

Table of contents

6.1	Introduction	3
6.2	Background	3
6.2.1	The National Scheme for Geological Site Documentation (NSGSD)	3
6.2.2	The Earth Science Conservation Strategy	4
6.3	What is a RIGS system?	4
6.3.1	Recommendations for a RIGS system	4
6.4	Recording RIGS	5
6.4.1	Primary data	5
6.4.2	Secondary data	5
6.5	Types of data required	6
6.5.1	Geological and geomorphological field surveys	6
6.5.2	Information on landowners, operators and managers of sites	6
6.5.3	Contextual data	6
6.5.4	Other site-based data	7
6.5.5	Other secondary sources of data	7
6.5.6	Remote sensing	7
6.6	Recording sites	8
6.6.1	Identifying potential RIGS	8
6.6.2	Collating existing data	8
6.6.3	Recording at a site	8
6.6.4	Boundaries	9
6.7	Assessing a site	10
6.7.1	The process	10
6.7.2	Assessment	10
6.8	Data handling – how to log sites and geological information	13
6.8.1	Management of data	14
6.8.2	Geological and geomorphological records	14
6.9	Data storage	16
6.9.1	Local Record Centres	16
6.9.2	The National Biodiversity Network (NBN)	17
6.9.3	The National Scheme for Geological Site Documentation (NSGSD) and GD1	19
6.9.4	GD2 Geological Database	19
6.9.5	GD3?	20
6.9.6	Other recording systems	20
6.10	Access to and distribution of data collected	23
6.10.1	Data ownership – the law	23
6.10.2	Access to information on RIGS	23
6.10.3	Supplying information on RIGS	24
6.10.4	Ownership of records	24
6.10.5	Data Protection Act (1984)	25
6.10.6	The EU Data Protection Directive (95/46/EC)	26
Appendix 6.1	Useful reading	
Appendix 6.2	Geology locality record	
Appendix 6.3	Case study: Nottinghamshire RIGS Group detailed site assessment form	
Appendix 6.4	Case study: Using historical records	
Appendix 6.5	Locality field card and A4 summary record	
Appendix 6.6	BGS National Geological Records Centre	

- Appendix 6.7** BGS and the confidentiality of boreholes
- Appendix 6.8** Case study: working with a Local Record Centre
- Appendix 6.9** Case study: Black Country Geological Society records
- Appendix 6.10** Case study: Gwynedd and Môn RIGS Group data record
- Appendix 6.11** Data Protection Act summary
- Appendix 6.12** List of Local Record Centres

6.1 Introduction

One of the difficulties currently facing RIGS groups is the lack of a standard and consistent system for recording and assessing RIGS. The systems in place vary so that there are differences between recording forms, the techniques used to record and assess sites, the quality of data and methods of storing it.

The purpose of this chapter is to provide a basis to address these problems by giving guidelines and recommendations to help unify and standardise recording techniques across the UK.

Throughout this chapter the term 'RIGS' is used to describe geological and geomorphological sites. It is acknowledged that other terms are currently used to describe equivalent sites in line with local systems (see section 3.5.3), but it is recommended that the term RIGS is used in conjunction with these other terms. This is to help wider understanding and recognition of the term 'RIGS' in line with advice given in planning policy guidance and supplementary guidance where RIGS have some measure of protection (see chapters 3 and 7).



Avoid duplication of effort – before you embark on site recording and assessment find out if others have already undertaken the same work. Check with the local geological locality record centre and the planning department.

6.2 Background

6.2.1 The National Scheme for Geological Site Documentation (NSGSD)

Established in 1977, NSGSD assumed a complementary role to the GCR (see section 3.4.1) by setting out to catalogue the wider geological resource, particularly from a conservation perspective. NSGSD was organised on a county basis and promoted the establishment of local geological records centres – these were usually operated by museum-based geological curators, supported by volunteer field workers. By 1990 some 18,000 sites had been documented in 55 record centres across Britain (see appendix 6.12).

The focus was on documenting alternative sites important for scientific and educational purposes to complement SSSIs and prevent their overuse. The scheme was a locally focused information service and encouraged centres to record sites in a consistent manner using the same technology. Each site was recorded as a site file with full details of all aspects of the site.

NSGSD remains an extremely effective mechanism for recording geological and geomorphological features and is still in use in many counties and by many RIGS groups. However, even with NSGSD record centres using a standardised set of record formats, there are still differences in recording techniques, which emphasises the great need to have a consistent approach to records and reliable information.

The NSGSD system never attempted to assess sites for RIGS uses. It simply records sites and provides data, much of which can be interpreted as part of an assessment (see appendix 6.2).

6.2.2 The Earth Science Conservation Strategy

The Nature Conservancy Council developed early guidelines for RIGS in the late 1980s. These guidelines reflected those used for the conservation of wildlife sites and in the selection of GCR sites.

The UK guidelines are clearly defined in *Earth Science Conservation in Great Britain – a Strategy* (1990) and are the basis for individual groups' criteria. Groups were encouraged to compile lists of sites in their county for use in the assessment procedure and also to consider developing a 'points scoring system' to aid in site selection (see appendix 6.3 and 10.3). However, the intrinsic scientific value was always the basis for defending sites at planning inquiries should designated and notified sites be threatened by development.



Sites are selected according to their value for:

- ◆ Educational fieldwork in primary and secondary schools, at undergraduate level and in adult education courses
- ◆ Study by both professional and amateur Earth scientists. Such sites demonstrate, alone or as part of a network, the geology or geomorphology of an area
- ◆ Historical significance in terms of important advances in Earth science knowledge
- ◆ Aesthetic qualities in the landscape, particularly in relation to promoting public awareness and appreciation of Earth sciences

The balance of importance of these themes, and the added value to the science base, has varied from county to county. Conservability, access, health and safety, industrial heritage, amenity, wildlife and archaeological value may also be considered alongside the Earth science interests of a site and add to the value of a RIGS designation. These additional interests certainly give greater strength to the argument for protecting sites from development when planning bodies are considering planning applications from any developer (see section 7.5.2).

6.3 What is a RIGS system?

A RIGS system should describe the processes involved in selecting and assessing locally and regionally important sites, protecting them through the planning process and monitoring and evaluating both the sites and the effectiveness of the system.



A RIGS system should include processes for:

- ◆ identifying sites, through detailed survey and assessment
- ◆ effective documentation of sites
- ◆ maintaining value of sites by working with landowners and managers
- ◆ protecting sites through the planning system
- ◆ assessment of the effectiveness of the system
- ◆ monitoring site integrity
- ◆ evaluating site use

6.3.1 Recommendations for a RIGS system

- ◆ RIGS should be considered in conjunction with other designations, initiatives and plans

- ◆ RIGS should be based on adequate data sources which include a full range of geological and geomorphological information
- ◆ RIGS data should be stored and managed by Local Record Centres, preferably in partnership with a RIGS group. Do not create a new centre if a record centre already exists.
- ◆ RIGS groups must comply with relevant legislation (notably Data Protection Act and Environmental Information Regulations)
- ◆ RIGS groups should ensure data is secure and access conditions are made clear and comply with copyright, the Data Protection Act and other relevant legislation.

6.4 Recording RIGS

Wide ranges of data are required to record, assess and identify a representative selection of RIGS in an area. Most RIGS groups should be able to access site data in their Local Record Centre and make a selection of RIGS from that data. However many areas do not have a record centre and groups will need to collect data. Before doing so, groups must ensure that a system to keep data secure is in place. Broadly there are two types of data:

- ◆ Primary data
- ◆ Secondary data

6.4.1 Primary data

Primary data is derived from the field and includes all kinds of information collected directly from site surveys and other 'fieldwork'. It may include studying collections from the field such as borehole cores and specimens.

