in order to narrow down the areas of search to those most likely to support suitable burial sites. This was accomplished for Cheshire and part of Lancashire by combining layers from the EA's Geographical Information System (containing, for example groundwater abstraction zones and vulnerable aquifers) with BGS-built layers (containing interpreted geological information and data density). For south Cumbria a regional assessment of till thickness and type was accomplished by combining borehole data with geologists' local knowledge and field data.

On occasion MAFF consulted the BGS about selecting sites for compulsory purchase, where a response was required within two hours, to ensure sites chosen were likely to be fit for purpose. In south-west England, contact was established with the military authorities and army officers worked with BGS geologists to assess smaller farm burial sites in Devon.

By mid-July, the BGS had completed 96 reports (*see map*). Reports for all of the mass burial sites were provided, although not always prior to their installation. However, considering the enormous effort the BGS put in to responding to the crisis, it is a sobering statistic that the number of potentially



Topography, Mountain High Maps © Digital Wisdom Inc.

Foot-and-mouth disease response location map as at July 2001.

contaminated sites countrywide eventually reached 900.

Clearly, the foot-and-mouth epidemic has been devastating for the country. However, the BGS's ability to respond positively highlights the value of our strategic surveys in even the remotest rural areas. Often it is only in hindsight that we are able to appreciate the relevance of detailed mapping. For example, a young BGS geologist recently mapping Quaternary deposits in the Lochmaben area of southern Scotland, when asked by a local farmer to justify the use of such a survey found it difficult to provide a satisfactory and convincing reply. His field slip has now proved one of the most valuable documents in BGS as it includes the Birkshaw Forest mass burial site and it enabled the BGS to provide the SEPA with a modern and

up-to-date scientific interpretation of the Quaternary geology. Drilling undertaken on behalf of the Scottish Executive has subsequently confirmed the three-dimensional conceptual model of the Quaternary geology provided by the BGS.

The BGS has recently been co-opted onto a working group dealing with the use of Geographical Information Systems in National Emergencies. This working group is set up under the auspices of the Department for Transport, Local Government and the Regions.

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