3 Data collection and recording Introduction

An LRC should act as the focal point for all biological recording in its area, whether or not the records generated are managed by the LRC. The LRC should take a lead in encouraging high-quality recording and promoting NBN standards among volunteer recorders, recording schemes, organisations and contractors. For the LRC to do this effectively, it must employ and promote standards for data on, for example, habitat classifications and sites, to allow data to be compared, collated and used.

An LRC must encourage recorders to use standard techniques in their recording and to use standard terminology when making records. Making these standards available in, for example, the form of recording maps helps recorders as well as improving the quality of data received. The LRC needs to ensure that good procedures are in place to verify species records (ie to check that records are attributed to the correct taxa). All this helps to improve the overall quality of the data generated and, in consequence, to make them more useful to a wider range of organisations.

LRCs have a role in promoting good recording practices by all recorders, and in particular to promote data collection that minimises disturbance to wildlife and that takes due consideration of landowners' concerns.

Many of the issues covered in this chapter still need further development by the NBN and its partner organisations. The guidance should to be viewed as current best practice, and it should be recognised that the issues covered will evolve as the NBN develops and as standards are further developed and agreed.

4 Definition of sites

Policy & Principles

- Sites are defined areas of land or sea that are used by data collectors to structure data collection, by data managers to aid data management and analysis, and by data users in their enquiries.
- LRCs should understand the uses made of sites by all sectors.
- Sites that all LRCs should recognise include identified sites such as SSSIs and Wildlife Sites.

4.1 Background

One of the elements of a biological record is its location (the essential elements of a biological record are described in section 10 *Minimum record standards)*. Location data for records can be provided by attaching records to 'sites' or by using grid references. A biological record without a grid reference or an accurate description of its location has little value.

A *site* is a location to which taxonomic, biotope and other data may be assigned. It may be specified as a point or an area of land or sea with defined boundaries.

Data are assigned to sites by data suppliers and data managers, and data users require data on sites. LRCs must understand the use of sites by these different sectors.

Because sites may be defined for a number of purposes, they may overlap, nest within each other, bear attributes in common with neighbouring sites, lack clearly defined boundaries, or change name, status and boundaries. Policies and procedures on dealing with sites are required by LRCs to ensure that there is clarity and consistency in the management of sites data, and to enable these data to be used.

Data that define sites may be in the form of boundary polygons, lines or points. Other data that apply specifically to a site may include information such as the date and reason for a site's designation and references to literature on that site. Sites may be sub-divided into sub-sites and sub-sites may themselves be sub-divided into further tiers of sub-sites. This may often be useful when defining sub-sites that users might require data on and which recorders can use to steer their data collection activities. Data attached to sites can include any of the many types of data managed by LRCs, from taxonomic occurrences to land ownership details. All these classes of data may be referred to as sites data.

4.2 Policy

LRCs should set policy on sites for three key areas of their operations:

- data collection
- data management
- data analysis and the generation of information products

4.2.1 Data collection

Data are always more useful the more accurate their geographical referencing, and all LRCs should set minimum standards on the geographical references of incoming data. They should promote these minimums and higher standards whenever possible.

LRCs should promote the collection of data that contain geographical components that meet these standards, and should prefer data providers to use only those sites that are recognised by the LRC (see section 4.3 *Types of site)*. However, data may continue to be supplied attached to sites that are not recognised, and policy should also be set on handling these data.

4.2.2 Data management

Geographical information systems (GIS) are designed for the manipulation of data with a geographical component, and are essential for the effective and efficient management of sites data by LRCs. Prior to the development of GIS, sites data were managed either manually or in computer systems that were not designed specifically for this purpose.

LRCs should manage site and sub-site boundaries using GIS, and should manage all sites data in accordance with the NBN data model. The Recorder 2000 software incorporates the NBN data model and standards. Although it is not a GIS package, it does have limited mapping capability that allows users to digitise sites data, to import data from GIS and manage site boundaries, and to display geographical information in some ways that are similar to GIS. It has the capacity to link to GIS software for more sophisticated analysis of geographical data.

Standards should be set by the LRC for the management of sites data. These standards cover two types of

data management activity involving sites:

- recognising (and sometimes creating) sites that the LRC then promotes in its area, by disseminating information on them to data collectors to encourage them to record using these sites
- documenting, and making available, LRC policy on creating and changing sites

As a rule, sites (or at least their sub-sites) should be small enough to allow species and habitat occurrences to be pinpointed with enough precision for users; furthermore, they should not overlap (see section 4.3.2 *LRC-created sites* below).

4.2.3 Data analysis and generating products

The primary function of an LRC is to provide information products and services in accordance with its users' requirements, and LRCs should manage data in order to maximise their value in providing this function. The LRC should set policy on how it will create and recognise sites in accordance with its users' requirements.

4.3 Types of site

Sites are used by data collectors, data managers and data users in accordance with their own, specific needs; but, in order to maximise the usefulness of data and enable them to be collated, analysed and shared, LRCs should set and promote standards in managing sites data.

A principal element of these standards must be the selection and promotion of a set of sites that the LRC will use in its management of data and which it will encourage data suppliers to use, but whose principal purpose is to meet the needs of LRC users. These sites are considered below in section 4.3.1 *Recognised sites*.

LRCs may wish also to recognise and promote sites that are principally of use to data collectors as they represent clearly defined locations on which data are collected. These are also considered below in section 4.3.1 *Recognised sites*.

In addition to recognised sites, there are other types of sites that individual LRCs may create for data management purposes. These are considered below in section 4.3.2 *LRC-created sites*.

When requesting data on specific areas, LRC users may specify areas other than recognised sites. These are considered below in section 4.3.5 *User-defined areas.*

4.3.1 Recognised sites

There are a limited number of sites that are widely recognised by all LRCs' core users: these are 'recognised' or 'identified' sites (sometimes also referred to as 'designated' or 'evaluated' sites; they may be statutory or non-statutory).

All LRCs should recognise, promote and hold boundary and other data on these sites:

- Sites of Special Scientific Interest (SSSIs)
- Natura 2000 sites
- Proposed Natura 2000 sites
- Ramsar Sites
- National Nature Reserves (NNRs)
- Wildlife Sites
- Nature reserves managed by NGOs
- Local Nature Reserves (LNRs) designated by local authorities

Habitat units as sites. LRCs may wish to define some 'habitat parcels' of land as sites or, more often, sub-sites, to enable recorders to recognise the boundaries of their activities easily. If they do so, they should promote widespread recognition of these sites by all data suppliers.

Examples of habitat units that may be defined as sites are rivers and flood plains, woodland copses and urban land parcels such as parks and gardens.

Species sites. LRCs should prefer to create sites or sub-sites on habitat grounds. However, some areas of land are biologically interesting for the species that use them rather than the habitats they support, and may deserve to be recognised as sites. Such sites may be important as wintering, breeding or transit sites. Examples of possible species sites are city parks that support wintering wildfowl, road verges supporting rare fungi and rock ledges where sticky catchfly grows. In general, sites and sub-sites should have defined boundaries, although some species sites, such as bat roosts, may be defined as point locations.

4.3.2 LRC-created sites

LRCs should only define, recognise and promote sites and sub-sites that are useful to both suppliers and users of data, and should not promote sites that are created by the LRC for its own data management purposes.

Many LRCs use created sites that are largely artefacts of using data management systems that were not designed for handling geographical data, and these sites become largely redundant when the LRC switches to using GIS. LRCs should avoid defining sites purely for data management purposes; they should use GIS instead. Sites should be designed to help data analysis and to steer data collection activities. The key point is that sites or their sub-sites should be small in size (how small will depend on the landscape in which they sit) and discrete (ie not overlapping), so that records can be unambiguously assigned to a single site.

LRCs should consider the advantages and disadvantages of creating sites for data management purposes but should not publicly recognise or promote such sites.

Sites created to overcome the problem of overlapping sites. Sites may overlap with others or may be enclosed within others (eg an SSSI that overlaps a local authority boundary or an SSSI that contains a Special Area of Conservation). Overlapping sites and sub-sites create data handling problems in non-GIS systems, as data must be associated with all sites and parts of sites to which they relate. In order to do this, LRCs have devised systems using 'created' sites to handle the data. As stated above, LRCs should avoid creating sites to resolve data management problems, and should use GIS to resolve these issues instead. An example of how overlapping sites may be handled through creating new sub-sites is provided in the case study.

In LRCs with GIS, newly created sites should not overlap with existing ones. Where this is necessary—for example, when an SSSI overlaps a local authority boundary—the SSSI site should be divided into sub-sites along the local authority boundary line, and records should be assigned to the sub-sites. This allows records to be linked to the relevant local authority.

Vague sites. Many biological data, particularly historical records, are so vaguely assigned to a location as to make the concept of vague sites an attractive one. LRCs may wish to define these locations as sites and to attach data to them, although this practice should be restricted to historical data and vague sites should not be promoted for data collecting purposes. Vague sites are those that have uncertain boundaries, and include places like 'near Borchester', 'North-west Borsetshire' and 'Pondon Village'. These sites may have value when handling historical data but LRCs should discourage people from using this type of site when recording.

Vague sites can have their boundaries defined in a number of ways, including:

- setting an outer limit which would include any reasonable person's idea of where the place might possibly be. For example, the vague site 'London area' might be limited to all of Greater London and the adjoining counties.
- setting both an outer limit as suggested above and an inner limit, which would be any reasonable person's idea of the minimum possible extent of the place. In the example above, this would mean that all records in the 'London area' would be assumed to refer to the area of Greater London and its adjoining counties, but might also reasonably be assumed to refer just to Greater London.

Whichever approach is taken, vague sites bring with them the problem of overlapping sites (see above).

4.3.3 Unrecognised sites

Biological recording has traditionally been referenced to locations or sites, and most recorders continue to reference their data to locations rather than to grid references. In some instances, recorders define their own sites or use non-standard names for recognised sites. LRCs should encourage recorders to record to the boundaries of recognised sites. However, LRCs will still receive records linked to unrecognised sites. LRCs with GIS need not worry about this too much, but those without GIS may need to reassign records from unrecognised sites to recognised sites, resulting in a reduction in the records' geographical precision.

4.3.4 Location names

The LRC should keep a record of the location names used by recorders. These names are often vague (they might be, for example, the names of nearby villages or other landmarks), and the locations they refer to often have no known geographical boundaries or even specific grid references. Recorder 2000 can store such location information; however, location names are not a substitute for sites, and LRCs should discourage recorders from using them. Nevertheless, location information can be useful in a number of circumstances; for example:

- when records are supplied only with a grid reference
- they can add geographical precision, such as 'under the third rock on the left'
- they can add information on micro-habitat, such as 'on north facing surfaces only'

- they can add useful habitat feature information, such as 'in boggy patches only'

4.3.5 User-defined areas

Users often require data relating to a specified area (a 'user-defined' area). A user-defined area, defined by one user, may be recognised by other users as a useful area of search. To facilitate the delivery of data products, LRCs may hold boundary data on these areas. Care should be taken to avoid creating a confusing plethora of overlapping sites, and user-defined areas should only be recognised as sites if they meet other criteria for sites. Boundary data that LRCs should set policy on holding, for the purpose of analysing data on user-defined areas are listed below:

- local authority administrative boundaries
- land ownership boundaries
- land management boundaries
- central, regional and local government development zones
- local authority land use zones
- river catchment areas
- flood risk and other emergency planning areas
- coastal zone management plan areas
- agri-environment zones
- Forestry Strategy areas
- Natural Areas (England) and Natural Heritage Zones (Scotland)
- EU Structural Fund zones

4.4 Procedures

All LRCs should document how their sites management systems work. This documentation should include current and past GIS and non-GIS systems. It should describe how the LRC will consistently handle all records attached to sites.

4.4.1 Data collection

Promoting recognised sites. Sspecies records may be attached to sites, habitats or grid references and habitat data to sites or grid references. For the purposes of querying and analysing data to produce LRC products, records should be submitted with precise grid references or associated with recognised sites, preferably both.

In order to ensure this, LRCs require procedures to influence recording activities. Ideally, they would ensure that all recorders use maps showing recognised sites at a scale of 1:25 000 or larger. However, such maps can be difficult to distribute and expensive to produce. Recorder 2000 allows the boundaries of sites to be distributed quite easily (eg by email), leaving recorders to print off maps when they need to. LRCs should consider using this as a way to disseminate recognised site boundaries.

LRCs should coordinate their use of sites with national schemes and societies, and separate procedures for ensuring this coordination and the promotion of recording to recognised site boundaries should be put in place.

Dealing with unrecognised sites. Data attached to unrecognised site names cause considerable data management problems for LRCs, so it is important that LRCs actively discourage recorders from attaching records to unrecognised sites or vague locations. The use of location names chosen by individual recorders often results in the loss of potentially useful information, even when the meaning of the name seems obvious to the recorder. LRCs should avoid trying to add geographical precision to a record through accepting a location name; they should use only grid references and recognised sites to locate a record, and should restrict location names to supplementary information on the record.

Procedures are nevertheless required to ensure that records that are referenced to unrecognised sites are properly dealt with. There may be occasions when unrecognised site names are simply the result of spelling mistakes, which can easily be checked and corrected.

Small, currently unrecognised sites that do not overlap with other sites may qualify as sites or sub-sites for data collection purposes (see section 4.3.1), and the LRC should decide whether to obtain and digitise the boundary of the site and subsequently to promote it. An alternative to accepting unrecognised sites is to attempt to disaggregate the data and assign them to recognised sites, or to determine the smallest site and/or grid reference to which the data can be associated with reasonable certainty. This may require local knowledge and the use of review panels. Reassigning data may not be possible and has the disadvantage of breaking up a data-set.

4.4.2 Data management

All LRCs should put in place and document procedures on:

- keeping under review the classification and listing of recognised sites used by the LRC, including the treatment of linear features
- correlating electronic data with paper records containing sites information
- creating sub-sites
- managing changes to a site's name
- managing changes to a site's boundary (referred to as 'variants' in Case study 1 and 'versions' in Recorder 2000)
- managing overlapping sites
- managing imprecise records (eg ambiguous site names)
- managing imprecise site boundaries (eg some Wildlife Sites and areas of woodland)
- managing historical records

4.4.3 Data analysis and generating products

All LRCs should put in place and document procedures on:

- which geographical data they will manage in order to respond to requests for data on user-defined areas
- determining the accuracy and precision of geographical information supplied to users

4.5 Process of developing the policy and procedures

4.5.1 Data collection

Policies and procedures on how sites will be promoted during data collection require the support and understanding of both individual recorders and representatives of recording schemes and societies, who should therefore be involved in developing those policies and procedures.

4.5.2 Data management

Policies and procedures on the management of sites data are technical issues with implications for both data suppliers and data users, who should be consulted as appropriate. It is particularly important that both data suppliers and users are fully consulted when selecting those sites the LRC will recognise and promote.

4.5.3 Data analysis and generating products

Policies and procedures on the delivery of products based on sites should focus on the sites that the LRC agrees to recognise; users should be involved in providing feedback on their needs so that any changes in demand can be anticipated and properly managed.

Case study

Definitions of sites

Lothian Wildlife Information Centre

Background

Lothian Wildlife Information Centre (LWIC) maintains a species database for the Lothian area of central Scotland (comprising four local authority areas). All Wildlife Site information is managed by LWIC, which also supports the Edinburgh LBAP through managing the information requirements for monitoring actions and outcomes. The LRC provides data to consultants, Scottish Natural Heritage, the local authorities and others on an ad hoc basis, although discussions are under way on establishing Service Level Agreements (SLAs). One full-time manager, who is employed by the Scottish Wildlife Trust, runs the Centre.

Discussion

Before setting out its individual policies and procedures on sites, LWIC introduces some of the key issues in a section providing background to the policy. This resumé highlights the complex issues arising from the different reasons why sites are defined and from the different ways they are used by recorders, LRCs and data users (including agencies responsible for designating sites). Two broad functions of sites are defined: they are used in data collection and in data analysis. Some particular problems encountered in handling sites data are covered, particularly how changes to site boundaries and designations can be handled.

Policies

Following the background section, LWICs policies are set out in short statements. The principles on which sites will be recognised and created are given, and the need to encourage the use of recognised sites by recorders is mentioned.

Procedures

LWICs policies are expanded and elaborated upon in a set of detailed procedures.

As an LRC that has yet to fully adopt GIS for its management of geographical data, LWIC has tended to define many sites according to the needs of local recorders. It is important that when LRCs define sites for recording purposes, the sites are useful to data users and that they do not overlap. LWIC sets out in detail, under ‘defining sites, how it decides on where and when to define a site, and includes much detail that is useful for addressing a range of problems encountered in handling sites data. Dividing sites into sub-sites is covered in a short section. Creating sub-sites is a particularly useful way of managing locational data and is facilitated by Recorder 2000.

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Policy on Definitions of Sites

1 Policy Statement

LWIC will store definition and boundary data for all sites in its area. Data will be stored in a form that will allow maximum data retrieval possibilities.

2 Background to policy

2.1 Site inclusion

There are many types of area with defined boundaries (e.g. fields, ownership, political, administration, functional, designation) and boundary data are obtained and stored for a wide range of pre-defined 'designations' (e.g. Local Authority areas, Watsonian Vice-counties, Country Parks, SSSIs, Local Plan areas). All these have a role in LWIC's work in two categories i.e. 1) collection and collation of recording data and 2) in the analysis of the data sets.

For recording purposes, a 'site' is considered as an area that has biological significance. Sites that have been designated for their nature conservation importance (e.g. SSSI, Nature Reserve, Wildlife Site, LNR, SAC) clearly fit into this category. Other areas, such as Country Parks and estates, which were not designated primarily for their wildlife value may also qualify because they represent a significant area of habitat under one management regime.

Any area for which LWIC particularly requires data will be considered as a site e.g. urban greenspaces, semi-natural habitats. Considering these areas as sites helps to focus recording effort and also facilitates the assessment of their potential for designation. Examples of suitable semi-natural habitats are rivers, still water bodies, woodlands and disused railways, but anywhere where there is a 'clustering' of semi-natural habitats could be included. Similarly, areas with significant marine habitats will be considered as sites.

In addition it is useful (for handling data) to consider defining a site where a significant data set is associated with a specific area of land (or sea). This data could relate to having many records, consistent recording, special surveys, extensive recording period (e.g. systematic species recording, ancient woodland inventory, garden surveys, CBC areas). In this case, a site is defined if the data merits it.

2.2 Definitions of sites

A site consists of a specific area of land that has been defined for a particular purpose (e.g. wildlife conservation designation, LRC data handling) and has a defined boundary. LWIC ensures that every site has a clear definition and in particular that site boundaries are accurately defined to allow unambiguous links to data.

There is also the additional complication that the boundaries and designations of sites frequently change over time - each change results in a new site variant. All changes are stored in order to be able to assign data to the relevant site variant.

2.3 Defining boundaries

Pre-defined boundaries of designated sites are adhered to by LWIC. The boundaries of some non-statutory designated sites may, however, be ill-defined, for a number of reasons e.g. the site has only been given a crude boundary or it is linear and its 'width' has not been decided.