Field collections are extremely important, as they may be the only physical records of a site. The collections should be suitably labelled and, wherever possible, deposited in a museum for safekeeping.

6.4.2 Secondary data

Secondary data sources include maps, plans, published literature such as memoirs, field notes/slips, borehole logs, previous field records and surveys. Any historical information derived from research ('desktop study') can be considered as secondary. Secondary information may be the only record remaining of a feature, temporary exposure or mineral working (see appendix 6.4).

However, geological and geomorphological localities do alter with time as dynamic environments change naturally. Certain sites are important precisely because they are dynamic, such as active landslips.

Exposures and sites may also become degraded, weathered, damaged and even destroyed. Alternatively, localities may improve – such as those sites that are currently worked for mineral resources.

It is important to back up any secondary sources of information with a visit to the site itself. In addition, regular site surveys enable more thorough assessment of sites and improved conservation strategies.

6.5 Types of data required

6.5.1 Geological and geomorphological field surveys

Extensive information is needed about the geology and geomorphology of the site to enable it to be evaluated against the criteria and ensure proper management. This should be collected by a field survey and, where appropriate, a desktop study of relevant historical information. Historical importance is one of the key criteria for RIGS.

6.5.2 Information on landowners, operators and managers of sites

A considerable quantity of data relating to liaison with the owners and managers of sites will be generated in running systems. Managing this data effectively is just as important as handling the geological data used to identify and assess sites. All this data needs to be maintained and kept up-to-date. It will provide a detailed record of all contacts - including permissions sought for access, communication over the value of a site and, potentially, details of management. Advice on this close liaison with landowners is given in section 5.10, and attention should be given to some of the issues raised in sections 5.7 – 5.9.

6.5.3 Contextual data

Contextual information is needed to assess the relative importance of any site. Contextual data should show the importance of a geological or geomorphological feature or group of features within an international, national and regional context.

For example, a roadside cutting in the Peterborough district would hold significant local importance as a relatively accessible surface exposure where most geology lies below sea level and is not visible without excavation. In the Scottish Highlands a similar feature might be considered insignificant against the variety and importance of the exposed geology in that area.

Consider the site in relation to the local geodiversity:

- ◆ Is it the only exposure of a particular horizon?
- ◆ Is it the best example of a faulted junction?
- ◆ Did a disused quarry produce most of the local building stone?
- ◆ Is it the best fossil locality for a particular group?
- ◆ How do the site's features compare with other sites locally, regionally, nationally and even internationally?

Multi-interest sites can be very important over a wide range. An understanding of the distribution of those features throughout the area is essential and this will help identify and determine a site's importance. For a useful source of comparative data, consult the recent GCR review volumes published by JNCC (see section 3.4). These are expensive, but can usually be consulted in the local studies section of a large town or city library or the local museum. See section 2.8.

6.5.4 Other site-based data

Information relating to the history, industrial history, wildlife and archaeology of the site and, if appropriate, its use by the local community should be collected. This will usually involve collating existing data and further survey work. Site data should be kept up-to-date to ensure that RIGS continue to meet criteria and to monitor site status and condition.

6.5.5 Other secondary sources of data

British Geological Survey memoirs, maps and the original field slips of survey field staff are an invaluable source of data. The case study of the canal project proves the value of field slips (see appendix 6.4).

Most local libraries, usually the local studies or archives section, hold copies of memoirs and maps of the area. The planning department of your local district or county council also holds maps, and your group may be able to acquire copies. Always ask at your local university or college, as these usually keep maps and memoirs.

However, all old and recent memoirs, maps, technical reports and field slips are lodged at BGS's National Geological Records Centre (NGRC) at Keyworth near Nottingham for England and Wales and at the Edinburgh office for Scotland; these can be consulted on application. Similarly, borehole records and cores are available for study at Keyworth and Edinburgh.

6.5.6 Remote sensing

Remote sensing is the term used for obtaining data about objects without coming directly into contact with them. Here we look at the collection of data through aerial photography and satellite imagery as potentially the most important methods.

Remote sensing can be very useful but requires specialist knowledge. Aerial photography and satellite imagery is expensive and not normally available for RIGS activities. Both are mentioned, however, as they are becoming more available.

Aerial photography

Aerial photography can be used in conjunction with a survey or as a separate method of gaining land cover information. Aerial photographs can also provide useful historical information on a site, such as how boundaries or cover have changed. It is important to note that aerial photography can only be used to detect 'visible' features, such as quarries, surface landforms and other definable features and should always be accompanied by work on the ground to verify interpretation of photographs.

Currently, the majority of aerial photographs are in black and white and operate on a scale of about 1:25,000. Colour aerial photographs are more expensive but can be easier to interpret. Local studies, university and college libraries and planning departments often hold sets of aerial photographs.

Satellite imagery

Satellite imagery can include 'photographs from space' such as those used for military purposes. For obvious reasons these are hard to come by and are not sufficiently detailed for identifying smaller features, such as boundaries. However, satellite imagery is useful for detecting larger features such as drumlins and extensive geological or geomorphological systems.

6.6 Recording sites

There are several issues to consider regarding the recording of RIGS. This section aims to give practical advice and guidance. It is recognised that circumstances vary from county to county and region to region and it is also acknowledged that no one will know the local geology and circumstances better than the local RIGS group.

Much of the advice contained here will seem like common sense. However, it is potentially crucial for the existence of your site. Consider what would happen if you had to defend your RIGS site against a development - would the site stand scrutiny at a public inquiry? Are your systems effective enough to protect a RIGS? Think about what standards you should apply when designating a site.

6.6.1 Identifying potential RIGS

Potential RIGS are often identified during the process and analysis of geological surveys; local geologists may also identify sites as being of importance. To enable assessment, adequate data is needed on all potential RIGS.

6.6.2 Collating existing data

Before commissioning a site-specific survey, all potential sources of data should be investigated. The starting point for most RIGS groups is often data held within the NSGSD, where records are held in geological locality, or local Environmental Record Centres. Where a Local Record Centre exists, this will be the main source of data and existing sources may provide sufficient data for a site to be assessed (see section 6.7).

6.6.3 Recording at a site

Each time you visit a site you can never be sure that this will be the time you see it at its best. With temporary exposures and mineral workings you may return to find that the exposure no longer exists. This is why it is important to make an honest and accurate record.

Give clear and detailed descriptions

The key thing to remember when undertaking a survey of any sort is to give as much description as possible. One of the major flaws encountered in recording is lack of detail. Even if you have made an incorrect interpretation in the field, providing enough supporting evidence and documentation will allow other experts to make a correct interpretation. Take as much information back with you as possible so that a fair assessment can be made.

Do not make assumptions

Don't assume that everyone else has the same level of expertise and knowledge that you have. If you are not sure that you have identified something in the field correctly, don't hazard a guess on what it might be. Make a clear record of what you see, and indicate where you are unsure of a particular feature so that it can be investigated further. It is much more professional to admit where further research is needed than to make inaccurate interpretations that could affect the credibility of any RIGS designation. It is essential that accurate and reliable information is recorded.

Plans, sections and sketches

It is often useful to record a geological face or feature in detail. Measurements are particularly important, especially when recording sections. It is not always practical to measure the whole site, but give accurate dimensions where possible.



The Quaternary Research Association produces a range of technical guides for recording Quaternary sites. See Technical Guide No 7 Description and Analysis of Quaternary Field Sections 1999. Jones et al. Priced at £17 (incl. p&p) for non-members.

Photographs

Photographs can provide valuable information that would be difficult to record by other means. However, their value is limited unless they are well labelled, annotated and referenced. Use them in conjunction with field surveys and sketches and not as a replacement for a field survey.

