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Using dBase for county SMRs: the Humberside experience

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5.1 Introduction

The establishment of archaeological data-banks at local or regional level has been an important development in British archaeology over the last 15 years. Unfortunately, those who set up or manage these Sites and Monuments Records (SMRs) often encounter problems in developing and justifying the services they can provide. Frequently working in isolation, subject to political, financial, or other pressures, time and money may be wasted seeking solutions to problems already solved elsewhere. Alternatively, inappropriate strategies and structures may be adopted, leading to longer-term difficulties, and preventing SMRs from reaching their full potential. This paper attempts to explain one particular approach to establishing a County SMR, and why and how dBase software was used to computerise it. It also takes a wider look at the use of dBase for SMR applications. Particular emphasis is placed on the importance of designing systems around their expected user requirements and the need to consider the practical constraints which may be placed on their development.

5.2 Why create an SMR?

On arrival in Humberside in September 1984, the writer's brief was to establish for the first time an organised Sites and Monuments Record for the County. There was a requirement from both the Historic Buildings and Monuments Commission (HBMC), who were providing initial 'pump-priming' funding for the project, and the County Council, who were expected to take it on, to demonstrate results as soon as possible. However, the requirements of the two organisations were different. As with other County SMRs, HBMC wanted the record to form part of a national network of county-based records which could, among other things, help them assess and identify sites and monuments of national importance for protection by Scheduling. Some degree of compatibility with other SMRs was therefore essential. The County Council on the other hand was not fully convinced it wanted an SMR—after all, it had managed without one up to that point. Local Authorities exist to provide services to the community, and for them the SMR would have to justify itself in public service terms. Within the County Council structure, the record was to be based in the Humberside Archaeology Unit, which had also previously managed without an SMR. The main requirement here was for background and comparative information which could be used in setting up field projects and research priorities for the county.

To be successful, therefore, the SMR would have to provide as wide a variety of services to as many people as possible in the shortest possible time. It would also have to market these services to build up support for continuing the project. Resources and equipment (such as a computer) would need to be attracted to the project and

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justified against competing demands. Spending months or even years laboriously preparing, checking, and entering data to a machine in the vague hope of future reward was therefore out of the question. Before it could offer a service however any system adopted would have to be 'fully retrievable for all reasonable purposes of enquiry' (Baker 1983, p.55), revisable with new evidence, and capable of development and change. Development plans would also have to be realistic and take into account the very limited resources available. Fortunately a good deal of preliminary gathering of material from the Ordnance Survey, Yorkshire Archaeological Society and other sources had taken place, and Loughlin and Miller had published their Inventory of Archaeological Sites in Humberside in 1979 (Loughlin & Miller 1979).

5.3 Who will use it?

Many people seem to believe that Sites and Monuments Records exist only for development control and heritage management purposes. Some will also recognise their potential for defining fieldwork priorities. However an SMR can and should aim for a much wider role than this. It should be available as a resource for students, researchers, and teachers at all levels; archaeology, local history, and civic societies; authors of academic and popular books, leaflets, and other material; farmers and landowners; and other enquirers. An SMR should also be able to promote archaeology positively and identify new possible uses and services.

Of course, the SMR officer cannot be expected to allow people to use the information contained in the record to damage or destroy sites, or to steal the property of landowners and occupiers. Balancing the needs of conservation and security with those of public information is therefore an important consideration. The structure of the SMR should make it possible for the controlling officer to make a professional judgement regarding access to information in individual cases.

5.4 The strategy adopted

At the very least, an SMR should be able to provide a basic retrievable index to archaeological resources for research, conservation and management, education and presentation. It should be able to tell us quickly what there is, where it is, and what it is currently thought to be. Provided the information held is structured properly to distinguish primary and secondary sources and make the updating process explicit, 'What and where' provides at least a basis for professional judgement, as well as a point of departure for research. No SMR is ever 'complete', and no matter how sophisticated it is, a critical approach is always necessary in assessing the information held.