Sometimes it is not possible to decide whether data was collected within particular site boundaries (especially historical records). In order to be able to handle all records it is consequently necessary to create a 'vague' version of a site i.e. the site without a defined boundary.

When LWIC has decided, for recording purposes, to make an area into a site it ensures that an accurate boundary is defined.

2.4 Naming sites

Because of the occurrence of site variants it is often not adequate, for data recording purposes, to use a simple name for a site (e.g. Roslin Glen). Each site variant needs to be given its own name e.g. Roslin Glen SSSI (86) – where '86 indicates the year that the particular boundary came into operation.

'Vague' versions of sites (see 2.3) should have their own nomenclature (e.g. 'Roslin Glen area').

A source of potential confusion is the fact that sites are often known by different names. It is necessary to decide on a 'main' site name and keep a record of all alternative names.

Data providers will sometimes bypass LWIC and feed directly into National Recording Schemes. The result can be a confusion of names for the same site. There needs to be a close working relationship between LWIC and recording schemes to ensure consistency of recording.

2.5 Recording site data

Records need to be linked to a locality and this, on many occasions, will be a site. Although it is not obligatory for the recorded data to be linked to the specific site there are advantages in doing so (e.g. allows assessment of a site's wildlife significance). LWIC tries to ensure that data providers are aware

of all sites and have access to maps showing their boundaries.

2.6 Handling site data

LRCs must have a means of storing area boundary data. The ideal tool is GIS since it was specifically created to handle geographically located data and all LRCs should aim to use it. In general, the boundary data stored by the LRC is required to be as detailed and accurate as possible. In addition, LRCs will need to use a record-storing database e.g. Recorder 2000.

The LRC should store data in ways that allow it to be retrieved quickly, easily and in all required ways. To ensure this, there are a number of aspects that need particular attention:

- *Associating sites* To facilitate data retrieval there is often a need to associate sites i.e. create linkages that allow data from sites to be pooled. For example, all site variants (including the 'vague' site) may need to be associated, or all woodlands within a river catchment could usefully be associated together.
- *Subdividing sites* It is often useful to attach data to particular areas of a site (subsite) e.g. compartments, permanent quadrats, river tributaries.
- *Dealing with overlapping sites* Where two sites overlap there needs to be a means of allowing the data associated with the overlapping area to be linked to both sites.
- *Relations between sites and other defined areas* If there is a need to extract data for any defined area (e.g. Local Authority area or Watsonian vice-county) then there needs to be a means of assigning data to the appropriate area if a site is situated over an area boundary. This is particularly applicable to linear sites.

3 Policies

3.1 ***Site inclusion*** LWIC will consider as sites all areas of land that have known or potential biological significance i.e. statutory and non-statutory designated sites and sites 'created' by LWIC to facilitate data collecting or handling.

3.2 ***Defining sites*** LWIC will ensure that all sites and site variants (see 2.2) have accurate definitions.

3.3 ***Recording site data*** LWIC will ensure data providers are aware of all sites and have access to maps showing their boundaries.

3.4 ***Storage of site data*** LWIC will store all data relating to sites in ways that will ensure that the requirements of all users can be met.

3.5 ***Inter- and intra-site relationships*** To facilitate data handling, LWIC will ensure that inter- and intra-site relationships are in place (e.g. associating sites).

Definitions of Sites Procedures

3.1 Site inclusion

3.1.1 Site inclusion The following are considered as sites for LWIC work:

- Statutory sites designated for their nature conservation value e.g. SSSI, NNR, SPA, SAC.
- Non-statutory sites designated for their nature conservation value e.g. Wildlife Site, wildlife trust reserve, SINC, voluntary marine reserve.
- Sites not designated primarily for their nature conservation value e.g. Country Park.
- LRC non-designated sites e.g. disused railway walkway, ancient woodland, pond, bay.

LWIC must ensure that it holds information about all designated sites in its area. Any non-designated area having, or potentially having, wildlife interest will be considered as a site. The decision on which sites to include will depend on user requirements and existing data holdings.

3.2 Defining sites

3.2.1 *Designated sites* Pre-defined boundaries of designated sites are adhered to by LWIC. In the case of some non-statutory sites boundaries may be ill-defined e.g. the site has only been given a crude boundary or it is linear and its 'width' has not been decided. In these cases LWIC will find out whether it is feasible to define more accurate boundaries with the designating agencies.

3.2.2 *Non-designated sites* Non-designated sites will be 'created' by LWIC to facilitate data gathering and handling, and fall into two categories:

1) Areas for which LWIC requires data – in particular, areas of semi-natural habitats. Any area that potentially could be suitable as a Wildlife Site (or SINC) may be considered as a site. Candidate areas include ponds and other still water bodies, river tributaries, woodlands (including those in the Ancient Woodland Inventory), disused and working railways, important sea-bottom

habitats/areas. In addition, areas that are particularly likely to be subject to development should also be considered as sites e.g. urban greenspaces.

2) Areas for which LWIC holds significant datasets. Any areas where data has been recorded within a specified boundary may be considered as sites in order to facilitate data handling. The decision on how much data is required to constitute a 'significant dataset' is a subjective one. The following should be considered:

- Anywhere that systematic species recording over a number of years has been carried out (e.g. CBC, specialist visits to their local areas, monitored roadside verges).
- Local patches of land (e.g. gardens) recorded as part of public surveys.
- Areas where recording tends to focus (e.g. seabird recording in bays).

For both categories of LRC-defined sites there is a need to define and map site boundaries. Areas of semi-natural habitats that are surrounded by built-up land or farmland should not present any difficulties. If the stretch of sea adjacent to coastal sites is to be included then either the low-water mark or a specified distance from the land will need to be decided e.g. the maximum distance that a bird or cetacean can still be identified.

Deciding on site boundaries in upland areas present particular problems and they generally need to be based around areas where specific habitat types occur.

3.2.3 *'Vague' sites* It is not always possible to decide whether a record has been made within particular site boundaries. This particularly applies to historical records but also occurs if data providers are not using the LWIC's site boundary maps. In order to unambiguously link data to sites it is consequently necessary to create 'vague' versions of sites i.e. ones which do not have mapped boundaries.

3.2.4 *Boundary and designation changes* The boundaries and designations of sites frequently change over time and each resulting site variant are individually defined.

3.2.5 *Naming of sites* Every site and site variant needs to be given a unique name (as well as a unique code). There are four aspects:

Naming of designated sites. The name given to the site should include its designation e.g. Roslin Glen SSSI.

Naming of LRC-defined sites. In cases where the site name is not known, effort should be made to find out using OS maps and/or local knowledge. Where a name cannot be traced, a 'made-up' name will be used and should be based on the name of the nearest locality on the OS map. A record must be kept that the name is not genuine and it should be changed if the real name is subsequently traced.

Naming of site variants (including 'vague' sites). Changes in boundaries and designations of sites over time result in a series of site variants each of which should be given its own name. As well as including the designation the name will include the year that a particular boundary came into operation e.g. Roslin Glen SSSI (86) i.e. in 1986. Another type of site variant is the 'vague' site (i.e. the site without a defined boundary). They will be named in such a way as to indicate their 'vague' status e.g. 'Roslin Glen area'.

Multiple names for sites. Many sites are known by several names and this can lead to confusion (e.g. Holyrood Park is also known as King's Park, Queen's Park, Arthur's Seat etc.). In particular, data fed into National Recording Schemes can include site names not used by LWIC. The LRC will decide on the 'main' name for a site and ensure that this name is widely used (i.e. both locally and nationally). A record must be kept of all alternative site names.

3.3 Recording site data

3.3.1 *Recording site data*LWIC will ensure that data providers are aware of all sites and have access to maps showing their boundaries. Two types of map are made available:

Current boundaries of all sites at a scale to fit onto A4 or A3 sheets.

10km square maps showing all sites on A4 or A3 sheets. The names and designations of the sites are indicated.

All data providers are encouraged to record using these maps.

3.4 Storage of site data

3.4.1 *Types of data* It is convenient to divide site data into two aspects, 1) Storage of site boundaries and 2) storage of other data relating to sites.

3.4.2 *Storage of site boundaries* There are two systems – 1) paper and 2) GIS.

1) Paper storage For convenience, all site boundary maps and 10km squares showing sites are stored as A4 or A3 sheets. Sites are stored in alphabetical order with all site variants

kept together and 10km squares are stored in grid reference order. Sites on 10km square maps include an indication of each site's designation. It is convenient to store the maps in transparent plastic A4 pockets in ring binders for ease of photocopying.

Although the ideal system for storing site boundaries is GIS, a paper-storage back-up/archive system is worth putting in place.

2) GIS This is the ideal tool for storing site boundaries and every LRC should aim to use it. All site boundaries need to be digitised and stored as polygons and should be digitised at the same scale as the site survey data. Linear sites should ideally have accurately mapped boundaries but, if the site has not been surveyed, an alternative method is to specify a certain distance (e.g. 30m) from the central line (though this should be avoided if possible).

3.4.3 *Storage of other data relating to sites* Database:LWIC stores a range of data relating to each site e.g. mid-point grid reference, area, habitats, designation, date range of designation, ownership, other people associated with the site, management plans, associated sites, subsites. Recorder 2000 has fields in its site files for all of these aspects. If another database is being used it will be necessary to ensure that all of the required aspects can be entered.

Although the ideal system for storing site boundaries is GIS, a paper-storage back-up/archive system is worth putting in place.

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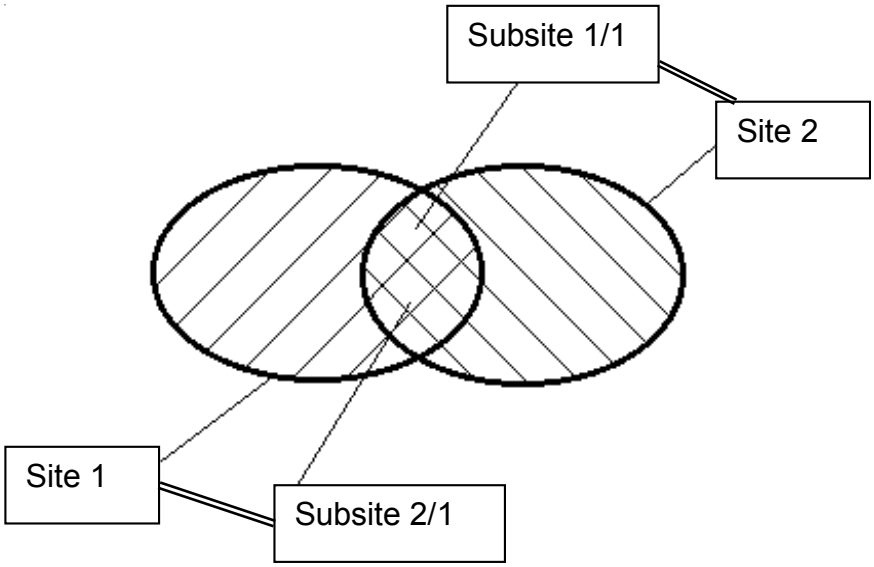
3.5 Inter- and intra-site relationships

3.5.1 *Associating sites* To facilitate data retrieval there is often a need to associate sites i.e. create linkages that allow data from sites to be pooled. It is useful to associate all site variants, including the 'vague' site. In general, sites will be associated whenever there is a need to analyse pooled data (e.g. all woodlands in a river catchment or all sites above a certain altitude etc.

3.5.2 *Subdividing sites* Any data that has been gathered from a specific area of a site will be linked to that area (subsite). Examples of subsites are: compartments, specific habitat areas, permanent quadrats, river tributaries etc.

3.5.3 *Dealing with overlapping sites* Where two sites overlap there needs to be a means of allowing the data associated with the overlapping area to be linked to both sites. In the diagram below site 1 and site 2 overlap. Data gathered from the overlapping area could be linked to either site. The following is a way of dealing with this difficulty.

The overlapping area is made into a subsite of site 1 and using Recorder terminology this becomes 1/1. The same area is also made into a subsite of site 2 i.e. 2/1. Subsite 1/1 is then associated with site 2 and subsite 2/1 with site 1.



3.5.4 *Relations between sites and other defined areas* If a site is situated over a Watsonian vice-county (or any other area) boundary then there needs to be a means of assigning data to the appropriate area. If GIS is being used (and the data is grid referenced) then there is no problem. LWIC uses a subsiting system i.e. the sites on either side of the boundary are considered as subsites and data are linked to the appropriate subsite. This is particularly applicable to linear sites since, by their nature, they are likely to extend over area boundaries.

5 Habitat classification

Policy & Principles

- In order for data on habitats to be shared, compared and analysed, they must be compatible.
- LRCs should assess their users' requirements for habitat data and set policy on which habitat classification systems they will use as standards.
- LRCs should design procedures to implement and promote standards in habitat recording.
- LRCs should design procedures for handling habitat data collected using classification systems other than those they recognise.

5.1 Background

A system for habitat classification seeks to identify biological and other factors that, because they are common to certain habitats, permit the generation of meaningful habitat information. Because this information is used for a range of purposes, different systems of classification rely on different factors to classify habitats. As a result, habitat classification systems may not be easily comparable with each other. An LRC needs to manage habitat information from different sources and for different uses in a way that allows data to be shared, compared and analysed, whilst still fulfilling the purposes for which they were collected.

5.2 The uses of habitat information

Habitat information is required for many purposes, including:

- planning and implementing the national UK Biodiversity Action Plan (BAP) and Local Biodiversity Action Plans (LBAPs)
- national and international reporting in support of the UK BAP and the Convention on Biological Diversity
- ensuring compliance with planning guidelines in relation to semi-natural and protected habitats
- environmental audits and land cover assessments
- identifying, monitoring, assessing and managing sites (including Wildlife Sites, statutory sites and sites under the EU Habitats Directive)
- ecological research into species, communities, biotopes and ecosystems

5.3 Habitat classification systems

There are several types of habitat classification system in use. Habitat information may be linked to a parcel of land, a species or a site. Some classification systems use data on biological communities only; others incorporate elements of other factors such as land use, soil chemistry, geophysical features, physical structures, degrees of disturbance and stress. Certain species may be identified (locally or nationally) as suitable 'indicators' of habitats and can provide a mechanism for monitoring of particular habitats.

5.4 The need for consistent and compatible standards

The need for consistency in the use of habitat classification systems is a major concern of users of habitat data. The application of consistent standards is a prerequisite for sharing and comparing data. For them to be useful, it is essential that data on habitats can be:

- compared with data relating to other areas (both nationally and internationally)
- compared with data collected at other times (to allow the monitoring of trends)
- collated with data collected at other scales
- aggregated to provide summary data

Because individual habitat classification systems have been developed for a wide range of different purposes, their degree of compatibility varies. The UK government uses BAP Broad Habitats for reporting on protected sites but employs EU Habitats Directive Annex 1 habitat types (CORINE) for designating Special Areas of Conservation.

The UK BAP lists a number of Priority Habitats. These were defined as sub-sets of the UK Broad Habitats, and are therefore fully compatible (nested) and can be aggregated from finer to coarser scales. However, no consistent approach to habitat classification is discernible in the list of Priority Habitats. They include descriptions of structural features linked to current or historical land use (eg Lowland Wood Pasture and Parkland), descriptions of features defined by environmental variables (eg Mesotrophic Lakes) and descriptions of vegetation communities (eg Purple Moor Grass and Rush Pastures). The situation is made more complex by the

listing of local BAP Priority Habitats. Some of these are the same as national Priority Habitats, whereas others are similar but define a local variant; others are not covered in the UK BAP at all.

Phase 1 habitat survey data are partly compatible with the BAP Broad Habitats, but have poor correspondence with Priority Habitats, although Priority Habitat classes can quite easily be translated into Phase 1 data.

The National Vegetation Classification (NVC) of plant communities has a low level of compatibility with those other systems that employ additional land use and structural criteria, but contains sufficient data to be translated into less precise systems on many occasions (eg all Priority Habitats have NVC codes assigned to them).

5.5 Developing and working with standard classification systems

At the time of writing there is no UK body setting standards in the use of habitat classification systems and attempts to develop processes for translation between systems have met with varying degrees of success. In some cases translation is impossible.

It is hoped that in the future standard systems for translating between different habitat classifications will be adopted by many of the key users of LRCs. This process should also set standard definitions for habitats to be used in reporting on many areas of work—especially BAPs. These standards will need to be adopted by LRCs to ensure comparability of data between LRCs and other nodes in the NBN.

The LRC must set policy on handling habitat data with a view to providing access to the maximum amount of relevant data in users' preferred formats. As work progresses on the UK BAP, this process will become an important driver for standards on habitat classification. LRCs will need to adopt these policies as national standards emerge.

5.6 Recorder 2000 biotopes dictionary

In the NBN data model, habitats (biotopes) are managed in the NBN biotope dictionary. The dictionary has been designed to manage multiple biotope classifications, and will continue to be maintained by an NBN project led by the Joint Nature Conservation Committee (JNCC). Updates to the dictionary will be made available on the NBN website at www.nbn.org.uk.

The dictionary stores information about the different habitats that make up each classification. It is used by Recorder 2000 as the source of habitat checklists, to which records stored in the database are referred. The habitat classifications available at the time of writing are:

- Biodiversity Action Plan Broad Habitats
- Biodiversity Action Plan Priority Habitats
- Birks & Ratcliffe Upland Survey
- Botanical Classification of Standing Waters
- British Trust for Ornithology Bird Habitat Coding Scheme
- CORINE Biotopes Project Habitat Classification
- EUNIS Classification
- Habitats of Community Interest for Nature Conservation
- Marine Nature Conservation Review Classification
- National Vegetation Classification
- Peterken Woodland Stand Types
- Phase 1 Habitat Classification
- Seabird 2000 Habitats
- Shimwell Urban Habitat Classification
- Vegetation Communities of British Rivers

The dictionary can provide users with biotope accounts for items in a biotope classification (eg it includes the published descriptions of Phase 1 habitats). You can add your own facts to your copy of the dictionary (such as unusual variants of an NVC community that are typical in your area), and you can add your own biotopes. However, records associated with such user-defined biotopes cannot be exported and LRCs are advised not to use them. You cannot add whole new biotope classification systems; these will be supplied with updates of the NBN dictionary.

The NBN data model provides a framework for translating between biotopes in different classifications, but because such translations are riddled with difficulties, this framework has not yet been used.

5.7 Policy

An LRC should employ practices and procedures that meet its users' needs. However, there is no single system or group of systems for classifying habitats that can be used by LRCs to meet all their users' requirements simply and comprehensively.

All LRCs should set policy on the standards they will use and promote for accepting, managing and supplying data. LRCs should also set policy on handling data that do not comply with these standards. The following sections provide an overview of the issues to be covered and incorporated into LRC policies.

5.8 Setting and implementing standards

5.8.1 Reviewing the needs of users

The LRC should continually review its users' needs for habitat data and should have a policy describing how it will do so. Legislation, regulation and policy initiatives have the capacity to influence requirements for habitat data. In particular, users may be influenced by government policy on monitoring habitats against UK BAP targets. The statutory conservation agencies' responsibilities to designate and monitor sites within the Natura 2000 network and guidance issued to local government on natural heritage and on environmental auditing and assessment can also influence user requirements. LRCs have a role to play in ensuring that users look forward when assessing their needs and do not simply look at what they currently require.