Taking samples and specimens

Use common sense in taking samples. They are only useful if taken in context with field recording. Samples and specimens may be best studied in detail if taken back for identification and further analysis. However, if a site is sensitive to damage and over collecting then it is wise not to take cores from rock faces or key specimens from the site. Please refer to guidance given in appendix 5.11 – 5.15.

6.6.4 Boundaries

At the start of surveying, no firm decisions should be made about the boundaries of the site unless there are distinct definitions. All areas of potential importance should be surveyed. The boundary should be defined after a survey of all potential areas.

Defining site boundaries

The term ‘site’ is simply a definition of convenience. It is acceptable to devise boundaries that ensure that all the areas of geological interest are included within the boundary, as well as considering factors such as land tenure and management practice. The ‘boundary’ should define and enclose the area of interest.

See section 7.6.3 for a discussion on boundaries in the planning process.

While site boundaries are best identified in the field (for ease of definition, ability to re-find and avoiding artificial divisions) it may be necessary to redefine boundaries when evaluating sites. Even if geological boundaries have been accurately mapped with precise grid references, ‘desk definitions’ should be verified in the field.

Wherever possible unambiguous ground features that are not liable to change should be used. These are usually boundary features such as walls, fences, hedges and roads but may also include clear definitions between geological features/rock type.

However, remember that in drawing a boundary on a map you are defining a geological unit which may be part of a system. Most sites consist of several related features and may include some areas which are of lesser value but form an integral part of the unit. These are sometimes referred to as extensive sites.

Relationships with other sites should be considered. A significant number of RIGS are adjacent to other sites such as SSSIs, and these may be considered together as a single geological unit. The relationship with other sites and the reasons for divisions should always be recorded. Data handling policies will need to address the problems of artificial administrative divisions.

6.7 Assessing a site

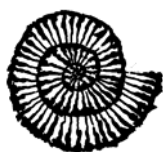
6.7.1 The process

Recording sites is perhaps the easy part of the RIGS process. Next comes the difficult task of assessing sites to see if they should be designated as RIGS. RIGS groups have addressed this process in various ways. Most groups select sites for RIGS designation without necessarily assessing their importance in a formalised way. This can lead to difficulties should the site have to stand scrutiny, as the planning authority could not be given full records of the reasons for the designation. It is most important to ensure that the RIGS system is fireproof and robust.

One way to bring objectivity to the assessment process is to initiate a points scoring system for potential RIGS. It is then possible to allow for consistent and objective assessments to be made by independent assessors. Groups may decide not to use this approach and choose another route to selection before notifying the planning authority, but they must be able to provide documentary evidence of the reasons for proposed designation should a public inquiry be called.

The assessment of sites is logically followed by selection of RIGS prior to notification. Some groups use a selection panel composed of local experts who may or may not be members of the RIGS group, while some groups just use their members to select sites. It is recommended that groups are as objective as possible and the selection panel should include qualified geologists and geomorphologists. The more consultation that is undertaken from different individuals and organisations (both professional and amateur) the more credible an assessment will be if it is scrutinised.

Groups should remember that RIGS must be able to stand scrutiny in the planning development control system.



It is recommended that groups have a formal system to assess and agree sites to be designated RIGS.

RIGS should be recommended to the local planning authority only if they are worthy on a local or regional basis.

The basis of the designation should be a sound scientific one so that RIGS can be defended at a public inquiry.

6.7.2 Assessment

It is important that criteria can be used easily and sensibly. See appendix 6.3. The criteria should cover a wide range of aspects of the site or sites, especially identification, description, management and cultural interests. These interests should be given values in a scoring system. The most simple is a 0-to-10 score with 0 as the worst and 10 the best. For example, in the case of access these would be:

- 0 no access by road
- 5 nearest access 1 km
- 10 good access and parking on site

The range of scores to assign each criterion is suggested as:

0	useless/ no good
1-2	very poor
3-4	poor
5-6	acceptable/ useful
7-8	quite good
9-10	excellent/ very good

This is only a guide and groups may decide to confer different ratings to the scoring system. Other ratings which will probably have to be included are N/A (not applicable) and DK (do not know).

The **general criteria**, with one example of questions to ask, could include:

Access – is there a road to the site and is parking easy?
Safe access to the site – are paths stable?
Safe use of exposure – are faces stable?
Public access – is permission required?
Condition of exposure – is it overgrown and weathered?

The **scientific criteria**, with examples of features:

Surface processes – is there evidence of erosion or deposition?
Landforms – what landforms are there?
Sedimentary rocks – what rocks and structures are exposed?
Stratigraphy – are non-sequences seen?
Fossils – is there evidence of fossil groups and environments?
Igneous rocks – what rocks and textures can be seen?
Metamorphic rocks – are structures and deformation visible?
Tectonic features – are folds and faults present?
Mineralisation – are minerals visible?

Geodiversity value

There will be sites that show the only example of a particular horizon, an unconformity or show exceptional preservation of fossils. These features will not always be notified as SSSIs and it is important to give a measure of protection to these local sites. Their value can be immense to the local geodiversity, the local area and the local distinctiveness and should be recorded and their presence made known.

A site may be worthy of RIGS designation on this one criterion alone as it is far easier to defend a unique occurrence than to try to defend 10 sites all showing the same or similar deposits. Scoring with geodiversity value should be higher as groups will probably put a threshold over which sites can be notified as RIGS.

Educational value

This aspect will require input from qualified teachers and lecturers to ensure that the correct level is assigned to a site. This can also be scored using 0-10 and four levels are suggested:

- ◆ Primary to Key Stage 2
- ◆ Secondary to Key Stage 3 and 4
- ◆ GCE A level, college and university

- ◆ Public

Most sites will have educational value. Some may only be appropriate for specific student use while others will be excellent to give the public an understanding and awareness of geodiversity.

Cultural value

The cultural aspects of sites can be a factor in their designation, and their value should be recorded as part of the assessment. Included within this area are:

- ◆ historical associations – famous people or events, visitors etc
- ◆ Earth science associations – famous scientists or key features first described
- ◆ economic activities – extractive products and processes
- ◆ landscape/aesthetic qualities – viewpoint
- ◆ amenity/recreation use – picnic site/ playing field
- ◆ wildlife value – local reserve/nesting site

Conservation value

The status of the site should be used, if one exists, as part of the assessment. A site may already have a status assigned by an organisation, such as

- ◆ nature conservation agencies, eg English Nature - SSSIs etc
- ◆ built heritage agencies, eg Historic Scotland - Ancient Monuments etc
- ◆ Countryside Agency - National Parks, AONB, Heritage Coasts
- ◆ local authorities - LNRs, SINC's etc

SNH and CCW are responsible for both nature conservation and countryside matters.

However, assessments should include details of a site's importance for conservation which will reflect the status. This area should be used to note any work required on the site such as face clearance, scree removal, footpath creation and the need for interpretation.

Questions to ask could include:

- ◆ is the site an existing SSSI?
- ◆ is the site a biological SSSI?
- ◆ is the site within an existing biological or geological SSSI?
- ◆ is the site a Local Nature Reserve?



RIGS can be designated within existing geological SSSIs, especially where the interest is different. Often a biological SSSI has a geological basis, but that interest is not part of the designation.

Some aspects will only require comments rather than scores, but are very important considerations when assessing sites, especially:

Activities – do any conflict with use as a RIGS?

Restrictions – are there sensitive areas to avoid?

Recommending a site for designation

Any site put forward for a RIGS designation should have sound paperwork to back it up, including details of surveys, assessments and who was involved. Always make sure that records, surveys, assessments and selection panel decisions are dated. To avoid confusion, ensure that dates include the month and year in full, eg 30 October 2000 and not 30/10/00.