A planner, road engineer, or building surveyor needs to know whether there is any archaeology at a given place, and what its implications are likely to be for his work. A researcher on the other hand may ask where are there examples of a particular site type or status. As the record develops, higher levels of evaluation and interpretation can and should of course be included, but they ultimately depend on this base level of information. A basic, county-wide database was therefore created from the outset and its scope gradually increased, instead of working slowly across the area in detail.

At the same time, a high-profile approach was adopted from the beginning. Every opportunity was taken to advertise and develop the record's potential within the County Council, to the relevant District Councils, and more widely. Contact was made with architects, road engineers, building surveyors, estates and valuation staff, education advisers, planners, countryside, minerals, and forestry sections. Up-to-date lists of sites and monuments, followed by 'constraint' (consultation) maps, were sent to the nine Districts and meetings arranged with relevant officers. Short reports

appeared in the County's Education Bulletin, the newsletter of the Rural Community Council, and the local press. Leaflets went out to Adult Education groups, local libraries, museums and societies. Close collaboration was developed with the local Farming and Wildlife Advisory Group.

An early decision was made to create an essentially paper record, using a computer, if possible, to do what it is best at: i.e. to provide a retrieval system. There can be no particular value at present in attempting to transfer all notes and references held in SMRs to the computer. Generally speaking, reports need to be individually written for whatever purpose they are needed, and cannot be satisfactorily assembled as kits from standard computerised blocks of free text. Similarly for those enquirers who want detailed information, the photocopier is still in 1989 a much more cost-effective piece of technology. The day of the fully-computerised SMR will no doubt come eventually, but when it does OCR (Optical Character Recognition) equipment should make data entry easy and cheap. Typing in unnecessary free text wastes time and money, and takes up valuable computer space better used for something else. Besides, a paper record is usually necessary in practice for storing photographs, drawings, field-notes, old planning applications, and correspondence. Later, as the computerised record develops, it may prove useful to include in it a short summary of the current state of knowledge on each site to help deal quickly with straightforward enquiries.

Other ways of saving time and money were also found. Instead of creating index cards or data input sheets, the existing copies of Ordnance Survey, Yorkshire Archaeological Society, Hull Museum, and other records were roughly stapled together in the first instance and given Primary Record Numbers (PRNs). These were then stored in sequence and used as they were for computer data entry. Meanwhile, the references were transferred gradually to standard record sheets kept in box files. Simple parish lists, containing the PRN, identifiable site name and status (Scheduled or not) of every site in each parish, provided a means of access, and a Record Manual was produced in a form which could be easily updated, designed as much for the user of the system as the compiler. Keywords and categories were adapted from those in use in Bedfordshire SMR, since having been designed originally for an optical co-incidence card retrieval system they were straightforward and unstructured. A Community Programme team funded by the Manpower Services Commission began work on a set of basic 1:10,000 dyeline maps. Meanwhile, demonstration of the SMR's potential persuaded senior County Council managers to transfer to the project a twin-floppy drive 256k Sirius from another section.

5.5 dBase: Why and How

After some experimentation with other software, dBase II was chosen mainly because it worked, and as it was already in use in the County Council, it was free and there were people around who knew how to use it. However, its potential was immediately obvious. A retrievable data-bank could be easily established and interrogated in a variety of ways. It was flexible and the data structure and format could be altered and developed when necessary. It could be used interactively, or simple programs could be written for specific applications. Being a widely used, standard, commercial software package, it would also be easy to upgrade and if necessary transfer the SMR to new software when it became available without typing it all in again.

Data could also be transferred to other records, since the flexibility of the package makes it possible to modify data structures and words used to fit the receiving system. One person's 'motte and bailey' can easily become another's 'fortification: castle'. Because it has structured records it is also possible to transfer information via ASCII to other types of record system (such as those based on Superfile). It

is interesting to note that this facility for data transfer has since grown, and both the North Yorkshire SMR system and the English National Monuments Record (both mainframe-based) can now interface with dBase III.