5.8.2 Choosing habitat classification systems

The LRC should identify a number of standard habitat classification systems for use by all its data suppliers (including microhabitats) and assess alternative habitat classification systems against users' current and projected needs. As mentioned above, there are a number of drivers for habitat data, of which the BAP process is possibly the most significant for many key LRC users. It is important that LRCs are aware of changing needs and do not assume that their current data holdings will suffice indefinitely. Experience has shown that Phase 1 habitat data do not meet the requirements of implementing and monitoring the UK and local BAPs and that many users of Phase 1 data have had to alter the system in the light of local circumstances and their particular requirements.

In order to be able to meet the needs of users for habitat data, an LRC should determine its policy on accepting and promoting particular types of habitat data. Adherence to standards in the recording of habitats is likely to differ between voluntary recorders and contracted surveyors, with the LRC able to require contractors to work to defined standards. These standards should cover both the classification system to be used and the required quality of data and associated metadata (see 5.9 *Promoting standards*).

5.8.3 Applying appropriate data standards

The LRC should supply habitat data that meet the standards required by its users in respect of precision, accuracy and age. The link between the needs of users and the supply of actual products and services must be maintained and the capacity of an LRC to generate what habitat data are required should be made clear to its users and potential users. The requirements should refer both to the classification systems used and to the quality of the data. Habitat data, like species data, should be verified to determine their quality. Quality factors that LRC policy may be expected to cover include the level of verification of data, the scale at which boundaries are specified and the age of data.

The LRC should verify habitat data in accordance with the needs of its users as regards accuracy and precision. Habitat data held by or supplied to the LRC as maps will usually have been generated by professional surveyors or other experts. Verification of these data should be based on standards employed during the survey work. These standards should be obtained by the LRC and attached to the data, to allow the quality of the data to be communicated to users. In cases where the LRC has contracted surveyors, the quality of the data will be determined by the standards stipulated in the contract. It should not be necessary for the LRC to consider surveyors' skills when determining habitat data quality, as these skills should be ascertained before entering into contracts.

Non-standard habitat data submitted along with species records should be dealt with according to separate policies (see 5.10 *Coping with historical and non-standard habitat data*).

Standard habitat data submitted with species records should be accepted only when these habitat data have been validated to ensure that there is no conflict with data that are already held.

5.9 Promoting standards

The LRC should seek to influence and promote survey and recording practices to ensure that habitat data adhere to recognised and consistent data standards. When setting policy on the promotion of standards, the LRC should consider whom it wishes to promote these standards to, as well as the mechanisms and the resources required to do so.

5.10 Coping with historical and non-standard habitat data

5.10.1 Historical data

The LRC should assess the compatibility of its current holdings with the needs of its users and following this assessment the LRC should seek to translate all habitat data into a form compatible with the needs of its users, but should retain all original data.

Before the widespread adoption of geographical information systems (GIS) and the recent release of Recorder 2000 software, habitat data management by LRCs mainly related to managing Phase 1 surveys (usually stored on paper maps with associated target notes) and habitat observations attached to species records. Many historical habitat data are held by LRCs in these forms; some are of immediate use to users and some are not. A policy on assessing these historical records against user needs, in the light of the LRC's capacity and resources, is needed.

5.10.2 Non-standard data

For cases in which species data of value to the LRC are made available, but are associated with non-standard habitat information, the LRC should set policy on managing such non-standard data.

5.11 Procedures for setting and implementing standards

5.11.1 Reviewing the needs of users

Procedures for reviewing users' needs for habitat data may best be incorporated into general procedures for assessing users' needs (see section 2 *Data needs*).

5.11.2 Choosing habitat classification systems

Procedures for deciding which habitat classification systems will be used by the LRC require mechanisms for the appraisal of users' needs against current data holdings, for realistic assessment of data supply standards and for analysis of the issues involved in translating between classification systems. LRCs operating GIS may decide to manage a number of layers of habitat data classified using different systems. GIS provides a powerful tool for managing habitat data, although care should be taken to avoid holding excessive numbers of layers, each containing data on a single classification system. Data management should be based on a number of standard systems chosen in accordance with users' needs rather than collectors' preferences.

Procedures for regularly reviewing the choice of habitat classification systems in relation to users' needs and in correspondence with LRC data management systems may best be incorporated into the normal business planning cycle (see volume 1, section 8 *Business planning*).

5.11.3 Applying appropriate data standards

Standards apply to more than just the classification systems used. In order to allow users to benefit fully from the LRC's management of information on data quality, the LRC should ensure that its procedures allow for user access to metadata associated with its data-sets. Habitat survey data managed by the LRC should always be associated with metadata describing methodologies, collection standards, levels of verification and age of data. These metadata should be made available to users in accordance with their requirements.

The verification of habitat data differs from that of species data because the skills required are different, the discipline is more recently established, and there can be elements of subjectivity involved in assigning habitat classes to areas of land. It is for these reasons that specifying and implementing standards in the collection of habitat data is particularly important. Contracts for collecting habitat data may simply specify the classifications systems to be used. There are a number of options in the case of historical data and non-contracted habitat survey data. Verification may usefully be divided into two questions: is the habitat correctly identified, and are the boundary data correct? The correct identification of habitats requires skill and experience, the level required depending upon the classification system being used. Survey qualifications provide a mechanism for demonstrating the possession of these skills. In the case of detailed surveys (eg using NVC), the LRC should request that geo-referenced quadrat data be supplied so that the habitat data can later be verified as required. Boundary data can be verified against aerial photographs or existing mapped data, particularly if the LRC uses GIS. It may be useful for an LRC to contract an expert to review historical data, in order to eliminate errors and

assign indicators of certainty to habitat identifications.

While species verification may focus on the unexpected, habitat verification may have to resolve the incompatible; habitat data may conflict. Procedures should prevent the capture of conflicting data by identifying any cases of newly-submitted habitat data covering land on which habitat data have previously been collected. Verification procedures are needed for use in the event of conflict. Such procedures may involve the comparison of associated information on data quality by the LRC, or external review by experts, according to circumstance. Conflict is most likely to occur when species records are submitted with habitat data that conflict with habitat survey results. In such cases it should be fairly obvious which habitat data to disregard. LRCs managing habitat data on GIS may wish to retain habitat data attached to species records in the species database without resolving conflicts.

5.12 Procedures for promoting standards

Procedures are needed for ensuring the collection of high-quality data and for encouraging the submission of metadata along with survey data.

Procedures for promoting standards through influencing recording activities will be different for voluntary recorders and contracted surveyors. The scale or precision required of habitat parcel boundary data should be specified in contracts and should be set at levels that are appropriate to data users' needs, are practicable for surveyors and will be useful to recorders collecting species data in the future.

Voluntary recorders may be influenced through procedures for increasing their knowledge and understanding of the uses made of habitat data by the LRC and its users (see section 13 *Working with data-providing individuals*).

Issues to consider when putting in place procedures for increasing recorders' skills are covered in section 7 *Species identification—increasing recording skills*; many of these issues apply equally to habitat surveying.

Practical mechanisms to help recorders submit data that are required by the LRC can include providing maps. These include site boundary maps; note that there might be advantages in treating habitat parcels as sites or sub-sites when promoting targeted recording effort (see section 4 *Definition of sites*). An LRC should make information available to recorders on the habitat data it manages, in order to encourage the submission of species records with compatible habitat data and to discourage the submission of incompatible data. Checklists, keys and summary descriptions of habitat classes may be useful to recorders.

5.13 Procedures for coping with historical and non-standard habitat data

5.13.1 Historical data

An LRC may hold, or have access to, historical habitat information, either attached to species data or in the form of habitat maps on paper. Procedures are needed for capturing these data in accordance with users' needs. These procedures should only be implemented when the LRC is sure that users have a genuine need for historical data. Most users require only current data and high-quality auditable trends data based on consistent surveying (see also section 9 *Recording methodologies*). Habitat maps are likely to be useful to many users and procedures for prioritising and transferring these to GIS are needed. The situation will vary greatly between LRCs, with some requiring significant resources to transfer paper-based habitat data to a more useful electronic form, especially if habitat classes require translation between systems. Procedures for correlating transferred data with the original records are also needed.

5.13.2 Non-standard data

A simple procedure for assessing the value of non-standard habitat information submitted with species data should be established. It should take into account the value of the species data and whether these species data are also geo-referenced to sites or grid references. Other relevant factors include the significance of the habitat information in enhancing the value of the species data, and the ease of translating the habitat information into a standard recognised by the LRC.

5.14 Process of developing policy and procedures

The LRC's policies and procedures on the management of habitat data will have an impact on its users and data suppliers and will have considerable influence on the activities of its staff. Some users require habitat data in particular classification systems; outline procedures for assessing the needs of users are covered in section 2 *Data needs*.

A number of standard classification systems should be selected. This will inevitably involve some compromises; it is possible that some uses of habitat data by some users will be compromised by not being fully supported by the LRC. It is also possible that some currently-held data will have to be translated into a recognised standard and in translation the level of accuracy of data may be lowered (although original data must always be retained and archived). Some data suppliers may find that their preferred method for recording

habitat data is not acceptable to the LRC. The process employed by the LRC to air these issues and seek agreement is best decided at the local level, but should enable all stakeholders to express their views, discuss the issues and understand decisions made by the LRC's management. Various forums are needed, especially a users' forum. The continual review of alternative standards should be incorporated into normal business planning processes.

Users always want to know the quality of the data they receive from an LRC. The verification of habitat data is a technical process. Setting the procedures for achieving such verification requires good understanding of the issues, and these procedures are best developed by the relevant LRC staff, with the assistance of experts in this area of work.

5.15 References

JNCC Report No. 307, Guidance on the interpretation of Biodiversity Broad Habitat classification (terrestrial and freshwater types): Definitions and relationship with other habitat classifications. Joint Nature Conservation Committee, Peterborough, 2000.

JNCC Handbook for Phase 1 habitat survey: a technique for environmental audit. Joint Nature Conservation Committee, Peterborough, 1993.

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Case study 1

Habitat classification

Leicestershire Museums, Arts and Records Service

Background

The Environmental Resources Centre in Leicestershire is an LRC that is managed by a local authority museum service—Leicestershire Museums, Arts and Records Service (LMARS). It is core-funded by Leicestershire County Council, and receives additional income from:

- Service Level Agreements (SLAs) with district and neighbouring unitary planning authorities
- administrative fees from commercial users
- a Heritage Lottery Fund (HLF) grant
- contracts to carry out a variety of professional works

Discussion

The LRC handles habitat data related to species records on an in-house MS Access database. It also operates GIS, on which Wildlife Site boundaries are stored together with Phase 1 habitat data, but this is still at an early stage of data population. Phase 1 data are available from a field-by-field survey of most of the county carried out in the late 80s and early 90s, and most of these data are currently stored in paper format. There are plans to complete digitisation of 'evaluated sites and to make these data available via a website, but additional resources are needed to complete the project to a reasonable timetable.

There are a number of groups that use habitat data. These include:

- the Wildlife Sites selection panel, which includes habitat features in its selection criteria
- the Biodiversity Action Plan (BAP) group, which requires Priority Habitats to be monitored in both extent and condition
- specialist recorder groups which wish to analyse habitat data associated with species records

As an LRC with a strong commitment to involving the community, Leicestershire sets out a policy that seeks to balance the needs of its users against the abilities of its data providers. However, few untrained people ever get involved in surveying habitats, and in practice individual recorders generally only ever submit habitat data that are attached to species records.

LMARS bases its management of habitat data on Phase 1 survey classification, and tries to ensure that all commissioned and sponsored data collection produces results compatible with existing Phase 1 data holdings. It is corporate policy to use Phase 1 habitat categories for species recording by LRC staff, ensuring that existing data remain compatible. It is recognised that Phase 1 habitats are inadequate for many taxa, and that none of the published Leicestershire Red Data Books have used Phase 1 classification to describe habitats.

However, there is no obvious alternative standard classification system that would be accepted by all specialist recorders in Leicestershire, and there are no current plans to alter the system.

The 'Background to the policy section notes that standards, including classification systems, are needed. In Leicestershire it is suggested that Phase 1 survey habitats be used, although exceptions may be appropriate; it is specifically noted that BAP Priority Habitats are such an exception. The choice of Phase 1 as a standard is based on the fact that a wide variety of surveyors, with different levels of skills, contribute data; however, most LRCs will find that their users require a more sophisticated system to meet their needs. The use of GIS enables LRCs to accept data based on different standard classification systems, from different groups of data collectors, more easily.

Although Leicestershire accepts non-standard habitat descriptions from external sources, it should be noted that they are currently entered only on to the species database and not on to the GIS database.

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Policy on habitat classification

1 Policy Statement

Leicestershire Museums, Arts and Records Service (LMARS) will collect and disseminate habitat records using data standards which can be achieved by its data providers and which meet the needs of its users.

2 Background to policy

2.1 Data on biotopes and species habitats are required for a variety of purposes by different users. The following examples illustrate the variation in requirements.

- The presence, absence or extent of habitat prioritised by a Biodiversity Action Plan may be required by a nature conservation organisation.
- The extent or geographical distribution of a particular biotope may be required for an environmental audit.
- The national vegetation classification of plant communities at a site may be required for site assessments.
- The habitats occupied by a particular species at different times of year may be required for a publication.

2.2 These examples show that a number of different concepts are covered within this policy, although they are often linked in practice. It is no surprise that a number of overlapping habitat classifications have evolved to meet different needs in terms of scale and application.

Habitat classification used for habitat protection and environmental audit

2.3 Habitat records need to be comparable both within the LRC and with other databases, for environmental audit and other purposes.

2.4 A nationally accepted habitat classification which can be applied to phase 1 survey data should be adopted as a standard by the LRC. Survey work commissioned or sponsored by the LRC or its partners should comply with this standard unless it is inappropriate.

2.5 The LRC standard habitat classification should be capable of being applied by a wide variety of surveyors so that it can be used by the full range of recorders contributing records to the centre.

2.6 Recorders will be discouraged from varying standard classifications in such a way that their records become incompatible with the rest of the database.

2.7 The LRC will assess any new habitat classification systems which address a wider range of user needs and adopt them as appropriate. In their absence, special arrangements will be required to accommodate records of priority habitats within Biodiversity Action Plans and the specific needs of other initiatives.

2.8 The need for a procedure to verify NVC records and other habitat records will be periodically reviewed.

Meeting the specific needs of individual users and contributors

2.9 Non-standard habitat descriptions from external sources will be accepted.

2.10 Data management systems should include facilities for handling non-standard habitat classifications, especially data relating to species habitats and microhabitats.

Procedures

1 Habitat classifications used for site recording

1.1 Use NCC phase 1 habitat codes for all in-house and commissioned site surveys. List BAP priority habitats separately.

1.2 Use the special dictionary for interpreting old non-standard codes into NCC phase 1 habitat codes where necessary. This may not be possible for some old codes.

1.3 Require the use of NCC phase 1 habitat codes and local BAP priority habitats on SINC proposal forms.

1.4 Accept NVC records but require the inclusion of associated data such as identifier and method used. Where appropriate, explain to users of NVC records that they may not be properly verified.

2 Habitat classifications used for species recording

2.1 Promote the standard use of NCC phase 1 habitat codes by issuing information sheets to species recorders.

2.2 If recorder groups wish to use non standard habitat classifications for particular taxonomic groups, require them to supply full documentation and to apply the classification consistently.

2.3 Convert non-standard and unapproved habitat descriptions to standard codes where appropriate or feasible. Always retain original description either in paper archive or in a freetext field.

Case study 2

Using Phase 1 classification in a partnership project to collect, manage and supply habitat data

The Warwickshire Habitat Biodiversity Audit Project

Background

The Warwickshire Habitat Biodiversity Audit (HBA) is a project that is surveying habitats and managing habitat data for the county. The data generated will support the project partners work on identifying Wildlife Sites and on the LBAP. In the longer term, a data management system will be established that will enable partner organisations to monitor changes in habitats and land use.

Discussion

A report on the work of the HBA project is enclosed. This starts with a short background section detailing plans and progress. This is followed by an analysis of the strengths and weaknesses of using the Phase 1 habitat classification system as the standard for this work; and the report concludes with a summary of the lessons learnt so far.

Chief of these lessons was that the habitat classification system needed changes according to local circumstances, particularly in urban areas. This clearly has serious implications for comparing and collating with data collected elsewhere.

Another important lesson is that using GIS brings considerable flexibility to managing habitat data, although it is important to decide at an early stage how the GIS will be used.

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Using Phase 1 classification in a partnership project to collect, manage and supply habitat data

1. Introduction

The Habitat Biodiversity Audit (HBA) was established in October 1995 through a partnership and funding consortium of all the local authorities in the area, and English Nature, Environment Agency and Warwickshire Wildlife Trust, who act as project managers. The project is housed within the Warwickshire County Council and makes use of the authority's geographical information system (GIS).

The role of the project has evolved with time but basically runs along a central theme of providing accurate, up-to-date and readily accessible ecological data to all the project partners. This can be summarised in a number of stages that are neither mutually exclusive nor exhaustive.

Stage 1:	Undertake a detailed Phase 1 survey of the study area and transfer all data onto GIS
Stage 2	Identify potential Wildlife Sites/SINCs undertake Phase 2 assessments and transfer boundaries onto GIS (update GIS where necessary)
Stage 3	Provide basis for local biodiversity action plan (i.e. the extent of broad and priority habitat types within study area) and a mechanism for setting targets as well as the means to monitor implementation.
Stage 4	Develop local community access to data sets (through community-based projects, library services, Internet etc)
Stage 5	Monitor habitat and land use change. Introduce hedgerow survey and photographic assessment of particular features (veteran trees, reserves, wildlife sites etc)

Stage 1 was completed in September 2000, Phase 2 is ongoing but is not likely to have been completed before 2002/2003. A full audit of broad habitat types has already been undertaken for the whole study area but some priority habitats are still being worked on.

2. Summary of stage 1 procedures

The initial stage of the project was to undertake aerial photographic interpretation to identify areas of potential wildlife interest. This was supplemented by the examination of existing records of known sites. All work of this nature used Phase 1 colour codes to represent the various habitats in the area. Mapping was done at 1:10,000 using accurate Ordnance Survey Landline data to provide hard copy maps. This provided a level of detail that was relatively high and allowed surveyors to target work towards areas of potential habitat interest as well as map more complicated or mosaic habitats with better

accuracy. Survey maps were produced as tetrads (2x2 km) so that the whole map area could be seen on an A4 clipboard.

The initial resource to the project was two members of staff. One to manage the project, provide training and co-ordinate all aspect of the project, the other was to be responsible for the input of data onto GIS. Most of the assessment work was to come from volunteers.

Within seven months of the start of the project it was agreed that the staffing balance was wrong and that whilst the project manager devoted considerable amount of effort and time in training other duties severely limited the time that could be devoted to a large number of volunteers. Therefore, in order to support volunteers better and increase survey productivity the project needed dedicated survey staff on a seasonal basis.