The RIGS selection panel could be composed of representatives from some of the following:

- ◆ local geological group/society
- ◆ local Wildlife Trust
- ◆ local planning authority including Local Agenda 21 officer, countryside officer or ecologist, planners particularly minerals planning and local plan officers
- ◆ conservation agencies, ie English Nature/Countryside Council for Wales/Scottish Natural Heritage/Environment and Heritage Service in Northern Ireland
- ◆ Environment Agency/Scottish Environmental Protection Agency
- ◆ British Geological Survey
- ◆ representatives of minerals industry
- ◆ university/other educational establishments
- ◆ local community that may use the site including schools and colleges and amenity groups
- ◆ representative who could advise on health and safety issues
- ◆ any landowners involved

6.8 Data handling – how to log sites and geological information

Any RIGS system is only as robust as the mechanisms it uses for handling the data it relies on. This section does not attempt to address all the data handling issues but raises key points and gives examples of how they can be tackled successfully. It is essential that these mechanisms are fully documented, used consistently and are reliable (see appendix 7.8). Data must always be secure; this means that not only should unauthorised access be prevented but at least one

duplicate copy of all data should be kept separately. Keep a hard copy as well as an electronic copy.



Ideally RIGS data should be managed by a Local Record Centre.

6.8.1 Management of data

There are several types of data which must be handled and managed in the operation of a RIGS system. You may need to split records into sections for clarity. These can broadly be grouped as:

- ◆ Identification details – grid reference
- ◆ Site description including the geology/geomorphology of the site
- ◆ Site management details – including access, management, facilities, liaison and contact records
- ◆ History, documents and collections relating to that site

Each type has its own information management requirements. However, the most efficient systems will integrate all of these types of information as many overlap. Keeping these four datasets separate will be laborious, may be inaccurate and require much data to be duplicated. Appendix 6.9 provides a good example of data handling.

6.8.2 Geological and geomorphological records

Two problems are frequently encountered in handling geological records for RIGS systems - the need to compile data from a wide variety of sources and to access the data in a wide variety of ways. Examples include searching by rock type, stage, 10km₂, site, year or any combination of these.

The majority of geological recording systems initially used were card index systems storing data by site. Now it is possible, using computerised databases, to integrate site details and provide flexible and efficient data handling tools.

Records should include:

- ◆ A means of identifying the site and record. Include:
 - Site name
 - National eight or ten figure grid reference (centred or at opposite ends of the site for linear sites)
 - Locality type – linear exposure
 - Description of the location and boundary maps
 - County, district, parish
 - Date
 - Recorder

◆ A geological description of the locality. Include:

- Date of survey
- Type of locality
- Condition of the locality
- Size and dimensions of the locality
- Any non-geological interests
- General description of the locality
- Status eg type locality
- Stratigraphy
- Petrology
- Mineralogy
- Palaeontology
- Structures
- Relationships
- Geomorphology
- Palaeoenvironment
- Palaeoecology

◆ Site management details

For a RIGS system to be effective, detailed information should be kept on each site. As a minimum, the data held should comprise records of all contacts with owners, managers and others involved in the site. See section 5.12. To be effective, this should be linked to the site records to enable the more effective retrieval of data. It is important to note the implications of the Data Protection Act in storing and handling this type of data (see section 6.10.5).

Include:

- Description of the site
- Planning authority
- Conservation status
- Management body
- Owner
- Tenant/occupier
- Development rights owner
- Access (including any restrictions)
- Planning details
- Safety (risk assessment)
- Any facilities
- Actual site use
- Potential site use (educational, conservation and interpretation)
- Threats to locality
- Monitoring of the site, ie when revisiting is necessary (this will depend on the type of site and its threats)

◆ History, documents and collections related to the site

The relative value of historical data is discussed in section 6.4.2. Any supporting background information is valuable to gain a wider knowledge of the locality and should be kept, or at least a reference kept, with the geological record. It would also be useful to document any important geological collections associated with the site. The reason for a site's importance may be on the basis of a collection that was made from this site. In addition, if a site is destroyed then the geological collection may be all that is left to see. Similarly, photographic records are a useful historical guide. Research papers and references to memoirs regarding the site should also be on the site record.

Include:

- General history of the locality
- References to appropriate map sheets
- Photographs/negatives and reference to any photographic material (including aerial photography)
- Plans
- Memoirs
- Field note books
- Technical reports
- Other books and journals or reference material including reference to the author, date, title, journal or publisher, volume and notes.
- Reference to fossil, mineral and rock collections

6.9 Data storage

6.9.1 Local Record Centres

Local Record Centres (LRCs) already exist in some form in many parts of the UK. The successful ones provide a valuable model for the management of data at the local level. They are seen as the focus for data in the area, they prioritise their work to meet users' needs, they have the trust of the local recording community, they provide sound and appropriate data on which to base decisions, they are well managed and cost effective.

Existing LRCs have not had the benefit of being part of a coordinated network. Recently there has been a significant increase in the recognition of the need for reliable biological information to support decisions.

Local Record Centres are biological record centres in the main and are organised with European and Lottery funding. Generally they do not store geological records unless a Geological Locality Record Centre is housed in the same building. This is often the case as many museums are both biological and geological record centres.

Environmental Record Centres, which are fewer in number, store all types of data including geological records. See appendix 6.12.

Local Record Centres in the National Biodiversity Network

Following the Rio conference in 1992 one of the British responses was to initiate the National Biodiversity Network in which LRCs are crucial.

By establishing partnerships between local organisations with common needs an LRC can effectively manage a wide range of data on their behalf – enabling them to focus on activities involving the use of data.

An LRC will play a key role in collating information about the habitats and species found in the area. It will be able to analyse this data to provide information in a way that will help a wide range of organisations and individuals. LRCs will work closely with these participants to identify their needs and priorities and ensure that data is available to meet these needs. This will involve encouraging and directing biological recording to target priority areas as well as seeking to achieve full and even coverage.

LRCs will have a valuable role in passing information to other centres and organisations at a national level and receiving information from such sources.

LRCs operating with the NBN will:

- ◆ act as a focus for biological record management within the area
- ◆ act as contact point for access to datasets by users
- ◆ promote the collection, validation and maintenance of key biological datasets
- ◆ manage specified datasets on behalf of partners
- ◆ research the availability of data sources, at an appropriate level
- ◆ provide a link for local users and suppliers to other LRCs and national data centres
- ◆ provide support and guidance for recorders
- ◆ supply data to decision makers, educational establishments and the public
- ◆ meet the criteria established for accreditation as an NBN LRC



LRCs currently have the best expertise for managing and handling data even if there is a lack of geological knowledge to interpret the data. Of course where there is a Geological Locality Record Centre then that is the best place to store data. RIGS groups are recommended to contact their Local Record Centre or museum if there is no GLRC within the NSGSD and try to persuade them to become a centre.

6.9.2 The National Biodiversity Network (NBN)

The purpose of the NBN is to improve the care of the UK's natural heritage by providing people with the information they need to make wise choices about how they use and interact with their natural heritage.

The aim by the year 2010 is for a UK-wide network of local and national data centres, each making use of information technology to manage databases of wildlife information in a way that will:

- ◆ improve access to reliable wildlife information to anyone who wants or needs it
- ◆ ensure that decisions affecting our wildlife are based on relevant, quality data
- ◆ link the demand for wildlife information to its collection

NBN nodes

The NBN proposes to achieve this through a range of 'nodes', working to common standards, that will cooperate to manage and provide access to biodiversity information throughout the UK. Each of the nodes will have specialist skills in managing biodiversity information and will be an effective and efficient means for many organisations and individuals to manage their biodiversity data.