Most important though at this stage was the fact that dBase could be used to create a demonstrable, working computerised SMR extremely fast and cheaply. Using the collected notes and references a county-wide database was built up very quickly from the parish lists using global replaces where possible. A simple file was set up for the first parish, containing the same basic details as the list: Primary Record or reference Number (PRN), an identifiable (unique if possible) site name, and its status (Scheduled Monument or not). The parish name was then entered using a global replace, the file structure copied to the next parish and the process repeated. When all the parishes in a district had been entered, the parish files were combined to create one for each district and the global replace used to enter the district name and pre-1974 county. This method was not only much quicker than entering everything by hand, but also minimised typing errors. A decision was made to exclude from the initial data input phase information which could logically be deduced from material already entered: this could be done later if required, using either the global replace function or simple specially-written applications programs. The file structure was then enlarged to include other fields, such as grid references, site types, and periods represented, and the relevant details entered.

The limitations of the twin drive computer meant that it was necessary to store each district on a separate disk—in effect 9 separate mini-SMRs arranged to the same format. Indeed, one of the districts (East Yorkshire) is so large and rich in archaeology that it soon had to be split into two. Despite these hardware problems, dBase proved to have all the required virtues of flexibility, simplicity and user-friendliness, being easy to use interactively by the writer or other staff without much need for high levels of computer literacy. Listed Buildings, SSSIs, Ancient Woodlands, Forestry Commission land, and other retrieval categories were added. Within a year we had a basic, retrievable SMR for the whole county, although because of the fragmented nature of the record County-wide searches were cumbersome. The next stage was the acquisition of a (second-hand) 10Mb hard disk Sirius, which allowed us to put the whole SMR into one file.

Simple programming in dBase turned out to be surprisingly straightforward. Producing computer-generated parish lists was no problem, and a special program was devised to check and standardise the National Grid map references, which had been entered in a variety of ways. The program also used the grid reference to identify the relevant 1:10,000 Ordnance Survey maps and enter these automatically in a new 'map' field. From this a map list was generated to check and update the maps themselves. As the computer database grew, mistakes in data entry inevitably appeared despite (and sometimes because of) the use of global replaces. These are powerful and dangerous commands, and care has to be taken so that only those records which require changing are affected. Mistakes produce absurd (and often hilarious) results, which can take some time to correct! However it was usually possible to formulate checking routines and carefully designed searches to bring these to light.

In autumn 1987, when the SMR had outgrown the 10Mb Sirius, HBMC made it possible to transfer to a new 40Mb IBM (AT) compatible NEC computer running dBase III+. This had a number of advantages, not least that it was now possible to add a 'memo' field containing a free text summary to each record. It also allowed 15 files to be open at once instead of only two as with dBase II, creating the opportunity to develop a network of relational databases.

A relational database system is particularly appropriate for SMR applications. Sites and Monuments Records need to cope with a variety of enquiries, and different types of site may require different categories or levels of information. Some retrieval fields

may only be required for Scheduled Monuments or Listed Buildings, for example, so sub-files can be created for these, linked by the PRN to the main database. These sub-files are usually small and quick to search, and reduce the need to take up unnecessary space on the computer by storing unwanted blanks. Cross-references to other records can also be provided where applicable—in Humberside, these include slides in the Unit's collection, HBMC, Yorkshire Archaeological Society and National Archaeological Record reference numbers, the register of cancelled numbers where new PRNs have been allocated, and details of excavation archives.

The relational arrangement can be taken further by networking several machines. Apart from providing extra terminals, where the record is housed within a field unit it should be possible to make direct links if desired between SMR, post-excavation, finds, drawing office and other databases. Other links could be established with local authority planning, property and estates records, with defined levels of access. With a MODEM, a number of similar SMRs could readily form a regional network.

Many people criticise dBase for its fixed-length fields, but this is not a serious problem if the system has been designed to make use of the relational facility. The length of retrieval fields is of course defined by the user, and can be altered if necessary, but the existence of fixed length fields can have a positive advantage in providing an informal structure to the data. Storage space on computers is rapidly becoming much cheaper, and a few stored blanks can usually be accommodated if space is not wasted on repeating fields, unnecessary free text and over-complex data structures. Similarly, abbreviations and coding have been avoided in the Humberside SMR where possible, as the advantages of a simple, user-and operator-friendly system were considered to far outweigh any possible benefits from gained computer storage space.

dBase IV, which has recently become available, has a facility to translate codes. Database linking is also improved and there are better report and query generators. The Assist function in dBase III+ has been replaced with a 'Control Centre' which covers most things, reducing the need for a programming language. There is also an on-line Help facility. Query by example (QBE) and the structured query language SQL are available, and the dBase programming language is still there (in improved form) if required. For anyone still using earlier versions it should be well worth the upgrade, although it seems slow to work in certain configurations.