All maps were colour coded and target notes entered onto computer using unique identification codes. The limited access to computers meant that surveys had to be organised according to when people were doing survey work, writing up maps or entering target notes onto computer. Staff on longer contracts tended to delay the completion of the write up process until later in the year to allow staff on short contract greater access to computers.

Data was transferred from coded master maps onto GIS. Any gaps in the data due to access difficulties or the presence of extensive arable land was added to the system from the aerial photographic interpretation maps. Target notes were added to the system as text files and can be accessed through the creation of hot links that displays selected target notes on screen.

A total of 640 tetrad area maps were produced covering an area of over 2,250-km . Approximately, 13,000 target notes were produced, which include an estimated 150,000 species records.

Advantages of the classification used

- Phase 1 is relatively quick and easy to learn and therefore easy to get viewers of the information to appreciate what is being shown.
- Largely compatible for input onto GIS, providing a near complete coverage.
- Relatively quick to complete survey work although maximum use should be made of the presence of surveyors in the field (we undertook a ridge and furrow assessment at the same time and produced animal species records that were provided to the local record centre).
- A standard survey technique which when done well can provide a basis from which other surveys can develop.
- Generally compatible with the National Vegetation Classification

Disadvantages of the classification used

- Does not allow for the identification of certain habitat types such as brownfield or post-industrial sites, wet woodland, wood pasture, reedbed, flood marsh grazing pasture etc.
- Does not provide a means of assessing habitat diversity within urban settings such as residential garden areas.
- Is not easily capable of classifying areas according to land management regime, such as hay meadows, woodland coppice, rush pasture etc.
- Required minor changes to Phase 1 categories such as scattered scrub, scattered trees and scattered bracken, orchards etc. so that these features could be mapped.
- Certain habitats (i.e. fens, bogs, and heath) are difficult to map and are generally identifiable through abiotic factors rather than plant species composition.

Possible solutions

The use of GIS allows you to view the same data set in different ways and you can create interpretations of existing data as additional layers of information. This means that we can show post-industrial sites, woodlands, grasslands, arable land etc, providing that information in a separate layer. It is also possible to also identify priority habitats and specific land management approaches and integrate that with the existing data set. We can create new data sets using other survey techniques or approaches and provide that where greater detail or a better interpretation of a particular habitat feature (i.e. ponds) is required.

3. Lessons learned

There is a need to develop efficient work procedures at an early stage of work so that the output in consistent, complete, traceable and continuous. It should be recognised that although volunteers are able to carry out the work this is a professional piece of work and volunteers and student placements need the support of professional staff so that they are able to conduct themselves appropriately and produce a professional product.

Consideration should be given to other surveying opportunities whilst surveyors are out in the field or examining aerial photographs. A few possible options include the identification of priority habitats, traces of ridge and furrow systems, animal species (badger setts, heronries, rookeries, other nesting sites, water voles newt ponds, reptiles etc).

Be prepared to add to the classifications to reflect the habitats present within an area. We have included 'set-aside' and 'allotments' as a subset of 'arable'; 'orchard' as a subset of 'broadleaf plantation' and plan to create a 'permanent grassland' category as a subset of 'improved grassland'.

The use of GIS in storing and expanding the use of Phase 1 and other data set can not be emphasised enough. Such considerations must be decided at the earliest stage, as it will affect the way the work is approached at a fundamental level, the cost implications and the ultimate use of the data.

Working in partnerships is very important when involved in such labour intensive work. To maximise the value of the work you have to maximise the use of the product a good approach to this is to gain financial support on a partnership basis. Work will still be needed to get those partner organisations to use the product but it is a start. It should be noted that a firm working agreement is needed to ensure that staff, managers and partners have a clear view of what their roles are and the way in which problems should be dealt with.

Once the survey has been completed the opportunities for the use of the data should become almost overwhelming. The HBA is currently exploring numerous opportunities to make use of the information and is involved in many projects that make use of the data at a strategic level, such as producing Sustainability Indicators for local authorities, as well as informing decisions about restoration and creation work. A number of applications for further funding have or are being submitted which will raise the profile of habitat conservation within the sub-region far beyond anything that has ever been experienced before.

4. Future considerations for the HBA

The initial purpose of the Audit was to provide partners with information that could assist them when dealing with planning application and strategic planning issues. Now that this stage of the work has been completed it is clear that its application goes much further than that.

The use of species data provided in the way described above could be a basis upon which the Audit will produce the first county flora available through the Internet. We are currently negotiating our involvement with a Historic Landscape Characterisation study and we are now formally integrated within the Local Biodiversity Action Plan process for the area. We also provide information and technical support to site based projects as well as providing information and analysis to support Countryside Stewardship Applications through the Farming and Wildlife Advisor Group.

Our partnership base is to expand – possibly to include Government Agencies, universities and NGOs – and will bring with it further funding opportunities. Other areas of future interest include a countywide hedgerow survey, a pond restoration project, research in the field of landscape ecology and school education packs.

6 Species identification - verification

Policy & Principles

- Reliable species identifications are required for most uses of data.
- The LRC should evaluate the quality of the species data required by its users, and should implement verification procedures accordingly.
- It is important that data are made available as soon as possible; this may involve making data available before they have been fully verified.
- Data should be assigned quality values, which should be used to determine how the data may be used.

6.1 Background

The quality of taxonomic identifications is critical to the operations of an LRC. Policies and procedures are needed to ensure that data are of the highest quality possible and that the reliability of all data is known. The verification of species records is a checking process to ensure that they are attributed to the correct taxon (usually species, but sometimes genus, aggregate variety or sub-species). Reliable species identifications are required for most uses of data; however, species data quality requirements may vary between different users, different uses and taxa.

The LRC must be able to ensure that all data supplied to its users meet their quality requirements (ie that the data are 'fit for purpose'). In order to ensure this, a data quality value must be assigned to every record in accordance with its level of verification. Levels of verification are determined through an assessment of the difficulty of identifying the taxon, in combination with an assessment of the procedures employed during the verification process. Such procedures may vary from reliance on the recorder's own identification skills, through vetting of data-sets by expert committees, to inspection of voucher specimens by national experts. Different taxonomic groups are often subject to quite different verification procedures.

It is essential that data are verified, although this does not have to be done by the LRC itself. No LRC can possibly have sufficient in-house expertise to deal with the expert verification of all the taxa it covers, so arrangements must be made with external agencies and individuals to provide this expertise. Wherever and however it is done, the checking, or verification, of taxonomic identifications is carried out by 'determiners'. Determiners may be individual recorders, groups of local experts, national experts or other bodies. Some verification mechanisms may be established by the LRC itself, while others may be established by entirely separate bodies (eg recording schemes or natural history societies). The checking of all records through verification procedures is time-consuming and may result in many records remaining unverified for a considerable period, during which time their continued availability is nevertheless required. It is important that the LRC sets a policy on verification that balances an assurance of data quality against the need to make data available.

It is important that all users understand the levels of verification of data that are supplied to them. While ascertaining the level of verification is important, it is equally important to aim to verify all records to the very highest standards.

6.2 Policy

All data managed by an LRC must be verified, although the policy on verifying new data may differ from that for historical data. The purpose behind verification is to ensure that data are of sufficient quality for their intended use and it is therefore important that LRCs set their policy on verification in response to the intended uses of data. Many data are verified by local and national recording schemes and societies and it is important that LRCs understand the terms of external verifications and that they seek to establish and implement higher standards of verification when required.

6.2.1 New data

Broadly speaking, the LRC must, as far as possible, understand the quality of the taxonomic determinations of all records it holds and should seek to improve their quality in response to the needs of its current and potential users.

The process of verifying records can be time-consuming and it is important that the LRC sets policy on whether and how records will be made available to users prior to their full verification, and on any minimum levels of verification that are required before data can be released at all. Policy should be set on which data, if any, can be made available prior to their verification. Data that may fall into this class are records of species and habitats that are particularly significant to decision-making by LRC users (eg Red Data Book species).

6.2.2 Historical data

It is important that LRCs set policy on how they will handle the verification of historical data and on whether the systems for historical data will differ from those for new data. Historical data must first be defined Ffor most LRCs it should be satisfactory to consider as historical data all data that were already managed by the LRC prior to the implementation of their current verification procedures. This may designate as historical a wide range of data, including many collected recently and for which documentation is available in the same way as for new records. However, historical data may also include records drawn from the literature and from museum collections, for which the amount of documentation available for carrying out verifications may vary widely. Policy on verifying historical data will vary between individual LRCs as a consequence of the varying significance of their holdings of historical data to their users. However, it is important to bear in mind that users' needs are predominantly for contemporary data and for information on trends and that it is not easy to generate information on historical trends from records that were collected in a non-systematic way.

6.2.3 Users' needs

As with many aspects of LRC activity, it is the requirements of the LRC's users that should drive LRC policy. It is important that users understand the LRC's system for attributing verification levels to data and that the system provides consistency across different taxa. Verification should attribute a 'quality value' to all records and users should be informed of the meaning of this value. There are different ways in which these values might be assigned and used. The simplest system is to attribute one of three values to records: 'verified', 'unverified' and 'not yet verified'. This is the system that Recorder 2000 will use and corresponds to its use of 'validation flags' (see Case study 3). However, records can be verified to different levels and individual records can sometimes be re-determined to higher levels some time after the initial determination. Case study 2 sets out a system in which data quality thresholds are set in accordance with the needs of data users and records are assigned a quality value within these thresholds in accordance with their level of verification. Such systems can become very complex, but it is important that the LRC understands fully the needs of its users and sets policy on whether it will release data at different levels of verification and on how it will advise its users on the implications of having data at those different levels. Records could be flagged if they require further verification before they are suitable for certain uses. It is important that the LRC's policy statement sets out the degree to which decisions on the appropriate use of data are the responsibility of the user of the data rather than the LRC.

6.2.4 Standards

Consistency between data is essential if they are to be shared and consistency between the different verification systems, particularly those for different taxa, is needed in order to implement quality control in accordance with the needs of data users. LRCs have a particular responsibility to their local users, and should set policy on how they will handle data verified by others.

The ideal is to fully integrate the LRC's verification procedures with those of all data suppliers. On occasion, this may not be possible, and the LRC should set policy on when data must be re-determined according to its own procedures. Policy should also be set on when the LRC will seek to influence other organisations that carry out verification of records it manages. Such influence may have a number of objectives. For example, the LRC may seek to standardise verification systems through discussions with data suppliers when systems are put in place; or it may wish to improve others' systems to bring them into line with its own higher or different standards; or it may wish to alter its own systems to take into account other verification standards as they develop.

6.3 Procedures

6.3.1 Verifying new records

The LRC must set procedures for verifying incoming records for all major taxonomic groups (see Case study 1).

The knowledge and skills required to make accurate identifications of species vary between taxonomic groups. Many recording schemes and societies have verification procedures for new records (eg The British Trust for Ornithology); others accredit those making the determination (eg The Mammal Society). Some taxonomic groups may require that a voucher specimen or a photograph be submitted to support a record.

In designing verification procedures for different groups, the LRC must work closely with local experts and other sources of expertise, such as national experts, specialist recording schemes, museums and national societies.

The first stage in setting procedures for verifying new records is to group the taxa. The number of taxonomic divisions should depend on the needs of the LRC, rather than on the availability of the skills needed to carry out the determinations. Case study 1 describes separate procedures used by an LRC for verifying records for ten taxonomic groups: mammals, bats, birds, reptiles and amphibians, lepidoptera, spiders, other inverte-

brates, flowering plants and ferns, mosses and liverworts, and fungi. It is likely that if data are being submitted in sufficient quantity to require regular verification at the local level, then the skills needed to carry these verifications out will be available locally. However, it is important to access peer groups and elect representatives to vet local 'experts' and to seek others' opinions on their level of skill in carrying out verifications. If data on certain groups are provided to the LRC only infrequently and in small numbers, then the identification skills needed for verification may not be locally available and the verification procedures should allow for remote access to those skills.

6.3.2 Verifying imported records

LRCs may wish to manage data from suppliers who have applied their own verification systems or who have managed the data without verification. It is important that an LRC ensures that it is able to understand and confirm suppliers' verifications and is able to convert the verification levels to its own system, or that it has sufficient information and evidence to carry out its own verifications.

The LRC must ensure that data supply agreements with data providers stipulate the verification procedures that data must have undergone (or set out the minimum information required for verification procedures to be implemented) and the minimum level of verification at which data can start being used.

6.3.3 Verifying historical records

Historical records are those acquired before LRC policy was implemented. The LRC should set procedures for verifying its historical records that ensure compatibility between historical and contemporary data verification levels.

It is important that all data held by an LRC are of known quality and it is therefore necessary to verify historical records. Procedures for evaluating the quality of historical records will vary from area to area and between taxonomic groups. In many cases, it may not be possible to obtain additional information from the recorder to help with verification, although field notes or even voucher specimens may be available in some circumstances. It is important that data quality values are determined that are consistent with those applied to new records and that relate to quality thresholds determined through assessment of users' needs.

6.3.4 Establishing data management systems

The LRC should implement a data management system that enables records to be tracked during verification and to be assigned an appropriate value that indicates their known quality, whilst also allowing for re-determination when required.

Records submitted from certain sources may be found to be of low quality. Inaccurate records should be retained for the purpose of identifying poor data sources.

The re-determination of records may sometimes be required. For instance, a recorder's identification skills may be re-evaluated; or a taxonomic unit may be re-defined (eg a species may be split into a number of subspecies or a single species may be split into two or more distinct species).

6.4 Process of developing the policy and procedures

Verification is an important and complex process involving many interested parties, including data users, data managers and recorders. The purpose of verification is to ensure that data quality is known and that potential users can decide on data's suitability. The needs of users are at the heart of data quality control; for LRCs, these users are predominantly local, although national requirements should be taken into account whenever appropriate.

The verification levels set by an LRC must allow for data belonging to different taxonomic classes to be easily compared. To set these levels, it is necessary to engage the skills of data managers and recorders. Using verification levels to make decisions on whether data are fit for a particular purpose is primarily the responsibility of the data user, who must nevertheless work closely with LRC staff, as users are often unaware of the complexities involved in verifying biological data. A simple mechanism is needed to match the LRC's verification levels against data quality thresholds set by each user for their own purposes.

Following discussions with LRC users and the setting of verification levels that are consistent between data classes and that meet users' needs, the actual procedures for verification must be considered.

At this stage it is essential that as many recorders as possible are involved, and it may be considered appropriate to establish a working group with invited expert membership to provide specialist input. Ideally, decisions on mechanisms should be based entirely on the need for verification and not on the availability of identification skills. It may take considerable time and effort from LRC staff and local recorder representatives to reach agreement on how records should be verified. A permanent recorders' forum provides an invaluable mechanism for accessing the necessary skills and experience and a recorder representative on the LRC management body enables effective communication with the forum.

The process should identify the procedures required to verify all the records managed by the LRC. The verification procedures for different taxa will vary, although it may be necessary to group taxa into classes and set out manageable procedures for each class. As mentioned above, Case study 1 illustrates an LRC that recognises ten taxonomic classes and therefore has ten different verification procedures. Taxonomic experts must design the individual procedures required for each class. It may be useful to set up working groups for the different taxon groups and to have these groups report to the recorders' forum. An LRC representative should sit on these groups to represent the needs of the LRC's users and to advise on the potential uses of data assigned to the different verification levels.

Case study 1

Verification

Leicestershire Museums, Arts and Records Service

Background

The Environmental Resources Centre in Leicestershire is an LRC that is managed by a local authority museum service—Leicestershire Museums, Arts and Records Service (LMARS). It is core-funded by Leicestershire County Council, and receives additional income from:

- Service Level Agreements (SLAs) with district and neighbouring unitary planning authorities
- administrative fees from commercial users
- a Heritage Lottery Fund (HLF) grant
- contracts to carry out a variety of professional works

The LRC has primary policy objectives to:

- fulfil its obligations in the Leicester, Leicestershire & Rutland Biodiversity Action Plan (BAP)
- enhance involvement of local communities in the monitoring and conservation of landscapes and their constituent wildlife, through parish volunteer networks
- improve access to environmental data (where information is to be communicated in a style and format accessible to the needs of general as well as specific audiences)
- maintain partnerships with the Leicestershire & Rutland Wildlife Trust and other partners, and establish new networks to assist in updating records and databases

The LRC does not support a single recorders forum, but it does support the activities of a number of recording groups. There is a long history of involvement with local recording groups and natural history societies, and with the museum service. Until 1997, the species database was located in the museum, where voucher specimens were deposited to support the verification of unusual and critical records.

Discussion

A single policy statement sets out the overall rationale that data users need to know the quality of the information they are supplied and that the LRC is central to both evaluating data quality and advising data users of that quality. LMARS has developed a verification system that assigns quality values to records on a scale from 1 to 9. LRCs may wish to use a narrower range of quality values, in which case they may be less involved in offering advice on how the quality of data can be translated into fitness for purpose.

Following some background information, the use of quality thresholds is introduced. These thresholds are used to translate data quality values into potential data uses, and in this case they are applied by LRC staff and are based on the specified requirements of users.

Provision for future re-determination of records is made through the creation of an ‘audit trail. The importance of retaining incorrect data for reference purposes is stated.

The procedures used by the Leicestershire Lepidoptera Recording Scheme are cited as the preferred model for verifying records. This system was developed by recorders to address problems caused by the absence of any verification procedure. These problems included a disproportionate number of records of national rarities being submitted by one or two recorders and anecdotal reports of identifications being made without sufficient evidence. There were consequent difficulties in using records in national atlases and in selecting local Red Data Book species. The use of a vetting committee and standard letters to recorders has been found to be very useful, improving the quality of records without putting people off submitting records; indeed, it has helped to establish contact with new recorders.

Lepidoptera records are now verified according to documented procedures. These procedures were developed by volunteer recorders and have been in place for about five years. They have been successful insofar as they have not dissuaded recorders from submitting records, and have improved the quality of incoming records, established contact with new recorders and helped improve recording techniques. The procedures involve a vetting committee that recognises those incoming records that are considered doubtful. Further information is then sought by way of a standard letter that also explains the benefits of verification, and the committee reassesses the quality of the record.

LMARS is currently supporting the development of verification procedures for nine taxonomic groups, and these are summarised in a table. It is noticeable that most of these verification mechanisms consist of vetting by members of local recording schemes, although national recording scheme staff and LRC staff are also involved. The balance between local and national experts and mechanisms, and

the degree of involvement of LRC staff, will vary between LRCs.

The verification of species records may need to be repeated for a number of reasons. These include: when doubt is cast on the skills of the original determiner; when there is a demand for higher quality data; and when a speciess taxonomy changes. LMARS provides for this through the use of an 'audit trail consisting of a combination of documentation, evidence and samples. The design of procedures for verification should always ensure that provision is made for future re-determinations, although these provisions may vary between taxonomic groups and between different species in the same group. Preserved organisms, hair, fur, teeth, photographs, drawings and field notes may all serve as voucher specimens. Voucher specimens have considerable value, especially when dealing with species that are hard to identify and when the organism is small. At LMARS, detailed descriptions and photographs are filed with the paper records. The LRC recognises that it is often convenient for determiners to maintain their own collections of voucher specimens in their homes for day-to-day use, but asks that these be deposited in a museum in due course.