Local Record Centres will act as one type of node working alongside national nodes, such as national recording schemes and societies. Each will manage a range of datasets that they are best placed to handle. By working together they can provide a complete picture of biodiversity in the UK, country, region or local area.

Who's involved?

The NBN Consortium involves:

- ◆ Joint Nature Conservation Committee (for the conservation agencies)
- ◆ Natural History Museum
- ◆ Natural Environment Research Council
- ◆ The Wildlife Trusts
- ◆ Royal Society for the Protection of Birds
- ◆ National Federation for Biological Recording (also representing the Association of Local Government Ecologists, Biological Recording in Scotland, Biology Curators Group).

A wide range of other local, national and specialist groups are also involved in planning and delivering NBN projects.

How is the NBN being developed?

Among the areas being developed are:

- ◆ Standards for Biodiversity Information - including access terms and conditions, data standards, collect/collate software, checklist and identification standards, meeting information needs
- ◆ Access to Biodiversity Information - including linking national schemes and societies, linking Local Record Centres, linking national biodiversity organisations, education and public access, network index and gateway
- ◆ Coordinating Development - programme management and communications and accreditation

NBN links to Earth science records

Initially, the NBN will only handle information on wildlife, but in the long term it is hoped that it will act as a means for managing all aspects of environmental data. It is envisaged that environmental information will eventually be collated, stored and used together to protect, enhance and manage the UK's environmental resources.

6.9.3 The National Scheme for Geological Site Documentation (NSGSD) and GD1

The NCC commissioned BGS to computerise NSGSD records in a proposed national database. This database became GD1 or the Geological Database.

The NSGSD scheme was extremely effective and many of the 55 Local Record Centres established in this scheme still function as the centre for local geological records. See appendix 6.12.

Nevertheless, there were problems with the NSGSD recording system even with standardised recording methods. These were:

Spatial referencing

Recorders did not give accurate eight-figure grid references due to difficulties in interpreting the type of locality - whether it was centred, linear or multiple.

General description

Recorders gave interpretations of what they expected rather than what they actually found. For example a recorder would report seeing the Lincolnshire Limestone, Middle Jurassic, rather than recording oolitic limestone and the nature of the fossiliferous, shelly beds within it. Recorders had difficulty differentiating between observation data and interpreted data.

Interpreting the recording form

In June 1977, NSGSD produced two forms (appendix 6.5), a Locality Field Card (A5) specifically for use in the field and a Geology Locality A4 Summary Record to be used as a summary of all available information held in that site file in the Locality Record Centre where the information was held. However, the A4 Summary Record was used as both field sheet and recording sheet in some centres; purposes for which the form was not designed. Consequently the form had some bad press as it did not lend itself well to field recording. In 1989 a Geology Locality Record was produced to make an initial record of localities which could be used in the field. This form - and the original forms - were designed to record sites and not to make assessments for RIGS designation.

6.9.4 GD2 Geological Database

The effort put into the NSGSD and the GD1 led to the subsequent development of the database, now called GD2. Over a period of about five years GD2 evolved into a powerful tool for recording and accessing information about geological sites. In GD2 the application and the data are totally intertwined and the application attempted to provide the user with all the functions, checking and reporting that they might ever need with their data. Applications on this scale are expensive to create and difficult to maintain, especially as voluntary projects. In addition, the DOS-based Advanced Revelation database has been overtaken by major changes in software and computers and now looks very dated. GD2 is still a functional database, but its main drawback is a lack of links to modern Windows software and difficulties in linking to other systems such as modern GIS.

GD2 is tailored entirely for the management of geological site and specimen records and includes many useful dictionary files, including minerals, rocks and stratigraphic names. The application includes several data entry windows to suit different purposes, including an NSGSD form and a quick entry form. Data entry is guided by context-sensitive help messages and data

validation provided through pop-up lists of terms and thesaurus index searches. Several keyword fields are linked to information files to aid data validation and interpretation. For example, if a site report mentions Beaudantite you can find out what it is. The data can be interrogated in many ways and output includes lists, formatted reports and a link to the DMAP distribution mapping program.



GD2 was written by Charles Copp of Environmental Information Management on behalf of the NSGSD and is available to Local Record Centres and RIGS groups. There is a charge of £200 which includes installation of the software on your machine, import of any existing NSGSD data and basic training.

6.9.5 GD3?

There is a move to get GD2 redeveloped as a Windows-based application. The aim is to develop an application which can run as a module of the Recorder 2000 software developed by the JNCC on behalf of the NBN. The benefits of this approach are that the geological application will be able to take advantage of the powerful reporting, mapping and security features of Recorder 2000 and will ensure the computability of geological and biological records. Funding needs to be acquired to allow the module to be written.

6.9.6 Other recording systems

Inter Agency Earth Science Database (IAESD)

The original aims of the IAESD were to ensure that the country agencies had standard, accurate information on sites judged to be of conservation value under the GCR. This was compiled for use in 1996 and is currently used by the three country agencies and the JNCC. The IAESD is a Windows-based application written specifically for the task of tracking the notification of sites. In 1998, the application was modified to allow better use of the data by adding stratigraphic and geographic reporting. Unfortunately the IAESD is a highly specific application and is not suitable for use by RIGS groups.

Recorder 2000

Recorder 2000 is a very powerful piece of biological recording software and a considerable advance over the existing Recorder 3.3.

It has been designed for people who conduct field surveys either on land, in freshwater or at sea. It has facilities which allow their observations to be entered efficiently and turned into an electronic format that is ready for widespread exchange and use.

Data exchange is the key to the design of Recorder 2000. It has been built so that individual recorders can quickly exchange data with others, or send the information to organisations collating data to provide access more widely. The same exchange format is designed to take updates so that individual users can pick up on changes in taxonomy, standard lists of sites, and other reference information that helps with recording.

The existing recording package Recorder 3.3 was restricted to people making species observations. Recorder 2000 has been built so that biotope and habitat surveys can also be made and combined in new ways with species-based recording. Recorder 2000 has also tackled some of the long-standing problems associated with creating records. This includes a more sophisticated approach to associating observations with 'sites', allowing changes to the records

to be added whilst preserving the original, and providing some facilities to deal with the inevitable duplication that occurs when records are collected from many sources.

Recorder 2000 is a collect/collate system. This means that it is designed for individuals to collect their observations and pass them on to collation points without use of sophisticated computer networks or other advanced technology. Recorder 2000 can cope with about a million observations, but in its current form it is not designed as a large corporate system which can provide access to hundreds of people or very large numbers of records.

However, Recorder 2000 is built on a number of standards. These include the NBN 'data model' which shows how biological data can be managed within relational databases, a transfer format, and NBN dictionaries for species, habitats and administrative areas. All of these standards are available for people building other biological recording software. This should help anyone providing a large corporate system to get up to speed quickly, or existing providers of biological recording software to enhance their own products.

Recorder 2000 uses digital maps to help with accurately locating observations. It is not a full-blown geographical information system. It is designed so that geographical information systems widely in use by small to medium organisations, such as MapInfo and ArcView, can get at the data within Recorder. These packages can then relate Recorder 2000 data to maps and carry out spatial analysis.

These days, much surveying work is performed by various remote sensing techniques, from sonar towed by a boat, to aerial photographs and satellite imagery. Recorder 2000 is not designed to store the raw image data collected from these systems.

Negotiations are currently taking place with OS for an arrangement which will allow 1:50,000 OS map tiles to be used within Recorder 2000 at a price that makes this an option for voluntary recorders. This will be a great help with data entry, especially for accurately locating sites and quickly plotting distributions across a map backdrop.