The Humberside SMR continues to grow and develop, serving not only the planning process but also the wider community. Mary Lakin, who took over as Sites and Monuments Officer in January 1988, strengthened the data structure and greatly improved the map record, and her successor Ed Dennison will no doubt make further changes. This is as it should be. SMRs are dynamic in nature and must change and develop continually to meet the demands placed upon them. In due course, dBase itself will be obsolete and all the records will be transferred to a new format, but for the moment it still has much to offer for developing Sites and Monuments Records.

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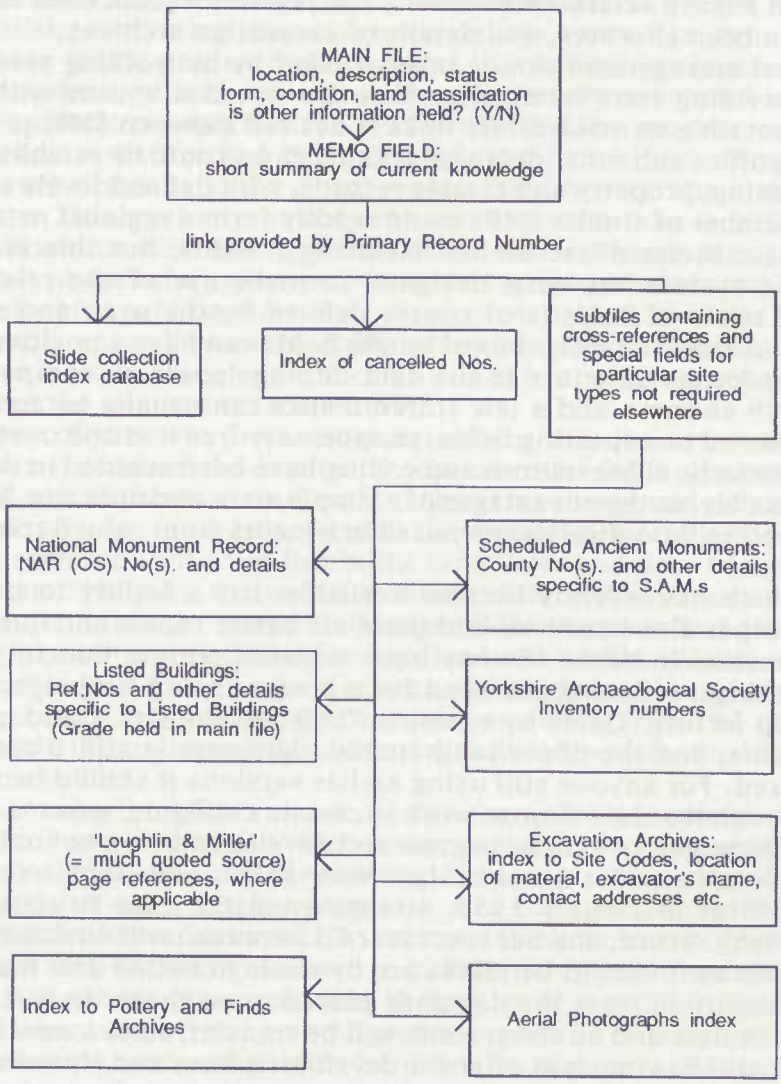

(one Humberside PRN may include several NAR Nos./ YAS Nos./ etc., or several PRNs may refer to one, since the information may not have been divided in the same way. The computer finds all the relevant matches and displays them. Searches can be done from indexed sub-files to the main file or vice-versa.) Any number of linked files are theoretically possible. dBase III+ allows 15 to be open at once, which is probably plenty for most purposes; dBase IV allows 99 files to be open simultaneously.

Figure 5.1: Relational structure of the Humberside SMR