The level to which records may be verified is described under procedures for 'evaluation of the reliability of a record. Some grouping of the classes may be considered appropriate by other LRCs if they wish to simplify the system. For example, 'false and 'rejected records may be classed as 'fail; 'uncertain and 'unconfirmed records may be classed as 'unverified; 'default indicates that a record has been automatically 'verified. The level of the determiners' skills may be simplified to 'local, 'regional and 'national expert levels and matched against the difficulty of the taxon under consideration, and the type of evidence presented, to determine a 'fail, 'verified or 'unverified level.

LMARS is still developing its procedures and evaluating this system, and has some reservations with regard to evaluating determiners' skills. It is difficult to avoid assessing identification skills when verifying records. One solution is simply to name the determiner(s) and let the data users assess the quality of the record. However, the users of LRCs are very unlikely to be in a position to do this. Case study 3 describes the Recorder 2000 verification system, which requires that the skills of determiners be defined as 'competent naturalist, 'county recorder or 'national recorder.

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Policy on Species Identification (Verification)

1 Policy Statement

The LRC will evaluate and apply quality standards to the accuracy of species identifications in order to advise on the appropriate use of data.

2 Background to policy

2.1 Reliable species identifications are required for many data uses. In particular, the accuracy of the identification of individual species may need to stand up to legal examination, if the data are used to select sites for protection by law or local development plans. Inaccurate identifications will also cause large-scale waste of resources where data are used to compile Red Data Books and prioritise conservation objectives as in Biodiversity Action Plans.

2.2 Old files and the literature contain a large amount of historical and relatively recent data whose reliability is affected by changes in taxonomy or suspected poor judgement. An evaluation of the accuracy of these records is needed in order to take a balanced view of any conclusions drawn from their use in, for example, studies of changes in biodiversity.

2.3 The most reliable way to check the accuracy of a species identification is to refer to a voucher specimen. These can also be used to update records following taxonomic revisions.

Verification of species identification

2.4 Quality thresholds based on the accuracy of species identification should be applied to the collection of all records used for site evaluation or the setting of conservation objectives. Their function should be to ensure maximum possible accuracy and, at the same time, to avoid discouraging voluntary recorders. Thresholds should be applied by LRC staff, local recording groups or national experts as appropriate.

2.5 An audit trail for species identification should be established for as many incoming records as possible. In particular, provision should be made for the retention of voucher specimens to support LRC records.

2.6 The reliability of all species identifications should be evaluated. Inaccurate records should be marked as such, but they should not be deleted from the database.

Procedures

1 Application of quality thresholds

1.1 Implement a system for verifying incoming records for as many taxonomic groups as possible.

For many popular taxa, this function will be performed by local recording groups and included in the standard data exchange agreement. The system used by the Leicestershire Lepidoptera Recording Scheme is the preferred model for verification by recording groups. It consists of a vetting committee which identifies dubious incoming records and sends out standard letters which request further information and explain the positive benefits of verification.

For less well-studied taxa, it will be necessary to rely on national experts, possibly through working with a national recording scheme. In some groups, LRC staff or local naturalists may have sufficient expertise to carry out this function.

1.2 Verification procedures follow national standards where these are available.

The table below describes the verification procedures for each taxonomic group.

Taxonomic Group	Verification procedure
Mammals (except bats)	To be developed.
Bats	The Leicestershire and Rutland Bat Group has a recording committee, which vets the Group's own records.
Birds	Leicestershire and Rutland Ornithological Society (LROS) has a records committee with an established verification procedure.
Reptiles and amphibians	To be developed by the new recording scheme.
Lepidoptera	The recording scheme has a formal, written procedure (see below).
Spiders	Records are vetted by a small, informal group of recorders working towards a series of publications.
Other invertebrates	Records are vetted by members of staff in their own fields of expertise. Occasionally national experts vet collections or sets of records for publication.
Flowering plants and ferns	The Botanical Society for the British Isles (BSBI) recorder

	vets all Atlas 2000 records.
Mosses and liverworts	Records are vetted informally by the Leicestershire Bryophyte Group.
Fungi	Records are vetted informally by the Leicestershire Fungi Study Group.

2 Establishment of an audit trail

2.1 Require commissioned survey reports to state how species were identified and by whom.

2.2 Encourage the collection of voucher specimens where appropriate. Voucher specimens are normally required for critical taxa and for unusual records such as first county records. For many taxa, a good photograph is often an adequate substitute. For rare birds, the Leicestershire and Rutland Ornithological Society Records Committee requires detailed field descriptions. It is illegal to collect specimens of species protected under schedule 5 of the Wildlife and Countryside Act.

2.3 Designate a museum for the deposition of voucher specimens in support of records in the LRC. It is convenient for determiners to maintain their own collections of voucher specimens in their homes for day-to-day use. Ensure that these are maintained to a common standard and that they will be deposited within the museum in due course.

3 Evaluation of the reliability of a record

3.1 Assign to each incoming record a single integer value which is based on the amount of effort and expertise applied in the identification of the taxon:

Value	Verification	Detail
0	False record	Evidence exists to reject the identification. Not subjected to the verification process.
1	Rejected	Rejected by expert or panel.
2	Uncertain	Doubt expressed by expert or panel. There is some prospect of further verification by an expert.
3	Unconfirmed	Records awaiting verification or in need of further investigation.
4	Accepted without redetermination	Records for which verification is not needed.
5	Checked by handling	Record accepted as a result of handling (bats, captured insects).
6	Ratified by society	Record accepted by a verification panel recognised by the LRC.
7	Local expert	Specimen verified by a local expert.
8	Regional expert	Specimen verified by a regional expert.
9	National expert	Specimen verified by a national expert.

3.2 Assign a default value of 3 to all existing database records, pending review by local or national experts. For existing public survey data containing records of more difficult taxa, verification panels may advise a default value of 2.

3.3 Records are not infrequently found to be inaccurate. It is necessary to retain them in the data-base with an appropriate accuracy score. Inaccurate records keep turning up like bad pennies, especially when they are included in the literature.

3.4 It may be necessary to introduce an additional tier of verification by the authorised LRC officer (or official scheme organiser in the case of data-sets wholly maintained outside the LRC but made available to the LRC for various purposes, eg the Leicestershire Lepidoptera Recording Scheme). On receipt of satellite data-sets, the data are checked by this officer, who may choose to reject some or all of the records received.

Case study 2

LRCs and National Schemes and Societies

Somerset Environmental Records Centre and Dorset Environmental Records Centre

Background

Somerset Environmental Records Centre (SERC) was established in 1989 by Somerset Wildlife Trust with the support of Somerset County Council and all five local district councils. It operates as part of the trading subsidiary of Somerset Wildlife Trust; this has the disadvantage that the LRC is not an independent organisation, but because its management is overseen by a management group of key users, it is usually seen as independent. Principal users of the LRC include local authorities, statutory agencies, conservation organisations, naturalists, the public and land managers. The centre has four full-time members of staff: a director, a survey manager, an IT manager and a support officer. It also has its own in-house survey team comprising between eight and ten graduate trainees.

Dorset Environmental Records Centre (DERC) was established in 1976 as an independent organisation to collate information on Dorset s wildlife. It is now a limited company and a registered charity. Although originally funded through grants, DERC has established Service Level Agreements (SLAs) with many of its main users (including English Nature, Dorset County Council, Dorset Wildlife Trust and several local authorities). Other income is generated through contracts, data searches and project work. DERC is accommodated by Dorset County Council, and currently employs: an LRC manager, environmental data manager, field surveyor and special project officer/surveyor.

Discussion

During the last two years SERC and DERC have worked together with Butterfly Conservation, The Mammal Society, the Heteroptera Study Group and the Spider Recording Scheme to review, document and improve the flow of data between these organisations.

Verification was seen as a critical operation in the process of managing data and therefore as an important element of the review. In particular, it was important to agree on who would be responsible for data verification, and on how data could be made to flow smoothly to and from data verifiers, LRCs, local and non-local recorders and national offices of recording schemes.

The information presented below represents a summary of the discussion and the decisions made by the LRCs and the local and national representatives of the recording groups. Some of the decisions have not yet been fully implemented.

The exercise illustrated the advantages to LRCs of entering into positive local relationships with recording schemes and societies. These advantages included gaining access to the skills needed for data verification, and benefiting from the high confidence of data users in these verifications. There was also seen to be an increase in data flowing to the LRCs from beyond their areas of operation.

There were also some minor disadvantages identified in the procedures. For example, there are some time delays between data being entered by the LRCs, passed to the verifier and finally verified and made available. These time delays and other difficulties encountered when transferring data between different databases will be addressed as more organisations and individuals involved in the data flow process adopt common NBN standards, particularly for data transfer. In addition to improving data flows through implementing common standards, one of the lessons learned is that it may be important for data to be made available before they have been fully verified.

The custodian

It was found to be important to agree on which body would act as the data ‘custodian. The role of the data custodian is to manage the master copies of data and to ensure that data are managed in accordance with agreed standards. It was agreed in every case under consideration that the LRCs would act as the data custodian.

The verifier

It was important to agree on which body is responsible for verifying data. In both Dorset and Somerset, there are active communities of recorders and representatives of national schemes and societies. The situation may differ in other areas of the UK.

The table below shows the organisation or individual that it was agreed would be responsible for verifying records for each taxonomic group in the two counties.

Dorset

Individual/organisation responsible

Butterflies	Local Butterfly Conservation data verifier
Mammals	County mammal recorder for The Mammal Society
Heteroptera	Taxa co-ordinator for the Heteroptera Study Group
Spiders	Dorset area organiser for Spider Recording Scheme (SRS)

Somerset

Individual/organisation responsible

Mammals	Mammal recorder for Somerset Mammal Group (legally protected species)SERC (non-protected species)
Heteroptera	Somerset taxa co-ordinator for Somerset Invertebrates Group
Spiders	Taxa co-ordinator for Somerset Invertebrates Group
Butterflies	Data flow arrangements could not be finalised due to personnel changes and there being no local Butterfly Conservation group. Data flow model agreed in Dorset to form basis for final agreement.

In most cases, individuals who are recognised as local experts and in whom there is a high degree of confidence within the recording community carry out the verifications. Through their connections within the recording schemes and societies, all verifiers have access to other experts who can assist in verification.

The verification of mammal records in Somerset is the responsibility of SERC. Data from the specialist mammal groups affiliated to SERC (otters, bats and badgers) and other data received by SERC are separated into data referring to legally protected and non-protected species. Most data are inputted by SERC, with those on legally protected species being passed to the Somerset Mammal Group s (SMG) mammal recorder for verification and SERC verifying data on non-protected species. Assistance was received by SERC from the SMG in designing verification procedures, particularly relating to assessing voucher specimens.

Data entry

Data inputting can be a time-consuming task. It can be done before verifying data or afterwards. Data that are entered prior to verification are available for use sooner than those that are verified first, although their usefulness is clearly compromised by their unverified status.

It was agreed that there should be a distinction made between records that include more taxonomic groups than those covered by a single verifier and those that are restricted to only butterflies, mammals, heteroptera or spiders. There was also a distinction made between records submitted on paper and those that had been already entered into a spreadsheet or database.

Records submitted covering more than one taxon

In the case of mixed records and other *ad hoc* records received by the LRCs, it was agreed that the LRCs would do the initial data processing and would subsequently extract data for forwarding to the verifiers. It was agreed that these data would be forwarded annually by the LRCs, usually as paper printouts from the database, and that the verifiers would similarly return their assessments of the data to the LRCs annually.

Records submitted covering one taxon only

In the case of records submitted solely from the individual taxonomic groups, it was agreed that these would be sent or forwarded (sometimes by UK, national or regional co-ordinators) directly to the verifiers. These data were verified and then entered into simple spreadsheets that the LRCs could subsequently incorporate into the database.

Records submitted in electronic form

Exceptions were made to normal data inputting procedures for all records submitted in electronic formats, as there is currently a wide variation in the capacity of verifiers to handle these data. It was agreed that the LRCs would input data supplied in this form in the same way as the ‘mixed records described above.

There were three exceptions to this. In Dorset, the heteroptera and spider verifiers maintain satellite copies of DERCs Recorder database, and so are able to input verified data directly in a form that permits easy transfer of the data to the LRC. Butterfly Conservation has UK-based data inputters who receive verified data from the local Butterfly Conservation verifiers, input the data, and then forward them in computerised form to the LRCs.

Contact

DERC

Carolyn Steele, manager

- Dorset Environmental Records Centre, Library Headquarters, Colliton Park, Dorchester, Dorset DT1 1XJ
- 01305 225081
- derc@dorset-cc.gov.uk

SERC

Bill Butcher, director

- Somerset Environmental Records Centre, Sandhill Park, Bishops Lydeard, Taunton, Somerset, TA4 3DE
- 01823 433889
- somerc@iname.com

Case study 3

Validation of identifications in Recorder 2000

Discussion

Recorder 2000 refers to verification as *validation* (and validation as *checking*). All records (taxon occurrences) are automatically marked with their level of validation: this is called the 'validation flag.

The system is fairly simple, but lacks flexibility in comparison to that illustrated in Case study 1 with its different levels of validation. However, many users simply want to know if a record is likely to be true or not, and they are likely to be satisfied if it is confirmed that efforts have been made to check its verity.

The validation flag

In Recorder 2000 all records have a 'validation flag which says whether a record has 'passed or 'failed validation or is 'not validated yet. In Recorder 2000 the original identification is the first determination, but another person might later determine that the original identification was invalid or they may confirm it as accurate, and in so doing they make another determination. Someone makes a determination whenever they put a name to, or otherwise classify something that they or another person has observed. So if I see a flying creature while out for a walk and think to myself, 'That's a wood pigeon, I am making a determination. If I don't know what kind of bird it is, but describe it to someone else, that person might say it is a stock dove; he too is making a determination. The validation process works out which determinations to accept.

The validation procedures are automated, and take into account three factors. The two most important factors are the difficulty of identifying the taxon (hereafter called 'difficulty) and the skill of the determiner in identifying the taxon (hereafter called 'skill). Recorder 2000 sets the validation flag by comparing the skills of the determiner with the difficulty of identifying the taxon. If the skills are sufficient then the record passes validation, but if they are insufficient then that determiner cannot validate the record, and it remains unvalidated.

The third factor is the 'determination type, which may affect redetermined records.

The three levels of the validation flag

Table 1.

0	Not validated	Validation has not been attempted. This is the default and all records start like this.
1	Failed validation	The identification of the taxon name attributed to this record has been checked and is believed to be incorrect (a reason should preferably be given in the comment).
2	Passed validation	The identification of the taxon name attributed to this record has been checked and is believed to be correct.

Records that have failed validation do not appear in reports and will not be exported unless this function is over-ridden, although unvalidated records do appear in reports and will be exported.

How the validation flag is set

The validation flag is determined using three pieces of information:

- the difficulty of identifying the taxon
- the competence of the determiner
- the 'determination type

The difficulty of identifying the taxon

This is established in the taxon dictionary and has four possible values:

Table 2.

Difficulty level	Definition
0	Easily identified. Identification always accepted.
1	Easily identified by any competent naturalist. Identifications accepted from regular recorders.
2	Requires experience. A 'county recorder or similar authority should check identifications.
3	Difficult to identify. Identifications require expert assessment by a 'national recorder, 'rarities committee or similar authority.

(Note that though the taxon dictionary can handle taxon difficulty, at the time of writing, this facility has

not yet been used in any checklists, so all taxa have default difficulty of 0. This means that records for all taxa automatically pass validation, unless specifically re-determined as invalid. This will change when the taxon difficulty facility is used in future checklists.)

- The competence of the determiner (skill level)
- The competence of the determiner is referred to as the 'determiner role value, and can have one of three values:

Table 3.

Skill level	Definition
1	Competent naturalist. Identification of difficulty level 1 species can be accepted.
2	'County recorder or equivalent. Identification of difficulty levels 1 and 2 species can be accepted.
3	'National recorder or equivalent. Identification of any species can be accepted.

The determination type

The determination type allows for the tracking of records as they are determined and re-determined. There are five pre-set classes of determination type, and these are shown below. Users can add new classes of determination type according to their requirements.

Table 4. Determination types used in Recorder 2000.

Confirmation **Invalid** **Observation** **Original** **Validation**

If the determination type is 'invalid, this may have a bearing on whether the record passes validation: if the determiner has the skill to identify the taxon and decides that a previous determination is invalid (ie its determination type is 'invalid), then the record fails validation.

How the validation flag is set

Use the key below to work out how the validation flag for a record will be set.

Question	Criterion	Options	Result
1	Difficulty	Equals 0	Passed validation
		Not equal to 0	Go to question 2
2	Skill	Less than the difficulty level	Not validated
		Equal to, or greater than, the difficulty level	Go to question 3
3	Determination type	Is 'invalid'	Failed validation
		Not 'invalid'	Passed validation

Example 1

A naturalist competent at identifying birds (skill 1) identifies a blackbird (easy to identify, difficulty level is 0). She is competent to identify the taxon.

The record **passes validation** because all records of difficulty level 0 are accepted.

Example 2

A naturalist competent at identifying birds but rather poor at botany (skill level for botany is 0), identifies a sea lavender as *Limonium parvum* (difficult to identify, difficulty level is 2). He is not competent to identify this taxon (his skill level is less than the taxons difficulty level).

The record is **not validated.**

The county botanical recorder (skill level 2) checks the previous record and decides that the record is incorrect.

The county botanical recorder *is* competent to identify the taxon and the determination type is 'invalid so the record **fails validation.**

The county botanical recorder goes on to re-determine the record (from a specimen) as *Limonium britannicum*.

The recorder *is* competent to identify this taxon (which also has a difficulty of 2) and the determination type is not 'invalid so the record **passes validation.**

Contact

Information on all aspects of Recorder 2000 is available via the NBN website:

www.nbn.org.uk

7 Species identification - improving recording skills

Policy & Principles

- It is in the interests of the LRC to ensure that recorders supply data of the highest possible quality and covering the widest possible taxonomic range.
- The LRC must define what role, if any, it will play in improving the identification skills of recorders.

7.1 Background

It is in the interests of the LRC for all species data supplied to be accurate, as this reduces the number of rejected records. It is also in the interests of the LRC that the pool of skilled recorders is maintained through new recruitment, and that recorders cover a wide range of taxonomic groups.

This policy area is restricted to the role of LRCs in improving recorders' skills in species identification. In order to function effectively, LRCs must also develop good relationships with their data providers (see section 13 *Working with data-providing individuals* and section 14 *Working with data-providing organisations*). Incoming data require verification, and LRCs might want to encourage local recorders to take on this task (see section 6 *Species identification—verification*).

7.2 Policy

Recording skills can be improved in various ways. These include: improving skills in particular recording methods, extending knowledge into new taxonomic groups, and improving precision in identification. There are several mechanisms for achieving these objectives.