Geographical Information Systems

Analysis of spatial data is best done through a Geographical Information System (GIS). RIGS systems rely heavily on spatially referenced datasets to assess, for example, whether data is within the site boundary, or a feature's proximity to other features. A Geographical Information System enables the user to examine, compare and generate a range of spatially referenced datasets. Using a GIS can address a number of data handling problems such as changing site boundaries. Data is collected at an actual location, then the site is represented by a polygon overlaid on a map, which can be done at any stage and includes the data within that area. Area measurements can be done quickly and easily at any time.

However, the use of GIS for RIGS systems may be relatively limited, primarily because of:

- ◆ the cost of hardware and software
- ◆ the shortage of skills needed to manage the system
- ◆ the cost of OS licences needed (can be more than £2,000 pa)
- ◆ the availability of data to use with the system

The first three are surmountable, the fourth is most important. The efficiency of GIS relies heavily on the quality of data available. Particularly important is the need for accurate grid references for data. Frequently this can only be achieved using a Global Positioning System and is a major constraint when working with other people's datasets.

Global Positioning Systems (GPS)

GPS was developed by the United States Department of Defense which continues to administer and control GPS. Civilian and commercial users are able to use GPS although accuracy is variable due to random error introduced by the US Defense Department to degrade the position fix.

GPS is increasingly being used by fieldworkers and the cost of receivers is constantly falling. GPS is a very useful tool available at a modest cost.

RIGS groups with close links to universities, BGS and statutory agency offices may be able to arrange to use their GPS equipment.

Ordnance Survey (OS)

Map data is essential for undertaking RIGS work. You may need to simply purchase or use it for information purposes. However, in many cases you may need to use OS map data to reproduce areas of mapping or use the data held in the maps. This requires a copyright licence.

There are several different types of copyright licence and these are explained in various information leaflets available from OS.

Types of copyright licence

Copyright 1 – Copying for business use

Copyright 2 – Publishing

Copyright 3 – Digital map data

Copyright 4 – Commercial publishing

Copyright 5 – Reproducing maps in the media

Copying for business use

You may need a licence from OS before any of their maps, digital mapping or maps based on their material can be

- ◆ reproduced, updated or copied in any form
- ◆ stored in an electronic retrieval system
- ◆ transmitted in any form or read on computer
- ◆ translated into a language or another form (for example printing a hard copy from a computer system)

Copying for publishing purposes

Copying maps or map data to sell or use to create products, services or publications to sell or distribute as free items, is known as 'publishing'. There are separate conditions for using maps or map data for publishing.



Details of copyright arrangements, leaflets on the type of copyright and the cost of licenses can be obtained from OS:

Ordnance Survey
Copyright Licensing
Romsey Road
Southampton
SO16 4GU

(☎ 01703 792913

"🌐 www.ordsvy.gov.uk

British Geological Survey

BGS is a major supplier of information in the form of maps, memoirs and reports and field slips, but at a price. See appendix 6.6 for details of these prices. The actual information is free but not the interpretation.

6.10 Access to and distribution of data collected

6.10.1 Data ownership – the law

This is a complex and difficult issue. Always remember that the recorder holds the copyright on their records. The fact that someone else physically holds the data does not imply ownership. It therefore follows that such data may only be released or copied to a third party if a licence to do so has been obtained from the owner. It must be very clear whether the information has been gathered by an individual, who may wish for their permission to be sought before data can be used, or if the information gathered belongs to the RIGS group.

6.10.2 Access to information on RIGS

It is important to develop policies to clarify how access to this information is provided to other bodies or individuals, including other partners in the system. A good starting point is to address the following questions:

Who owns the data?

It is important that you have the right to supply the information you hold.

Is any of the data confidential or personal?

You may be under an obligation to limit access to data, as required by the Data Protection Act. See section 6.10.4.

Is any of the data affected by the Environmental Information Regulations?

This will apply to data collected by or on behalf of a 'public authority', including local authorities and the statutory conservation agencies (see section 6.10.6).

Do you have a charging policy?

A charging policy makes it easy for users and suppliers of information to understand why they can or can't have information and why they are being charged for it. See appendix 6.6.

6.10.3 Supplying information on RIGS

When supplying information, in any form, you should attach the following as condition(s) on supplying the information. Disclaimers are mandatory.

- ◆ a disclaimer accepting no responsibility for the accuracy of any data or any interpretation placed on it
- ◆ a disclaimer should say what information can be made available and that some data may be confidential
- ◆ a statement retaining the intellectual property rights over the information. While supply of data does not automatically assign any rights, such a statement will confirm the situation and avoid confusion.

Information agreement

'Anyone receiving confidential information is required to sign an agreement, which stipulates the conditions under which they receive the information. This includes a condition stating that the information received will not be passed on to any other organisation or person unless a specific arrangement has been made.'

(Source: Wildlife Insite - Lothian Wildlife Information Centre, A Guide for Users Scottish Wildlife Trust August 1994)

6.10.4 Ownership of records

This issue has, until recently, generally been ignored or dismissed as unimportant. As part of Phase I of the Co-ordinating Commission for Biological Recording's work, an investigation into the legal aspects of holding and providing access to biological records has been completed. This is the first time such an investigation has been carried out and the implications for those running Wildlife Sites systems are significant. These implications may be parallel to those providing access to RIGS information. In summary, the key issues are:

- ◆ The originator of a record owns copyright of a record and the intellectual property rights
- ◆ The originator does not necessarily have any ownership over the metadata (any data interpreted for the original data)
- ◆ The originator can assign these rights to another individual or organisation only if signed and in writing
- ◆ Moral rights are also acquired by the originator and can be waived, enabling another to alter the form of a record
- ◆ Permission is required to compile records unless the intellectual property rights have been assigned
- ◆ If data is originated by an employee in the course of duty, then all rights belong to the employer

These issues require urgent consideration, especially where data is collected by volunteers or collated from a variety of sources. To avoid the need for complicated, costly and time-consuming work each time data is used or supplied to a third party, formal agreements should be entered into with all organisations or individuals who supply data to the RIGS system. This should clearly specify to what data it refers, whether or not copyright is assigned or licensed and, if licensed, for what purposes it may be used. This process must also be carried out retrospectively for all data used in the system.

Care should be taken when letting contracts or taking on contract work to ensure that the contract includes suitable clauses to specify who retains rights over the data.

6.10.5 Data Protection Act (1984)

The Data Protection Act (1984) covers personal information which can be processed automatically (ie in a computerised form). A RIGS system is likely to hold information relating to landowners, managers, surveyors and other individuals who contribute records. It is essential that the organisation managing this data is registered under the Data Protection Act. If more than one organisation holds this information, they should each be registered.

Personal data includes statements of fact about an individual and 'opinions' about them. Within a RIGS system information held about an individual is likely to include their name, address, land owned/managed and possibly information relating to their expertise.

Under the Data Protection Act, everyone has a right to access any data that relates to them. In addition, an individual may request that errors in personal data are corrected or deleted.

In relation to RIGS this means that a recorder may request access to any data they have generated (indeed they will probably own this data) but not to other related data - such as data collected on a site by another recorder or data that has been interpreted from the original data they collected. A landowner may be given access to personal data such as that describing the land holding which he is associated with or any personal attributes which are described. Access, however, is not automatically permitted to all records that relate to this land.

Registering under the Data Protection Act

Registration under the Data Protection Act should cover all personal information which is held in a computerised form and those organisations or individuals to whom information may be supplied. Many organisations will already be registered, but the existing registrations should be checked to ensure that they cover the necessary elements. When you register you must determine which of the two categories best describes you - for RIGS data managers it will probably be the first, but may also be the second.

The categories are:

- ◆ Organisations or people who control the use and content of personal data.
- ◆ Organisations or people who process personal data for data users or allow the processing of such data.

Guidelines explaining the act and information on how to register are available from:

The Data Protection Commissioner
Wycliffe House
Water Lane
Wilmslow
Cheshire
SK9 5AF

(☎ 01625 545745 (enquiries and information)
(☎ 01625 545700 (main switchboard)

"🌐 www.dataprotection.gov.uk

6.10.6 The EU Data Protection Directive (95/46/EC)

The EU Data Protection Directive (95/46/EC) has effect in the UK from October 1998. The Directive is implemented in the new Data Protection Act which came into force in March 2000.

It is important to note that data controllers have a transitional period to bring their systems into compliance. Manual and computerised data that meet the requirements of the 1984 Data Protection Act will not have to be compliant until 2001. Other manual data held in filing systems before October 1998 need not comply with some aspects of the Act until 2007.

The main differences between the old and new Acts are in the following areas:

- ◆ registering as a data controller
- ◆ notification of access to see data held
- ◆ conditions for processing data
- ◆ security of data
- ◆ access to information on the subject of data and how it is being handled
- ◆ access to data – some new rights
- ◆ increased capacity to claim compensation for damages under the breach of the Act
- ◆ transfer of data overseas
- ◆ the need to include manual records

One of the areas that will most affect RIGS groups is the need to register and comply with the Data Protection Act on manually held records. This applies to any information that is recorded as part of a 'relevant filing system' and includes information that is structured either by reference to individuals or by reference to criteria relating to individuals.

Although there is no requirement to comply until 2007, it is recommended that RIGS groups ensure that any manually kept information that they hold complies with the Data Protection Principles of Good Practice (see appendix 6.1).

Freedom of access to information on the environment

The regulations on freedom of access to environmental information which implement the EC Directive came into force on 31 December 1992 (Environmental Information Regulations, EIR (SI 1992, No. 3240)).

The regulations require all 'public authorities' to make information they hold relating to the environment available to anyone who asks for it.

What does 'environmental information' mean in this context?

Environmental information is taken to mean:

- ◆ information, held in any form, relating to the state of the environment including information on the state of water, air, flora, fauna, soil, natural sites and other land
- ◆ information affecting the state of human health

- ◆ information on measures and activities which adversely affect, or are likely to affect, the state of the environment
- ◆ information on any measures designed to protect the state of the environment

Who is covered by the regulations?

All public authorities have responsibilities toward the environment. Public authorities that are covered by the regulations include:

- ◆ government departments
- ◆ all local authorities
- ◆ statutory environmental agencies

How is information to be made available?

The regulations place a duty on organisations to ‘define the practical arrangements under which information is effectively made available’ and state that organisations are ‘only required to supply information in a reasonable form and at reasonable times and places’. In addition, there is a requirement for the public to be made aware of what information bodies hold, although the publication of reports is discretionary. It is also stated that ‘a response to a request for information should be made within two months’.

Charging for the supply of information

Under the regulations, a charge may be made to defray the costs incurred in supplying information. This may include the costs of copying, postage and staff time in retrieving and preparing information. The charging policy of any body should be made freely available. Bear in mind that where public money has been used to gather the data the data belongs to the ‘public’ and should be free, however a charge may be made for the gathering, compilation, interpretation, copying or postage of data.

Is all environmental information covered by the regulations?

No, there are some cases when a request for information can be refused (giving reasons). A public authority may choose to withhold information which:

- ◆ relates to national security or international relations
- ◆ is involved in legal proceedings
- ◆ relates to the confidential deliberations of any body
- ◆ is considered incomplete or unfinished
- ◆ involves commercial confidentiality

Information which must be treated as confidential includes:

- ◆ personal information where the individual (or individuals) concerned have not given their written consent for this information to be disclosed

- ◆ information supplied by an individual or body who was not under any legal obligation to supply the information unless their consent has been received
- ◆ where the disclosure of information may be potentially damaging to the environment

There is a right of appeal for any applicant who is dissatisfied with a refusal by a body to make information available or where a request has been inadequately answered.

(Source: DoE Guidance to ‘relevant persons’ dated 21 December 1992)

Charging for information

There are clear distinctions between a number of different elements for which charges can be levied:

- ◆ survey work or initial collection of data
- ◆ handling and management of data
- ◆ retrieving and presenting data
- ◆ analysing and interpreting data
- ◆ provision of existing data (sale of raw data)

It will be appropriate to have different charging policies for each of these elements. These policies should also address the issues of ownership and confidentiality.

A charging policy should be explicit in ‘what’ is being charged for - this is usually for time spent retrieving data, producing reports and, where appropriate, analysing data. Also, any ‘material’ costs (such as photocopying, printing, postage) should be passed on. Where a charge is levied for the data itself, this should be apparent to the user.

The two factors which are most resource-intensive and difficult to fund are survey work and data management. Many RIGS systems fund these activities through core funding from partners, grant aid or service level agreements with local authorities. This will be another factor in establishing a charging policy.

Equally, it is usual practice to charge different users different rates, dependent upon the status of the enquirer. This would mean that a separate policy would usually be needed, for example, for public inquiries and requests for information from consultants.

Consideration should also be given to the Environmental Information Regulations.

Confidentiality

Data may be considered as confidential if:

- ◆ it is of a ‘sensitive’ nature, ie it relates to a rare or threatened feature or site
- ◆ the owner of the record wishes it to remain confidential
- ◆ the data is of a personal nature (for example names and addresses of landowners)

Whatever mechanism is used for handling data, it must be possible to ‘flag’ confidential data and restrict access to it. A system may be needed for ‘vetting’ users of data to identify what, if any, restrictions should be placed on them.

Various classifications of confidentiality may be required. Appendix 6.7 outlines five levels of confidentiality used by BGS for boreholes.

Appendix 6.1 – Useful reading

- Countryside Commission. 1991. *Protected landscapes in the United Kingdom*
- Cooper, J.A., with Phillips, P.W., Sedman, K.W. & Stanley, M.F. 1980. *National Scheme for Geological Site Documentation: Geological Record Centre Handbook*. Museum Documentation Association
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- Ordnance Survey. 1999. *Copyright 1: Business Use of Our Digital and Conventional Mapping*
- Ordnance Survey. 1998. *Printers and Copyshops Licensed to Reproduce Ordnance Survey Maps*
- Ordnance Survey, *Products and Service Price List*
- Stevens, C., Gordon, J.E., Green, C.P. & Macklin, M.G. *Conserving our Landscape: Evolving Landforms and Ice-age Heritage* (Conference proceedings)
- Wilson, C. *Earth Heritage Conservation* The Geological Society

Useful articles

- Barlow, C. Finding that elusive RIGS information. 1977. *Earth Heritage* No.8, p4
- Stanley, M. 1992. *NSGSD Annual Report* Geological Curators' Group
- Stanley, M. 1984. Record of the rocks. *Earth Science Conservation* No.22, pp17-22

Appendix 6.2 – Geology locality record

Appendix 6.3 – Case study: Nottinghamshire RIGS Group detailed site assessment form

Appendix 6.4 – Case study: using historical records

As part of a recent canal restoration scheme, British Waterways Board asked the National Geological Records Centre at BGS if they had any record of the source of the clay puddle used to seal the canal when it was originally constructed. The supply would normally be local and they wished to use the same material if possible. The clay had proved suitable and it would reduce their costs if they could find a suitable source.

Searches of the written data provided no details of the construction work last century. However, the area had been surveyed by the Geological Survey in the 1920s. The surveyor had mapped the area in great detail and meticulously recorded information on his field maps. His six-inch-to-the-mile scale maps showed a series of small circular hollows and ‘marshy’ areas that formed a regular pattern along one side of the canal. These were the remaining evidence for the borrow pits from which the puddle clay was extracted during the canal construction. This information allowed British Waterways Board to obtain supplies of the same clay and complete the restoration.