Training events and courses are valuable for many. A recorder may also benefit from one-to-one mentoring with an expert or from involvement with a club or society. Checklists, identification keys and guides, and field and laboratory equipment are all vital for improving skills. Circumstances vary between LRCs, although the principles on which to set policy on LRC involvement in improving recorders' species identification skills should be the same. Primarily, decisions should be based on the cost-effectiveness of direct involvement of the LRC and the availability of support from local and national recording schemes and societies.

In the policy statement the LRC should define its degree of involvement in improving recorders' identification skills, in the three categories of training, support and equipment.

It must be recognised that training in identification skills demands a high level of knowledge and teaching skills, and takes time. In most cases, it is not appropriate or feasible for LRC staff to provide training. However, the LRC may coordinate training sessions, bringing in suitably qualified recorders to run the courses.

Training events are only one mechanism for improving identification skills; others include encouraging networking among recorders and providing access to high-quality equipment and reference material.

In general, the LRC should evaluate the cost-effectiveness of direct and indirect involvement in a range of actions directed at improving the species identification skills of recorders who supply, or may supply, data to the LRC.

Specifically, the LRC should define its involvement in:

- the provision and promotion of training events and courses
- making equipment and reference material available to recorders
- supporting recorders' networks, groups and mentoring programmes

7.3 Procedures

The LRC must decide on the nature and extent of its involvement in the provision of training, equipment and support for the improvement of recorders' species identification skills. To assist in developing procedures, listed below are possible LRC actions to implement a range of policies within the three main areas of training, equipment and support. Procedures should be set at the local level and should be based upon consideration of the following possible activities.

7.3.1 Training events and courses

Possible LRC actions:

- assess recorders' training needs
- provide training

- facilitate training by, for example, organising training events, providing a venue for training, obtaining resources to pay for trainers, venues, equipment, transport etc
- advise recorders on training opportunities
- publicise and promote training events

7.3.2 Equipment and reference material

Possible LRC actions:

- provide guidebooks, checklists, keys and other reference material
- advise on sources of guidebooks, checklists, keys and other reference material
- advise on the availability of field and laboratory equipment held elsewhere
- provide field equipment
- provide an equipped laboratory

7.3.3 Support for recorders

Possible LRC actions:

- encourage mentoring by suggesting and encouraging the matching of experts with those who wish to improve their skills
- support networks by encouraging links between local recorders and between local and national recorders
- support recording groups through encouragement, making small grants, and providing facilities such as meeting rooms

7.4 Process of developing the policy and procedures

This LRC policy will mainly affect recorders themselves, who will want to secure as much training and support as possible. There are potentially substantial resource implications in providing training and equipment for recorders, and it is important that policy decisions are made in consultation with the LRC's core users and the full LRC partnership.

Case study

Species identification - improving recording skills

Lothian Wildlife Information Centre

Background

Lothian Wildlife Information Centre (LWIC) maintains a species database for the Lothian area of central Scotland (comprising four local authority areas). All Wildlife Site information is managed by LWIC, which also supports the Edinburgh LBAP through managing the information requirements for monitoring actions and outcomes. The LRC provides data to consultants, Scottish Natural Heritage, the local authorities and others on an ad hoc basis, although discussions are underway on establishing Service Level Agreements (SLAs). One full-time manager, who is employed by the Scottish Wildlife Trust, runs the Centre, which is located in premises in Edinburgh city centre.

Discussion

LWIC makes a general policy statement before a short background section that sets the context. This section incorporates some policy decisions, such as not to undertake training but to promote public surveys. These decisions reflect, on the one hand, the clear difficulties involved in spending time on training in an LRC with only a single staff member, and on the other, the high priority given by LWIC to encouraging public involvement in recording (see also section 15 *Public information gathering*).

The policy statement focuses on providing advice and encouragement to recorders, but it is necessary to look at the procedures to understand the nature and extent of the LRC's involvement.

The procedures cover some aspects of training and equipment. In particular, LWIC has decided that it will act as a source of information on training. Other LRCs have decided that they are not well placed to obtain and disseminate information on training events, and that their role is restricted to maintaining lists of contacts in specialist groups who can advise on these issues. LWICs role in promoting mentoring among recorders is described as part of its procedure on training. This important aspect of support, which all LRCs should be in a position to provide, is seen by many LRCs as perhaps the single most important thing an LRC can do in helping to improve recorders species identification skills.

At LWIC it has been decided to supply lists of useful reference materials rather than to provide the materials themselves. Most LRCs will build up collections of books and journals in the course of their normal operations. LRC managers must decide whether to make these available to recorders, whether to keep keys and checklists up to date, whether to advise recorders on the reference material they need or simply to advise recorders on the specialist groups that may hold this information. Many LRCs will adopt the latter position and decide that they have no direct role to play in advising recorders on species identification.

LWIC will encourage recorders to network with each other by encouraging them to join recording groups.

Contact

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Species Identification (increasing recording skills)

Policies

1 Policy Statement

Advice and encouragement will be offered to data providers of all levels of experience on developing their identification skills, allowing them to become more knowledgeable about the taxonomic groups they are familiar with and to expand their taxonomic coverage.

2 Background to the policy

2.1 An LRC is dependent on having accurate data and it is consequently essential to ensure that contributing recorders are as skilled at species identification as possible.

2.2 With the advent of Biodiversity Action Plans (both national and local) there is an increasing need for people with knowledge of specialist taxonomic groups. Unfortunately the number of such people is small and decreasing. If the biodiversity resource is to be properly assessed it is necessary to increase the pool of specialists.

2.3 However, training in ID demands teaching skills and is time consuming. It is not appropriate for LWIC to undertake training although it can be party to training programmes and the identification of training needs.

2.4 It is recognised that people develop their identification skills in different ways – some prefer to learn on their own, others prefer to learn with others (or a combination of both approaches). Guidance and encouragement will be given by the promotion of public surveys, training courses, recommended literature, access to mentors etc.

Procedures

1 The Procedure

1.1 *Promotion* The need to have more people with wildlife identification skills will be promoted via newsletters and other publications, meetings etc. Promotion of courses/events etc. that have been designed to extend identification skills will also be carried out.

1.2 *Training* To be in a position to offer the most appropriate advice on training it is necessary to be aware of the full spectrum of training available at both the national and local level (e.g. British Museum courses, local naturalist outings). Taxonomic training courses/workshops/events/field trips that local people may be interested in will be publicised. Provision will be made for putting potential specialist recorders in touch with experienced specialists for guidance. Connection will also be made with museums/botanic gardens to facilitate access to reference collections.

1.3 *Literature* LWIC will have a checklist of the most useful literature (local guides, field keys etc.) available for recorders with different skill levels and taxonomic interests.

1.4 *Local recording groups/schemes* Recorders will be encouraged to join any groups/schemes active in the area.

8 Good recording practice

Policy & Principles

- **Recorders should ensure that data are collected in ways that minimise disturbance to landowners and wildlife, comply with species protection legislation and avoid trespass.**
- LRCs should ensure that LRC staff, and surveyors working under contract, employ good recording practices.
- LRCs should advise partner organisations, individual recorders and coordinators of recording schemes of their policy on good recording practice.
- When recording work is required on private land, it should be carried out with the written permission of the landowner.

8.1 Background

The practices of data collectors vary greatly. The data that are managed by LRCs come from a number of different sources, including conservation agencies, NGOs and individual recorders. Some data are collected during surveys conducted by staff members of partner organisations; other data are collected by surveyors working under contract for partners. Many data are collected by individual recorders, some of whom work within the methodologies and systems of recording schemes and national societies; other recorders work on their own.

Data collection practices are significant to LRCs in two key respects:

- It is important that an LRC knows if data have been collected 'illegally' or through using methodologies that incorporate bad practice.
- It is important to ensure that good recording practices are promoted, in order to build trust in the LRC.

8.2 Policy

The issues covered by recording practices include:

- obtaining permission for access to land for biological recording
- obtaining permission to record in the cases of protected species and with recording methods that require a licence
- avoiding disturbance to wildlife

The amount of influence an LRC can exert over recording practices varies between types of recorder and recording activity. An LRC has control over recording carried out by its own staff (in-house recording), and influence over surveyors it has contracted. Recording carried out by, or on behalf of, a partner organisation is the responsibility of that partner, although the LRC may wish to promote good recording practices in its partner organisations. The degree to which an LRC can influence the activities of local recorders varies between recorders, and may be influenced by the guidelines, practices and methodologies of any national schemes or societies to which a recorder belongs. It may be appropriate for an LRC to publish guidelines on good recording practice as part of its support services for local recorders.

The greatest pressure to promote good practice an LRC can exert on recorders it does not directly employ may be brought to bear by refusing to accept records. The LRC may wish to introduce a requirement that recorders demonstrate that recording has been carried out to a certain standard before their records can be accepted.

Recording activities may specifically concern species protected in legislation and for which licences are required, or they may take place on land where there is a risk of incidental disturbance to protected species. Disturbance to breeding birds and accidental trapping of non-target species are common risks that should be considered when planning survey work. LRCs should have access to information on all legally protected species, in order to ensure, as a minimum, that data that have been collected illegally are not accepted. The licensing of activities that may disturb protected species is managed by the conservation agencies. Contact details are provided below under 8.5 *References.*

It is not feasible for all LRCs to define for themselves what they consider to be good recording practices for all recording methodologies, for all taxa; but all LRCs should have access to information on where advice on good practice can be obtained. Particular recording methodologies are covered in section 9 *Recording methodologies*. Codes of practice for collecting specimens are available from a number of societies:

- insects—Joint Committee for the Conservation of British Invertebrates
- phanerogams—Botanical Society of the British Isles

- algae—British Phycological Society
- lichens—British Lichen Society
- fungi—British Mycological Society

Recorders need to seek permission from landowners if they wish to access private land while recording. This is essential both for courtesy and to avoid trespass. In doing so, they should advise landowners of the purpose of their visit and also of what will happen to the data they collect. When permission is refused, the refusal must always be respected. An exception that may affect LRCs is that local authorities have the right to access land for the purpose of gathering data for local plans—this can apply to their appointed representatives. No permission is needed to record on footpaths and other public areas, although there have been instances when landowners have claimed data should be invalid because recording is not an activity permitted on footpaths. This has not been legally upheld.

Health and safety issues affect recorders, but these are not dealt with under good recording practice as they are the responsibility of the employing body (where appropriate) or the individual. An LRC may wish to offer advice on health and safety to recorders, and must take account of all health and safety issues if it is to employ recorders or surveyors.

8.3 Procedures

LRCs should encourage all recorders to implement good recording practice whether they are involved in a structured survey or simply making casual observations. Procedures to promote good practice may include:

- **Issuing good practice guidelines to recorders and LRC partners.** An LRC should make its guidelines available in the form of a convenient leaflet for recorders. Seeking and obtaining permission from landowners to record is an important aspect of good practice, and the LRC should include advice on doing this within its guidelines. It is courteous to send landowners copies of all data collected on their land; this job might be carried out for the recorder by the LRC.
- **Running, promoting or coordinating training events for local recording groups and societies.** Although an LRC may not be involved directly in training recorders, it is usually feasible for an LRC to hold contact details for recording schemes and societies that can advise recorders on good recording techniques. See 8.5 *References* for sources of information.
- **Incorporating good practice guidelines into contracts with surveyors and supplying the guidelines to partners involved in survey work.** In certain circumstances, an LRC may decide to make adhering to its guidelines a prerequisite of records being accepted. This is likely to apply in particular to protected species, in which case the LRC might indicate on its database those species requiring licences so that recorders' licensing can be checked during data entry.

8.4 Process of developing the policy and procedures

Promoting and implementing good practice during biological recording requires the understanding and support of those who will be affected. Biological recording staff and recorders' representatives should therefore be involved in policy decisions and in designing procedures for their implementation. It is important that local representatives of recording schemes are also involved in setting policy. Defining good recording practice requires knowledge of the legislation governing protected wildlife and the regulations covering particular recording methods.

8.5 References

8.5.1 Recording techniques

A Sourcebook for Biological Recording in Scotland. BRISC (Biological Recording in Scotland), 1999. (Available from BRISC, c/o Chesterhill, Shore Road, Anstruther, Fife KY10 3DZ.)

A Handbook for Biological Recorders, A manual for recording plants, animals and their habitats in Cornwall and the Isles of Scilly, 2000. (Available from the Environmental Records Centre for Cornwall and the Isles of Scilly (ERCCIS), Five Acres, Allet, Truro, TR4 9DJ, Cornwall TR4 9DJ.)

8.5.2 Legislation

Reid, Colin T, *Nature Conservation Law*. W Green, Edinburgh, 1994.

A Manual of Nature Conservation Law, Michael Fry (ed). Clarendon Press, Oxford, 1995.

Scotland's Wildlife: the law and you. Scottish Natural Heritage, 1998.

8.5.3 Access to land

The Wildlife Sites Handbook. The Wildlife Trusts, Version 2, Newark, 1997.

8.5.4 Licences

England

Licensing Service, English Nature, Northminster House, Peterborough PE1 1UA

01733 455 136

Wales

Licensing Section, Countryside Council for Wales, Plas Penrhos, Fford Penrhos, Bangor, Gwynth, LR57 2L

01248 385615 (mammals and flowering plants)

01248 38 5653 (other taxa)

Scotland

Licensing Service, Scottish Natural Heritage, Advisory Services, 2 Anderson Place, Edinburgh EH6 5NP

0131 446 2460

Northern Ireland

Licensing Service, Environment and Heritage Service, Natural Heritage, Castle Street, Belfast

02890 251 477

Case study 1

Good recording practice

Leicestershire Museums, Arts and Records Service

Background

The Environmental Resources Centre in Leicestershire is an LRC that is managed by a local authority museum service—Leicestershire Museums, Arts and Records Service (LMARS). It is core-funded by Leicestershire County Council, and receives additional income from:

- Service Level Agreements (SLAs) with district and neighbouring unitary planning authorities
- administrative fees from commercial users
- a Heritage Lottery Fund (HLF) grant
- contracts to carry out a variety of professional works

Among these professional works are surveys carried out by LRC staff.

Discussion

A single policy statement sets out the key elements of LMARSs policy on good recording practice. These elements are explained and elaborated on in background notes covering access to land, disturbance to wildlife, health and safety, and contracts.

The policy focuses on in-house recording practices, although 'third party recording is also mentioned. Many LRCs do not carry out survey work but do wish to influence others survey practices. It may be appropriate for an LRC to set different policies for different types of recorder; this should not require good recording practice to be redefined, but should simply reflect the need to exert influence in different ways.

LMARS has divided its policy broadly into land access and nature conservation issues.

Land access issues concern obtaining permission from landowners to enter land to carry out biological recording. Many years of experience of in-house and contracted survey work have led LMARS to conclude that identifying landowners is often very time-consuming, and that a considerable proportion of survey costs can be spent on obtaining permission to carry out the survey.

Experience at LMARS has led to the following points being made about contacting landowners:

Preliminary visits to sites can determine whether a site has been ploughed, developed or otherwise altered to the point of the survey having to be cancelled.

Previous correspondence with landowners can generate useful data on ownership, although establishing a database requires registration under the Data Protection Act.

Third parties have offered to trace ownership for LMARS but have been unable to do so, possibly as a consequence of the time required.

'Knocking on doors can be very useful.

All survey work is preceded by a personal visit to explain to the landowner what the survey is for and what it consists of, and to supply them with a copy of the LMARS 'Code of Conduct (reprinted below) and other background information and contact details.

LMARS has found that local recorders do not put very much effort into seeking access permission from landowners. When LMARS is involved in coordinating the work of local recorders, the LRC will carry out this task.

Good nature conservation practice is considered as a topic. This includes adhering to regulations concerning protected species, and minimising impacts on wildlife from recording activities.

The procedures cover a number of straightforward steps for obtaining access permissions and reducing impacts on wildlife during surveys carried out by LRC staff, contractors and partners.

Contact

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- dlott@leics.gov.uk

Policy on Good Recording Practice

1 Policy Statement

LMARS will ensure that its recording activities are carried out with minimal inconvenience to third parties and in accordance with the law and good nature conservation practice.

2 Background to policy

2.1 Field recording, either in house or through third parties, is fundamental to LRC operations. However, it would be counter-productive to alienate landowners and other interested parties by insensitive fieldwork procedures. Seeking permission for access to a site is best seen as part of a wider process of securing sympathy for the aims of the survey from the landowner. Indeed this can be crucial to the success of the project for which the survey is being conducted.

2.2 Local authorities have power of access to land in connection with local development plans, but it is unlikely that LRC staff would be required to exercise these powers except in exceptional circumstances.

2.3 Without proper precautions, fieldwork can also compromise nature conservation objectives through the disturbance of rare species or the reduction of populations by over-collecting. It is important to realise that there is a perception that some survey techniques are damaging to nature conservation, even when their use is properly justified.

Dealing with landowners and tenants

2.4 Surveys requiring only visual access will be carried out from public rights of way, from outside the site or from the air, unless permission for access has been acquired.

2.5 Permission from landowners will be sought for access to sites for all other in-house surveys. The purpose of the survey will be fully explained when requesting access.

2.6 It may be necessary to survey land, whose owner is unknown, but only after all reasonable steps have been taken to identify the landowner.

2.7 Inconvenience to tenants and other third parties will be kept to a minimum.

2.8 Conditions of access will be adhered to. If these conditions conflict with the aims of the survey, then the survey will be cancelled.

Conforming with good nature conservation practice

2.9 In-house surveys will be conducted so that they do not contravene protected species legislation. Also their impact on populations of target species and other species of conservation value should be negligible.

Conforming with good employment practice

2.10 The authority's health and safety policies will be applied to all fieldwork projects.

Recording by third parties

2.11 Contracted surveys and surveys carried out by partners as part of joint projects will conform to the same or equivalent standards encapsulated in the policies above.

Procedures

1 Securing access to sites

1.1 Select sites according to survey design.

1.2 Identify landowner. Four methods are available:

1 it may be possible to identify the landowner from data held by LMARS or commissioning organisation;

2 it may be possible to identify the landowner from third parties;

3 sometimes landowners can be identified by application to the land registry;

4 the identity of landowners can usually be discovered by calling at neighbouring residences.

1.3 Contact landowner to explain purpose of survey and secure permission for access. If land is closely grazed, it may be useful to ask the best time of year to see pregrazed growth.

2 Good nature conservation practice

2.1 For each survey site, assess the potential presence of protected species and other species of conservation value.

2.2 Assess the potential impact of survey techniques on these species.

2.3 If necessary, modify survey techniques so that they have no impact on the conservation of populations belonging to these species.

2.4 If this is impossible, select another survey technique or another study site.

2.5 If this is impossible, contact English Nature for advice.

2.6 Consideration of survey technique options must include an assessment of their impacts on target species populations.

2.7 Carry necessary documentation on site.

3 Recording by third parties

3.1 If permission for access is not LMARS's responsibility, include a clause on seeking landowner's permission in contracts or agreements for other parties to carry out survey on behalf of LMARS or a partnership involving the LRC.

3.2 Similarly require survey contractors and partners to carry out assessments of the impact of the proposed survey on protected and target species where this is not LMARS's responsibility.

COMMUNITY PARISH WILDLIFE & COUNTRYSIDE SURVEY SURVEYORS' CODE OF CONDUCT

This Code of Conduct is written for Community Volunteer Surveyors, who are participating in a local Parish Wildlife & Countryside Survey.

1. At no time and under no circumstances will the bearer enter upon private land without the expressed permission of the owner (and occupier, if different). All surveys, if no permission is given, will only be completed from Public Rights of Way.

2. The bearer will seek to explain the purpose of the initiative and discuss any concerns, but will always respect any decision to withhold permission for access.

3. The bearer will always be completely honest about the purpose of the survey and the intended use of the information thereby gained. The bearer will explain who are the parties to this initiative and, if required, pass on the details of the Leicestershire Countryside & Wildlife Initiative who facilitate the survey.

4. The bearer will respect the privacy and property of the landowner (or occupier, if different) at all times and only visit the areas to which specific permission of access has been received.

5. The landowner (or occupier, if different) will, on request, be appraised of the findings of the survey in a full written report entirely free of charge.

6. It is not the function of the initiative to designate land or to target areas suitable for designation. If there are grounds for designation, the appropriate authority will consult the landowner (or occupier) directly.

7. The landowner will, at the discretion of the initiative, be offered support and advice on how to protect, maintain and enhance their land for wildlife, including the availability of grants and other payments, or will be passed details of an appropriate officer or organisation who can assist.

8. The bearer will leave the land and property of the landowner as it was found and will not damage crops nor disturb livestock.

9. The bearer will report back to the landowner (or occupier, if different) before leaving the property, if this is deemed necessary.

10. The bearer will notify the landowner (or occupier, if different) of every proposed visit, unless blanket access has been granted.

Case study 2

Obtaining permission to survey

The Scottish Wildlife Trust

Background

The Scottish Wildlife Trust (SWT) is working to identify, survey and provide management advice on Wildlife Sites across Scotland.

Discussion

SWT staff provide central coordination for activities to establish Wildlife Sites across Scotland. Survey and access work are overseen by a full-time survey coordinator, who manages a seasonal team of surveyors and access officers. Site surveys are mostly carried out by contracted surveyors, although occasionally local volunteers or trainee surveyors also do this work. Prior to a survey being conducted, an access officer will attempt to identify, contact and obtain written permission from the landowner(s). Occasionally, local volunteer survey groups seek permission to carry out their own survey work, following the same methodology.

There is a simple procedure for obtaining permission to survey from landowners, supported by detailed guidelines. The procedure is based on written correspondence with landowners. In the event of there being no response to an initial letter, a telephone call will be made to the landowner.

Guidelines (reproduced below) have been drawn up on:

- how to identify landowners (section 1)
- what to include in initial correspondence with landowners (section 2)
- how to conduct telephone discussions with landowners (section 3)
- the contents of a 'surveyors pack (section 4)

Contact

Scottish Wildlife Trust, 13 Murray Place, Stirling, FK8 1DQ

01786 445 300

estafford@swt.org.uk

Guidelines for obtaining permission to survey from landowners

Section 1

Identifying landowners

There are various ways to find out who owns an area of land, which vary from area to area. These are listed below to provide a number of routes depending on the individual situation:

- Phone around locally.
- Contact the local authority estates/planning department.
- Contact the local Scottish Natural Heritage office.
- Contact the local NFUS office.
- Approach occupiers of the nearest farms.
- Contact the local Ranger Service.
- Rates valuation rolls can be resourced at the national library.
- BSBI Recorders.

- The Scottish Landowners Federation can be contacted if you are unsuccessful with the other routes. They are more likely to hold information on large estates rather than small landowners.

SLF & NFU

The Scottish Landowners Federation must be notified, through one of their Regional Managers, of surveys taking place in their area. A standard letter is sent out by the Survey Co-ordinator. The same applies to the NFU. After notification, approaches can be made to the appropriate Regional managers for landownership details.

Section 2

2.1 Contacting landowners

It is essential that access permission for surveys is agreed with the landowner before surveyors go onto a site. When seeking permission for access to a site all landowners must be sent:

- The standard access letter (see below)
- A copy of the Wildlife Sites Leaflet to provide an explanation of the system.
- A reply sheet for them to return with the site name and grid reference filled in.
- A stamped addressed envelope.
- A map outlining the site on their land.

An example of a site survey summary.

If landowners require additional information they can contact the Survey Co-ordinator.

Section 3

3.1 Talking to landowners

It is sometimes necessary to telephone landowners as they may not respond to your letter. When discussing access permission with any landowner always emphasise the positive aspects of identifying Wildlife Sites, which include:

- The opportunity to receive free advice from the Scottish Wildlife Trust on how to manage habitats or species to ensure they continue to thrive. The survey is vital to identify what biodiversity interests a site has. Potential resources for free advice are our specialist Wildlife Advisors, Regional Conservation Managers, Wardens of SWT Nature Reserves and the Surveyors.
- Guidance on the availability of a full range of grants to manage the site will also be available. This

is especially relevant now the Rural Stewardship Scheme is in operation as this provides grant aid for management work for nature conservation e.g. fencing for stock exclusion for woodlands, bracken control, wetland management, and reduction of grazing levels and exclusion of stock for part of the growing season.

- A Wildlife Advisor can draw up a management plan in consultation with the owner and liaise with the SWT Conservation Teams who are sometimes available to carry out practical habitat management work.
- The great value of the wildlife present on their land and its comparative rarity due to enormous losses of wildlife habitat over the last 50 or so years, resulting from demands for increased yields and previous targeting of agricultural grants and subsidies towards this aim. Figures such as the loss of 95% of wildflower meadows, 50% of lowland ancient woods, and 50% of lowland heaths and mires over the last 50 years, can be quoted.
- It is worth noting that only 4–20% of the countryside is protected by statutory designation. 80–90% is therefore potentially at risk. The greatest threats to valuable habitats are generally neglect and mismanagement.
- One important point which must be covered when talking to an owner/manager of a site we wish to survey is that we are working in partnership with the local authority e.g. they usually supply us with maps, and that they will have access to the information. This will be at a specific level i.e. they will be given details of the site, should it make it as a Wildlife Site (they will already have ownership details from property records etc). Otherwise the information gleaned through our Wildlife Sites surveys will be available at a more general level, contributing to statistics of rare and valuable habitat types for example.
- It is also important to reassure them that this is not a formal designation but a voluntary system and that it will not affect any agricultural operations. We are aiming to work with them co-operatively and are currently campaigning to get the best possible grants system in place to support this work.

3.2 Anticipating questions

Anticipate any objections they may have as this will reassure them that we have thought this through and are not just giving them an answer to appease them. The most likely are:

Will it affect how they farm their land? Generally it does not affect their farming practices at all, as for example, the site is likely to be neglected grassland, or non-productive woodland. Our management advice and survey information helps identify habitats and species eligible for grant aid.

Can we enforce any recommendations? No. The Wildlife Site System runs on voluntary co-operation and goodwill. Planning applications sent to Local Authorities subsequently will however be subject to review in light of the survey findings.

Things to avoid are:

- Giving the impression that we can force them to give us access permission by other means.
- Continuing a conversation where the other person is obviously not listening and not replying to the points you are raising but following their own agenda—in this case go on to the next landowner.
- Suggesting that the landowners have to take our management advice, make it clear that is entirely up to them.

It is important that we maintain good relationships with landowners as the Wildlife Sites system depends largely on their goodwill and co-operation. Landowners that give verbal permission also need to be sent a standard letter, which we provide. This ensures that surveyors have some documentation to carry in the field should they meet a landowner/tenant farmer.

Section 4

4.1 Surveyors' packs

The Access Officers must compile the following information to pass onto the surveyor who will be surveying the site.

- A location map of the site, photocopied from the local Landranger map.
- Two boundary maps at 1: 10 000 (1 blank and 1 with the provisional boundary).
- Four maps at the appropriate scale (discuss this with the surveyor if you are unsure but generally it is preferable if the entire site fits on one A3 sheet).
- A copy of the permission slip and any details on parking, access dates etc. Please be sensitive to, and respect landowners/estates seasons e.g. lambing, shooting etc.
- Any background information you have collected on the site e.g. past survey records, species list etc.
- Photocopies of aerial photographs if possible.
- Local flora (rarities) lists including list of spp. which are so rare and important that correct identification needs to be verified by experts.
- Acetates for site write-ups.
- Report card per site.

Standard access letter

[access officer's name, address & Tel no.]

[landowner's name]

[date]

Dear

2000 Wildlife Sites Surveys

[Further to our recent telephone conversation] I am writing to you with regard to the Scottish Wildlife Trust's Wildlife Sites survey programme for this year. As you may know, this survey aims to identify those areas of land that have considerable importance as wildlife havens, supporting locally rare or threatened habitats and species. It also makes it possible for us to assess the health of the countryside as a whole. The Scottish Wildlife Trust works in partnership with many other environmental agencies to safeguard Scotland's natural heritage and so, for example, summary survey information on those areas judged to be Wildlife Sites is given to Local Authorities for their own records.

[Site name] has come to our attention as being of interest, and we would like to have the opportunity to survey it this year. Taking advice on our code of practice from the Scottish Landowners Federation and the National Farmers Union, we insist that our surveyors have written access permission from all relevant landowners

before visiting sites. Also, that while making their visit they are careful not to cause any disturbance of property, crops or livestock. As I believe that you are owner/part-owner of this site, I would be grateful if you would grant permission for one of our surveyors to visit your land by returning the reply slip and map. The surveyor will, of course, introduce himself/herself to you as soon as they start working in your area. In addition, upon completion of the survey you will be provided with a copy of the survey findings.

The survey season is short (June to September), so we need to plan our workload well in advance. I hope you do not mind, therefore, if I telephone you within two weeks of sending this letter, if I have not had a reply by then, to discuss the matter further with you. If you need more time to consider, we can arrange when it would be convenient for me to call back.

In the meantime, please feel free to contact me with any queries. Thank you for your help.

Yours sincerely

[Access officer's name]
Wildlife Survey Access Officer

Enc. Wildlife Sites leaflet, SAE, map, reply slip

WILDLIFE SITE SURVEYS 2000

Name of Site:

Grid Ref. (centre of site)

I confirm that:

1) I am the owner / tenant* of part / all of the site named above.

2) The boundary of my part of the site is as shown on the accompanying map.*
(Please mark the map to show the area you own)

3) I agree / do not agree* to the site being surveyed by SWT in order to establish whether it meets the criteria for a "Wildlife Site". A leaflet is enclosed to provide more information on the Scottish Wildlife Trust's Wildlife Sites System.

4) The site (or part of it) is currently used for:

Timber production *
Game preservation *
Grazing *
Other (please specify) *

Name:

Address:

Phone:

Signed:

Date:

Comments:

* Please delete as appropriate.

9 Recording methodologies

Policy & Principles

- **The use of consistent recording methodologies is essential if data are to be collated and so that data from different sources or areas can be compared.**
- LRCs should understand how to manage and use data that have been collected using particular methodologies.
- LRCs should set policy on their involvement in recording systematically collected data.

9.1 Background

There are many methods for the collection of data on species, habitats and sites. These range from casual observations of species to employing technical equipment in systematic and standardised ways.

Particular data collection methodologies have been developed for many purposes. Monitoring of trends, for example in a species' distribution or in its population size, is conducted by many schemes such as the Breeding Bird Survey and the National Bat Monitoring Programme. Other collection methodologies, such as the Fleas Mapping Scheme and the Nematode Survey, simply describe how records should be collected in the field. Many monitoring, mapping and recording schemes issue recording cards that stipulate the data required to constitute a record. (This is discussed in section 10 *Minimum record standards*).

LRCs should develop good working relationships with recording schemes and societies, and should seek to manage the data collected by their contributors and make them available to others. In order to do this, an LRC must have a good understanding of the data collection techniques used and of the uses to which the data may be put. Many recorders collect data as part of recording schemes or other systematic recording initiatives, and the LRC should be in a position to advise others on the purposes and requirements of these schemes. This information is needed both by local data users and by recorders themselves, particularly those wishing to participate in more systematic recording activities.

LRCs should be able to provide information products that are based on the simple presence of species and habitats, and many data can contribute to such products. Contextual information is also important for many LRC users. Context often consists of information on national trends and legal status—in which case, the information is best generated centrally and then passed on to be held by the LRC. Determining local context is different, and LRCs can often generate information on local trends from data that have been collected systematically.

9.2 Policy

Data for monitoring changes through time, and other systematically collected data, are much used by the statutory conservation agencies and by national recording schemes and societies. Data on changes through time require ongoing systematic recording activity. Geographical gaps in data need to be filled through survey work undertaken using consistent methods.

Few LRCs are likely to be in a position to manage the collection of data for monitoring purposes as part of their core services. However, all LRCs should actively promote the filling of geographical gaps in the data they manage, and many will advise their partners on recording methodologies or commission surveys on behalf of their partners.

All LRCs should set policy on supporting and promoting systematic data collection. An LRC should decide what support services it will provide to recorders (see sections 13 and 14 on *Working with data providers*). Part of this support may be giving advice or providing facilities to promote systematic data collection as part of local or national monitoring or mapping programmes. This policy area should be based on analyses of users' needs and on the LRC's policy on working with data providers.

All LRCs should set policy on supplying products that are dependent on systematic data collection. In order to assess what the potential uses of the data it manages are, an LRC must understand any implications arising from the particular recording methodologies used to collect the data. The LRC must also know which data products require data to be collected in certain ways.

9.3 Procedures

Procedures are required to implement LRC policy on promoting systematic data collection and on use of systematically collected data.

9.3.1 Supporting and promoting systematic data collection

One of the foundations of systematic data collection is that the system or methodology embodies standards; adherence to these standards permits data to be collated with other data sources. An LRC should promote the adoption of common standards in recording methods among recorders in order to maximise the value of the data they collect, although it may wish to adapt and improve on the standards used in national recording schemes.

There are a number of simple mechanisms that LRCs can promote locally that can improve the usefulness of systematically collected data. These include: standardising recorder effort during surveys; restricting the weather conditions and time of day when recording takes place; specifying the minimum skills of recorders; and setting the verification criteria.

Some collecting methodologies are supported by specialist recording schemes or societies, in which cases the LRC should determine the level of support it will offer local recorders who are participating or who may wish to participate. This support may consist of maintaining lists of scheme coordinators who can be consulted by recorders or by data users who require specialist advice. Many details can be obtained from the Biological Records Centre at Monks Wood (see section 9.5 *References*). Some recording schemes may collect data at standards below the minimum required by the LRC, in which case the LRC should inform local recorders of this fact and promote local recording to higher standards. The LRC should also consider how to encourage the adoption of these standards by the scheme coordinators.

9.3.2 Supplying products that are dependent upon systematically collected data

Certain information products can only be derived from data that have been collected using particular recording methodologies, and an LRC must understand fully the implications of this, to avoid making incorrect analyses.

As mentioned in section 9.2 *Policy*, there is a significant demand for data on trends. Time sequences covering species population numbers or breeding success, or the extent and distribution of species and habitats through time, are examples of trends data. Producing these data requires that consistent standards be applied to data collection and analysis. Data users must define their requirements for local trends data, and should discuss with the LRC the extent to which currently-held data can meet their needs, and what new data are required. The resource implications of any new recording activity, and associated data analyses, must be considered and agreed before the LRC engages in influencing recording activities to meet its users' requirements for local trends data.

9.4 Process of developing the policy and procedures

It is important that LRC users are fully involved in discussions with LRC management on their needs for products and services, and that biological recording staff are also involved.

When an LRC decides to promote a particular recording methodology, it should discuss and agree with the recording community what its level of support for recorders will be. In most cases, a society or recording scheme coordinator will be best placed to provide the 'hands on' support needed to ensure that the data collected actually meet the requirements of the particular recording methodology.

LRCs should aim to develop and maintain good communications with local recording scheme coordinators, and may seek to influence survey design to match their data needs more closely. To this end, it is useful if any recorders' forum includes in its membership representatives of locally active recording schemes.

Systems for the management of data and metadata generated by systematic recording should be set by LRC staff in accordance with the policies on *Data processing and management* (see sections 16–21).

9.5 References and sources of further information

A Sourcebook for Biological Recording in Scotland. BRISC (Biological Recording in Scotland), 1999. (Available from BRISC, c/o Chesterhill, Shore Road, Anstruther, Fife KY10 3DZ.)

A Handbook for Biological Recorders, A manual for recording plants, animals and their habitats in Cornwall and the Isles of Scilly, 2000. (Available from the Environmental Records Centre for Cornwall and the Isles of Scilly (ERCCIS), Five Acres, Allet, Truro, TR4 9DJ, Cornwall TR4 9DJ.)

Biological Records Centre

Centre for Ecology & Hydrology, Monks Wood, Abbots Ripton, Huntingdon PE28 2LS

0148 777 2400

www.brc.ac.uk

Case study

Recording methodologies

Lothian Wildlife Information Centre

Background

The Lothian Wildlife Information Centre (LWIC) is run by a full-time manager who is employed by the Scottish Wildlife Trust. A small number of volunteers assist with various tasks including data entry, producing newsletters and other publications and collating responses to public surveys.

The LRC maintains a species database for the Lothian area of central Scotland (comprising four local authority areas), and provides data to consultants, Scottish Natural Heritage, the local authorities and others on an ad hoc basis, although discussions on establishing Service Level Agreements (SLAs) are ongoing. The LRC is contracted by Edinburgh Council to assist in managing biological information in support of the LBAP and has been involved in setting priorities for actions through determining the local status of species. LWIC has recently set standards and methodologies for data collection, aimed at generating information on the effectiveness of LBAP actions; this will allow for the monitoring of trends and reviews of the effectiveness of actions.

LWIC is closely involved in work on identifying Wildlife Sites, and has designed site assessment methodologies. These have required modifications to be made to certain recording methodologies to ensure that the data collected meet the needs of the assessment process. The Wildlife Sites survey teams are employing these methodologies locally.

Discussion

The focus for LWIC's policy and procedures on recording methodologies is on the promotion of systematic data collection, and LWIC has a general policy to promote standard recording methodologies by providing advice to recorders and organisations. This is elaborated in a series of five sub-policies covering advice, promotion, training, data management, and filling data gaps.

Each sub-policy is implemented through a number of procedures. Advice to recorders and organisations is a central component of LWIC's approach; providing such advice requires a good knowledge of recording methodologies. Some LRCs may decide simply to concentrate on advising local recorders on sources of support within the recording community. LWIC sees a clear role for itself in promoting standard recording methodologies in the pursuit of high quality data that are fit for a range of purposes. It does this by influencing survey design methodologies wherever possible, rather than through working with individual recorders.

Although it does not normally provide training, LWIC does take an active role in promoting relevant training in recording methodologies.

Contact

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Methodologies/Sampling Techniques

Policies

1 Policy Statement

LWIC will advise recorders on the use of appropriate survey/sampling techniques and encourage them to use recognised, standard methods to ensure the maximum value from their data.