Rod Bowie
British Geological Survey

Appendix 6.5 – Locality field card and A4 summary record

Appendix 6.6 – BGS National Geological Records Centre

Appendix 6.7 - BGS and the confidentiality of boreholes

The issue of borehole confidentiality is complex and has suffered in the past from poor understanding and control. Data has been received and kept under confidential cover without knowledge of the reasons for this status or when and how the data can be released. Valuable data may therefore have been kept unnecessarily from researchers. Data was also placed on open file without the donor understanding that the information would be made available to third parties.

All confidential records deposited in the National Geological Records Centre (NGRC) must now be accompanied by documentation showing the owner/donor and the release date. Contact information needs to be comprehensive. All data received is acknowledged and donors informed that, unless instructed to the contrary, data will be placed on open file. No data can be deposited in the NGRC with an unlimited confidential status. If records must be kept confidential then short periods are negotiated. Donors must be fully aware of the conditions of deposit, release to third parties and confidentiality.

BGS currently applies five levels of confidentiality:

1. no conditions applied (non-confidential)
2. position of bore and name of owner may be given
3. existence of bore within an area and owners name may be given
4. BGS will consult owners before any information is given
5. unknown

Even this is inadequate to manage the complexities of current donations and use. There is a need to indicate different levels of confidentiality within the same borehole record. For example:

- ◆ The lithological description of the borehole is released but the water analysis is confidential.
- ◆ The logs and laboratory test results are released but the interpretative data or the whole site investigation report remains confidential.

A new table is being devised to deal adequately with the complex conditions of deposit.

Rod Bowie
BGS

Appendix 6.8 – Case study: working with a Local Record Centre

The Avon RIGS Group was set up by the Bristol Regional Environmental Records Centre (BRERC) in 1995, following the demise of the local Geological Advisory Group. BRERC coordinates various groups, predominantly species recording groups, but it was felt that, being an environmental records centre, a geology group should be included in its remit. The Records Centre also has good links with a variety of organisations and individuals, including the Avon Wildlife Trust, local authorities, local museums and geological organisations, and so these links were built upon.

BRERC provides the secretariat for the Avon RIGS Group and a member of BRERC staff continues to coordinate the group. This involves organising and minuting meetings, editing the group's newsletter (produced twice a year), coordinating field work and the assessment of potential RIGS, publicising RIGS and the Avon RIGS Group, answering initial enquiries concerning geological/geomorphological sites, and being the initial contact for all matters concerning geological/geomorphological sites. This means that RIGS group members are free to get on with field work, site clearance and interpretation work.

BRERC collects, manages and provides information relating to wildlife, geology and geomorphology. Information about more than one thousand geological/geomorphological sites is currently held at the Records Centre, the majority of which was collected in the 1980s by a scheme initiated by Bristol City Museum. BRERC manages the data and provides the information to individuals/organisations requiring such information. These include local authority ecologists and planners, environmental consultants, local wildlife organisations, as well as members of the public. BRERC operates a charging policy - a service charge is made to people/organisations who make money out of the data. The data cannot be sold, as the copyright of the information remains with the collector. It is vital that any geologist lodging information at the Local Record Centre understands what the information he/she collects will be used for, along with the charging policy.

Members of the RIGS group are free to use the geological site information, remembering that this does not entitle permission to visit the sites.

BRERC acts a bit like a clearing house, leaving the RIGS group free to carry out site recording, clearance work and interpretation, and provide advice. This set-up works well, as the environmental records centre is impartial and only provides information, not interpretation or advice.

Sarah Myles
Avon RIGS Group

Appendix 6.9 – Case study: Black Country Geological Society records

Appendix 6.10 - Case study: Gwynedd and Môn RIGS Group data record

Gwynedd & Môn RIGS Group Site Record

General	Gwynedd & Môn
Site Name: Trwyn y Tâl	File Number:
RIGS Number:	Surveyed by: Stewart Campbell
Grid Reference: SH 365468	Date of visit: 12.4.99
Type of Site : Quaternary	Date Notified:
Unitary Authority: Gwynedd	
Site Nature: IS: static geomorphology EC: coastal exposures	
1:50,000: Sheet 123, Lleyn Peninsula	
1:10,000: SH 34NE	

RIGS Statement of Interest:

Trwyn y Tâl provides one of the most impressive examples of a glacial meltwater channel in Llyn. The channel runs due west from the coach park on the western outskirts of Trefor, and within c. 0.5km terminates at the coast where the valley sides grade into a low coastal terrace cliffed at its seaward side. The exposures, although locally overgrown, show that the terrace comprises a complex and variable sequence of Irish Sea till (boulder clay), fluvio-glacial (meltwater) and periglacial deposits.

The channel is cut sharply into the surrounding land. It has steep, bracken-covered sides, a broadly u-shaped cross-section and starts and ends abruptly. Importantly, it contains no stream. These characteristics suggest that it was cut by glacial meltwaters running under great pressure beneath an ice sheet (subglacial meltwater channel). Although such channels are a characteristic feature of the Lleyn landscape, Trwyn y Tâl provides a particularly clear and accessible example that can be used to demonstrate the essential characteristics of such landforms. The associated sedimentary sequence exposed in the coastal cliffs adds stratigraphic interest to the site.

Geological setting/context:

Llyn is one of the core areas in Wales for studying Quaternary (Ice Age) deposits and landforms. The peninsula was overrun by ice sheets, with sources in North Wales and the Irish Sea Basin, on a number of occasions. The precise timing of these glacial events and the interpretation of the sedimentary and landform evidence are still a matter of considerable controversy. The evidence from Trwyn y Tâl complements that from 7 Quaternary stratigraphic sites on Llyn selected as GCR sites/SSSI.

References:

CAMPBELL, S. & BOWEN, D.Q. (1989). *Quaternary of Wales*. Geological Conservation Review Series No. 2. Nature Conservancy Council, Peterborough, 237pp.

WHITTON, J. B. & BALL, D. F. (1970). North-west Wales. In: Lewis, C.A. (ed.) *The Glaciations of Wales and adjoining regions*. Longman, London, 21-58

PRACTICAL CONSIDERATIONS:**Accessibility:**

Access to the site is by a public footpath from the old smithy to the coast. Examination of the stratigraphic sequence at the coast can be made from the cobbly beach. The site is privately owned, and permission to access land away from the public footpath must be obtained from the site owners.

Safety:

The valley has no obvious safety problems, although the coastal exposures are steep and prone to rock falls - the normal precautions for working at coastal sites should suffice. The land is grazed and caution should be taken with livestock.

Conservation status:

The site lies adjacent to the Trwyn y Gorlech to Yr Eifl Quarries GCR site, and within the Llyn AONB and ESA.

OWNERSHIP/PLANNING CONTROL:**Owner/tenant:****Planning Authority:****Planning status/constraints:****CONDITION, USE & MANAGEMENT:****Present use:**

The valley is grazed by cattle and sheep; the steeper slopes are bracken-covered.

Site condition:

The site is in excellent condition with all the landforms natural and unmodified. The coastal exposures are in places overgrown but are unobscured by man-made structures.

Potential threats:

The main threat to the glacial meltwater channel would come from large-scale building works and afforestation which would obscure the valley form and slopes. The main threat to the coastal exposures would come from the erection of coast protection and cliff stabilisation works. These potential threats seem unlikely given the remote rural location of the site.

Site Management:

The current agricultural regime is ideal and no changes are envisaged.

SITE DEVELOPMENT:**Potential use (general):****Potential use (educational):**

An excellent research site and good for university and A level teaching.

Other comments:

Appendix 6.11 – Data Protection Act summary

Appendix 6.12 – List of local record centres