2 Background to policy

Terminology

There is a need to decide on standard terminology.

Method – orderly procedure that allows data to be gathered in a repeatable way.

Standard method – a method that has become widely adopted.

Methodology – system of methods.

Sampling method – The method used to organise sampling e.g. 1km square per tetrad or random positioning of quadrats in a stand.

Sampling technique – The procedure used to take samples e.g. quadrat or pitfall trapping.

2.1 *The need for methodologies/sampling techniques* It is generally accepted that habitat and species data should, wherever possible, be gathered and recorded in a standardised way. The use of standard methods allow:

- Efficient and accurate collection of data.
- Maximum value of data e.g. comparisons between data sets and meaningful interpretation of pooled data.

2.2 *LRC requirements* LWIC is not directly involved in recording but has a direct interest in the prioritising of data collection and in its quality. There are a number of basic data sets which the LRC requires and which need to be of a certain, known standard. For example a habitat survey of the area is essential and this would need to be done to the accepted Phase 1 survey standard.

It is also true that complete coverage of a species or group would be most valuable if a standard sampling method had been used throughout. Similarly, accurate comparison of sites is only possible if they have all been surveyed to a known and compatible standard.

It is of particular value to LWIC to identify sites or groups where data have been collected over a long time scale using a standard methodology. This allows changes in habitats and/or species to be detected and offers the opportunity to repeat the sampling at a later date and add to the data set in a compatible way.

It is therefore in LWIC's remit to be aware of the best methods for sampling and recording and to encourage recorders to adopt and use these.

2.3 *The range of recording methodologies* Over the last two decades detailed studies have been made to identify the most effective methods of collecting, recording and analysing data for both species and habitats. Many animal groups in particular can only be accurately sampled using specialised sampling methods.

It follows that there is a wide range of these available methods that LWICwill be familiar with from standardised recording practices to monitoring techniques. These include both habitat (e.g. Phase 1, River Corridor, NVC) and species recording methods (e.g. national recording scheme methods, butterfly monitoring scheme).

2.4 *Advisory role of LWIC* A practical knowledge of the whole range of aspects relating to recording, sampling and monitoring techniques is required. LWIC will be in a position to promote and offer advice on:

- All current recording schemes and surveys e.g. millipede recording scheme and national water vole survey.
- All established survey/monitoring methodologies e.g. Phase 2, CBC, butterfly transects.
- The full range of standard sampling considerations e.g. ensuring geographical and altitudinal coverage, positioning of quadrats.
- All search/sampling techniques e.g. pitfall trapping, quadrats.
- Every aspect that should be recorded e.g. 6 figure grid reference, habitat, locations of sampling sites.
- Modifying standard methods under special circumstances (e.g. lack of resources).
- Design of survey/monitoring forms.

Data storage.

2.5 *Data storage role of LRC* LWIC's knowledge of the practicalities of dealing with the storage of data in both physical and electronic forms puts it in an ideal position to store and assess long term species/site monitoring data (e.g. for the LBAP process).

Considerations when advising on methodologies

2.6 *Adherence to standard methods* LWIC will always promote the use of existing standard methods and will include them in the design of its own surveys.

2.7 *Training and quality control* The quality of the data is heavily dependent on the skill of the field workers. It follows that the LRC must be aware of quality aspects of the work – even if standard methods were used. The competence of the recorder must be considered and the need for training in the methodology recognised.

2.8 *Planning surveys* When LWIC is party to the planning of a proposed survey then time/man-power/equipment/money resources will need to be taken into account. In particular, the pros and cons of using volunteers or professionals will need to be considered.

2.9 *The link between data and the sampling method* The quality of any data set clearly depends on the way in which it has been collected. It follows that details of the method used, including the amount of effort and the skill of the recorder should always be accurately logged and the resultant data cross-linked to this information. Analysis and interpretation of the data will, therefore, be enhanced by the knowledge of the nature of the sampling and the quality of the way it was carried out.

Policies

2.10 ***Knowledge of standard methods*** LWIC will be aware of all of the standard methods for the collection of data on species and habitats by keeping an up-to-date record of recording schemes and survey techniques.

2.11 ***Promotion of standard methods*** LWIC will promote standard methods whenever appropriate including using them as foundations to its own surveys.

2.12 ***Training in standard methods*** LWIC will encourage all contributing recorders, when appropriate, to consider upgrading their knowledge of sampling, recording and survey techniques through training. (BRISC training in Scotland, local training courses).

2.13 ***Linking records and methods*** LWIC will tag all individual records to the survey they came from along with, where appropriate, the details of the methods used.

2.14 ***Gap-filling surveys*** LWIC will identify all data sets where standard methods have been used to a known standard and particularly flag up those sites where the same technique has been applied over a long period, in order to decide where surveys to fill data gaps should be focussed.

Methodologies/Sampling Techniques

Procedures

Knowledge of standard methods

1 Background to the procedure

The procedure implements the following policy:

LWIC will be aware of all of the standard methods for the collection of data on species and habitats by keeping an up-to-date record of recording schemes and survey techniques.

2 The Procedure

2.1 *National Recording Schemes* LWIC will keep an up-to-date list of all current national recording schemes. It is also necessary to have batches of standard reporting cards and instructions for any recommended sampling methods and techniques used in the schemes. The LRC should be in a position to advise people wishing to take part on the practicalities of using the sampling methods and techniques.

If it is not obvious, it will also be necessary to know what are the minimum data requirements for each scheme to be able to advise recorders who have limited time/resources available.

LWIC will also know the schemes' validation requirements e.g. when it is necessary to collect voucher specimens.

2.2 *Survey methodologies* A working knowledge of the following methodologies is required:

- Phase I habitat survey
- Phase II habitat survey
- National Vegetation Classification
- River Corridor survey
- Common Bird Census
- BTO surveys
- Water pollution monitoring methods
- Butterfly Transects

LWIC will be aware of the pros and cons of using the different methods e.g. levels of skill (and training) required to successfully carry out each method, time and cost considerations, availability of suitable field workers and accessibility of suitable maps.

2.3 *National and local surveys* LWIC will be aware of any national and local surveys taking place.

2.4 *Sampling methods and techniques* Some recorders may not wish to be involved with national recording schemes but are willing to gather data in a standardised way. LWIC will advise them on suitable sampling methods and techniques based on their levels of skill, available time and taxonomic interests.

2.5 *Designing local surveys/recording schemes* If required to advise on or create a local survey/scheme LWIC will use its knowledge of the range of methodologies to ensure that standard methods are incorporated - if possible existing standard methodologies should be used.

Promotion of standard methods

1 Background to the procedure

The procedure implements the following policy:

LWIC will promote standard methods whenever appropriate including using them as foundations to its own surveys.

2 The Procedure

2.1 *Promotion of standard methods* LWIC will widely publicise its willingness and ability to advise on standard recording methods (e.g. in promotional leaflets, talks, newsletters).

LWIC will particularly ensure that it has an advisory role in the planning of LBAP species and habitat surveying and monitoring.

LWIC will make sure that individual recorders and local recording groups are aware of relevant national recording schemes, and encourage them to take part in the schemes. If they are unwilling to take part directly they should be encouraged to gather data using the schemes' sampling and recording methodologies.

National and local surveys and national requests for records of specific species should be publicised as widely as possible (e.g. newsletters, talks, events).

Training in standard methods

1 Background to the procedure

The procedure implements the following policy:

LWIC will encourage all contributing recorders, when appropriate, to consider upgrading their knowledge of sampling, recording and survey techniques through training. (BRISC training in Scotland, local training courses).

2 The Procedure

2.1 *Training in standard methods* As a general principle all recorders will be encouraged to increase their knowledge of sampling, recording and survey techniques.

All relevant training courses at both the local and the national level will be publicised by LWIC.

LWIC will consider running training sessions on the principles of standard recording methods but not on the methods themselves.

Linking records and methods

1 Background to the procedure

The procedure implements the following policy:

LWIC will tag all individual records to the survey they came from along with, where appropriate, the details of the methods used.

2 The Procedure

2.1 *Linking records and methods* It is important that LWIC tags all individual records to the survey they came from.

If the methodology has been modified for a particular survey/recording scheme (e.g. pared down due to lack of resources) this information will also be stored on the database. If there is knowledge of the data quality of the survey/scheme then this will also be recorded.

Gap-filling surveys

1 Background to the procedure

The procedure implements the following policy:

LWIC will identify all data sets where standard methods have been used to a known standard and particularly flag up those sites where the same technique has been applied over a long period, in order to decide where surveys to fill data gaps should be focussed.

2 The Procedure

2.1 *Flagging of quality data* LWIC will encourage surveys to fill gaps in its data holdings (i.e. gaps in habitat and species distribution coverage). These gaps should preferably be determined using data sets where standard methods have been used, particularly when the same technique has been used at an area over a long period.

Gap-filling surveys and recording schemes should use the same standard methods as was used in the areas already covered.

10 Minimum record standards

Policy & Principles

- Minimum record standards define the essential elements of a biological record that must be met for the record to be accepted by the LRC.

10.1 Background

Minimum record standards define the elements of a record that must be present for the record to be accepted by an LRC, and they set out the accuracy and precision required of those elements. LRCs should normally encourage recorders to submit data of a higher quality than that described by the minimum record standards. Historical records may fall below the minimum standards and LRCs may wish to define different standards for some historical records. Minimum record standards provide a mechanism for the systematic appraisal of records submitted to LRCs on an ad hoc or casual basis.

Records collected using standard recording methodologies should always conform to minimum record standards. Guidelines for recorders should normally encourage recording to a far higher standard than is set out in the minimum record standards—for example, while it might be acceptable for the LRC to handle data with limited location information, the LRC should ask for records with an eight-figure grid reference so they can be used for a wide variety of purposes.

10.2 Policy

Minimum record standards have been set by the NBN as an important element in ensuring that records from one survey are compatible with those from another. These standards have been incorporated into Recorder 2000. The essential elements of a record are:

- taxonomic occurrence (what is being recorded)
- recorder (who made the record)
- where the observation was made
- when the observation was made
- type of observation (how the observation was made)

There is considerable flexibility in the acceptable levels of precision and accuracy with which data can fulfil the minimum standards in each category.

LRCs should set policy on minimum record standards that incorporate these essential elements of a record. The minimum and desirable levels of precision and accuracy of the data in each element may be subject to some variation, depending on the type of record. The individual elements are discussed below. Details on NBN record standards are available on the NBN's website at: www.nbn.org.uk/projects/standards/minrec.htm

10.2.1 Species and habitats (taxonomic occurrence)

Most LRC users require taxa to be identified at species level, although the policy should state which taxonomic groups an LRC will accept at a lower level of identification. NBN species and biotopes dictionaries should be used for selecting the standard names and classification systems. See section 4 *Definition of sites* for guidance on handling sites data.

10.2.2 Recorder (source of record and identity of determiner)

The NBN data model requires that either an individual or an organisation be specified for every record. It is important that LRCs do not attempt to work around this requirement. When a record has been verified (determined) by someone other than the recorder, the identity of the determiner must also be given.

10.2.3 Location

Up until the 1980s, species records were often simply linked to a place name, often a town or village, or a site such as the name of a wood. Data users now require data to be recorded at a far higher level of geographical precision. The higher the level of geographical precision of data, the wider their potential uses.

The minimum acceptable geographical precision of records will vary between taxonomic groups. Records of birds and other mobile species may have a lower acceptable standard for recording their location than plants and less mobile invertebrates. The ideal standard is an eight-figure grid reference, but it is unrealistic to expect this of all recorders. LRCs should set this as the standard for contracted and other professional survey work where it is appropriate to the taxon being recorded, and should encourage all recorders to record to at least a six-figure grid reference whenever possible.

10.2.4 Date

Most recorders record the date on which a field observation was made, although for some recording methodologies it is not possible to be more precise than to specify a range of dates. Many LRC users may not require an exact date, but the more accurate the specification, the wider the potential use of the data.

10.2.5 Type of observation (sample type)

Many records are collected during simple field observation, although desk study and various specialist recording techniques may also generate a large portion of the records managed by LRCs. The NBN data model requires specification of the type of survey during which a record was collected.

10.2.6 Historical records

Historical records can pose problems for LRCs, as their quality may fall below minimum standards, but their usefulness can sometimes compensate for this. LRCs must decide how to deal with such records. On many occasions, the quality of information can be improved by carrying out some additional research.

Many species' taxonomies have changed over time, and care must be taken to check that changes have not occurred that would result in the name given in a historical record being incorrect. Voucher specimens are particularly valuable when such redeterminations are required, and the NBN species dictionaries permit the checking of historical names for species.

Historical location data can be particularly difficult to handle, as place names can change over time and records may only have very general information on where they were collected. Care must be taken not to infer more precision than is justified. In many cases, some knowledge of the recorder's field activities is needed to check where records were actually collected.

Exact dates may not have been recorded, although it is often possible to make an estimate based on the dates of publication of records, the dates of the recorder's birth and death, or the recorder's periods of active fieldwork.

10.3 Procedures

LRCs should assess all records prior to their input, to ensure that the minimum record standards have been met (although minimum standards will be exceeded in most structured recording activities).

Standards should be incorporated into guidance on recording. This guidance should be supplied to contracted surveyors, LRC partner organisations, local voluntary recorders and the coordinators of recording schemes.

Procedures for dealing with historical records should be put in place, and should set out how any additional information needed will be sought or sub-standard records returned or discarded.

LRCs must decide what to do with incoming records that fall below minimum record standards. Such records may be either discarded or brought up to standard.

10.4 Process of developing the policy and procedures

Minimum record standards are needed for assessing records prior to inputting, and should be based on the minimum required by LRC users. Standards must be easy to understand and use, and should be set by LRC staff, including those involved in data input. It is important that these standards are explained to recorders' representatives and that any concerns of recorders are considered during policy development.

Case study

Minimum record standards

Leicestershire Museums, Arts and Records Service

Background

The Environmental Resources Centre in Leicestershire is an LRC that is managed by a local authority museum service—Leicestershire Museums, Arts and Records Service (LMARS). It is core-funded by Leicestershire County Council, and receives additional income from:

- Service Level Agreements (SLAs) with district and neighbouring unitary planning authorities
- administrative fees from commercial users
- a Heritage Lottery Fund (HLF) grant
- contracts to carry out a variety of professional works

Discussion

LMARS system for applying minimum record standards provides a useful model and incorporates the key elements of the NBN data model. The policy and procedures are based on a division of the information contained in biological records into 'principal data and 'associated data, and of records themselves into 'current and 'historical.

Principal data

Principal data include three of the five elements discussed in section 10.2: the 'what, where and when of a record. They do not include the source of the data (the 'who), nor the type of observation (the 'how),

LMARS has set accuracy and precision thresholds or standards for these principal data, based on the needs of the LRCs users.

Associated data

Associated data include information on the background to the recording event. This class of data includes the remaining two elements within the NBN data model: the source of the data and the type of observation (referred to by LMARS as the 'survey event). Associated data also include details of the verification of records and any other background information. Associated data are no less important than principal data, and are also subject to variation in their levels of precision and accuracy, but these variations do not affect the quality of the record, so 'precision thresholds are not set for associated data.

Historical data

Historical data are defined as those for which it is either impossible or undesirable to contact the recorder for further information. This is a useful definition, although it is often possible to upgrade historical records through other means.

Procedures

LMARS sets out procedures for assessing site-based and species records against minimum standards.

The procedures require that all the principal elements (referred to by LMARS as 'principal data types) be specified. In the case of site-based records, LMARS permits the 'what element to refer to a range of observations made at a site, including species, habitats or management events. Management events are not equivalent to species or habitat data, and the NBN data model requires the name of a taxon or biotope to be specified. A similar procedure is set out for assessing species records in which the 'what element refers to the taxon identification. LRCs should assess habitat data against minimum standards in a similar way to species data.

LMARS sets out precision thresholds for the principal elements of current and historical records, although these are minimums and higher standards are promoted whenever possible. Other LRCs may set their own minimum requirements to take local circumstances into account, although the highest possible standards should always be promoted, in line with NBN standards. In particular, other LRCs may wish to set higher thresholds for historical records than those set by LMARS.

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Minimum Record Standards

1 Policy Statement

1.1 LMARS will ensure that incoming records contain enough information for their potential use to justify the costs of data storage and processing.

2 Background to policy

2.1 Several levels of usable data can be recognised within a record:

- Principal data refers to the basic description of what, where and when in a record. This is the data that most users require. Examples of principal data include taxon identification, habitat, site management event, locality and date.
- Associated data refers to how or why principal data was generated. This is the data required for audit, processing and interpretation. Examples of associated data include identifier, date of identification, recorder, survey events etc.
- Principal data can have attributes such as precision and accuracy, which can affect the value of the record for future use. Associated data can also have these attributes, but they rarely affect the value of the record.

3 Current records

3.1 A record must link at least two types of principal data as well as the date.

3.2 There should be threshold criteria for accepting records based on the precision of principal data. These thresholds should be set at a standard that would suit at least one major user and be reasonably practical for data providers.

3.3 Principal data should be linked to sufficient associated data to enable the operation of data processing tasks such as validation and verification.

4 Historical records

4.1 Historical records should be subjected to lower threshold criteria than current records in recognition of their potential value for understanding changes in the landscape, flora and fauna, even if they contain imprecise principal data. A historical record is defined as any record for which it is impossible or undesirable to contact the recorder or donor for further information to upgrade the record. Consequently, there are circumstances where it would be appropriate to apply this policy to quite recent records.

5 Other records of low potential value for users

5.1 There may be circumstances when records are not accepted despite meeting all the minimum data requirements listed above. A judgement must be made on whether the potential value of incoming records justifies the costs of data storage and processing.

Procedures

1 Principal data

1.1 Accept current site-based and habitat records only if they contain the following principal data:

- Locality data expressed as a polygon with defined boundaries
- Date
- At least one other type of principal data

Examples of other principal data types include habitat, NVC community, species identifications, management events etc.

1.2 Accept current species records only if they contain at least the following types of principal data:

- Taxon identification
- Locality
- Date

2 Threshold precision criteria for accepting records

2.1 Evaluate incoming current records according to the precision threshold criteria listed in the table below. Secure additional information from the recorder where necessary before accepting or processing the records.

Principal data type	Precision threshold
Locality	4 figure grid reference (6 figure preferred) or polygon with boundaries defined to maximum 20 metres (preferably 10 metres) displacement precision, drawn on a map base at 1:10,000 scale or larger.
Date	Year (day or range between two days preferred)
Taxon identification	Species (class in exceptional circumstances)

2.2 Evaluate historical records according to the precision threshold criteria listed in the table below. Where possible, secure additional information by interpreting associated data or information in contemporary sources.

Principal data type	Precision threshold
Locality	County or vice county
Date	None
Taxon identification	Species (class in exceptional circumstances)

3 Associated data

3.1 Accept records only if they contain the recorder of the principal data. Contact details for the recorder should also be included where necessary.

3.2 Ensure that records containing taxon identifications also contain the identifier and the date of identification.