**Mammal records verification rule sets
for NBN Record Cleaner and recommendations on
species whose records should be treated as sensitive**

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1. Introduction

NBN Record Cleaner is an automated validation and verification decision-support tool for recorders and biodiversity data managers. It is designed to improve the efficiency of data flow and to ensure the quality of datasets on the NBN Gateway, by enabling the automated checking of large datasets in a variety of formats against validation and verification 'rule sets'. Verification rule sets flag up any records of species that fall outside the known temporal or spatial distribution of that species, as well as highlighting records of species that are inherently difficult to identify.

The Mammal Society was contracted by the NBN Trust to produce verification rule sets for mammals. The Mammal Society has for nearly 60 years been an authority on the study of mammals, their biology and the conservation issues affecting them. The Mammal Society holds data on spatial distribution of mammals in the UK, has leading experts on the Council and is well connected to expert advice from species specific organisations such as Cardiff University Otter Project, Bat Conservation Trust and ORCA.

This report details recommendations on the format of mammal records, along with a procedure for dealing with records highlighted by Record Cleaner and information regarding how the spatial and temporal rules were created. Advice is also given on best practices for dealing with sensitive records.

2. Attribute fields for new records

There are four attributes which should always be associated with new records of mammals, and other attributes which are considered desirable. For bat records only, the record method is an essential attribute, for all other mammals it is a desirable attribute.

2.1 Essential attributes

Date
It is preferable to have a complete date i.e. day, month and year. Records with month and year only may still, however, be useful, particularly for rare species, and so these records should also be accepted.

Location
Location should be given as an Ordnance Survey (OS) grid reference. Although a resolution of 100m is preferable, NBN should also accept records submitted at a lower resolution (10km) in some cases. Low resolution records are acceptable where species records are considered sensitive, and where the recorder is only prepared to share records at a low resolution (for example, due to landowner permission). Additionally, because many mammals are highly mobile and have large ranges (e.g. cetaceans), recording at a fine resolution may not be biologically meaningful.

Species
Records should be stored with both Latin and common names, to prevent confusion resulting from ambiguous common names in English or Welsh. If records are provided with common name only, the Latin name should be added before the record is stored.

Observer

The name of the person who observed the animal should be associated with the record. This allows the ownership of a record to be defined, and allows the observer to be contacted if necessary for verification. First name or initials, and surname, should both be stored.

Record method

An essential attribute for all bat records only. Bats may be identified by direct observation in the hand or through the use of bat detectors. These two methods present different levels of difficulty in identifying species, for example lesser horseshoe bats are easily recognised with a bat detector but more experience is needed to recognise them by sight. The record method will allow identification difficulty to be assessed (see section 4.1).

2.2 Desirable attributes

Additional fields should be included for the following desirable attributes:

Record method

Some records are based on direct but distant observations, others on direct observation in the hand (e.g. following trapping). Other records are based on the indirect observations, e.g. of signs or sounds. Recording the type of record can help in verification, for example molecular scatology may confirm the presence of a pine marten where a record of a footprint may be ambiguous.

Location name

A location name can help with verifying location, if (for example) a typographical error is made when submitting grid references.

Determiner

In certain cases records may be verified by an expert, for example by examination of a photograph. In these cases the name of the determiner should be recorded, in order to allow the determiner to be contacted if necessary. First name or initials, and surname, should both be stored.

Count

This is particularly important for bat, cetacean, seal and deer records as they can be found in large numbers. It should be possible to submit records as estimates, by the use of *circa* or a range (e.g. 20-30).

Age and sex

These can help to identify areas used for breeding. To enable future analysis of records, it may be helpful to limit the format of entries, for example, to juvenile or adult.

Time

Time can help with verification if the likelihood of the species being recording varies with time of day (e.g. bats are unlikely to be recorded in the middle of the day).

Comment

Comments from observers can help with verification, for example the habitat in which the animal was observed may help assess the likelihood of an observation.

Sensitivity of record

Bat Conservation Trust feel strongly that the observer should decide the resolution at which the record should be considered sensitive in order to encourage sharing of records. If an observer indicates a record is sensitive but does not indicate the level of sensitivity, then records should only be shared at the 10km square resolution.

3. Procedure for dealing with records highlighted by Record Cleaner

Mammal records are created by a variety of recording schemes (e.g. the Mammal Society's 'Mini Mammal Monitoring' scheme), and by more casual observations. Unlike other species groups (for example birds), there is no standardised recording scheme that covers all species of mammals on a national scale. National surveys do exist for single species (e.g. the Environment Agency's National Otter Surveys or PTES 'Hogwatch') or specific groups of mammals (e.g. BCT's National Bat Monitoring Programme) and these vary in frequency and coverage. Records from these may already have been verified or surveys conducted by trained experts. Assurances should be sought from the organisation concerned and if verification is deemed unnecessary then these national surveys may be used to update NBN Record Cleaner rules (e.g. on spatial distribution).

A two step approach should be taken in order to verify all records that fall outside the known range of the species concerned, or records of all species that are inherently difficult to identify (i.e. all records whose status is "requires verification"):

1. **Local verification**

   Local Records Centre (LRC) should be the first port of call in all cases. In some counties there are County Mammal Recorders or Local Mammal Groups to whom the LRCs may pass records for verification, but specialist groups for mammals are not found in all counties. Contact details for LRC can be found http://www.alerc.org.uk/find-an-lrc.html

2. **Species specific experts**

   If the LRC is not able to verify a record based on local knowledge (i.e. the verification status of the record remains "requires confirmation") then the record should be sent to one of the following organisations, depending on the species concerned;

   > Bats → Bat Conservation Trust

   > Cetaceans → ORCA

   > All other mammal species→ The Mammal Society

Bat Conservation Trust	**ORCA**	**The Mammal Society**
5th floor, Quadrant House	Brittany Centre	3, The Carronades
250 Kennington Lane	Wharf Road	New Road
London	Portsmouth	Southampton
SE11 5RD	PO2 8RU	SO14 0AA
0845 1300 228	023-92832565	023 8023 7874
enquiries@bats.org.uk	info@orcaweb.org.uk	enquiries@mammal.org.uk

These organisations will consult individual experts as necessary; these experts are not named here in order to avoid errors arising (e.g. in the case of retirements or changes in professional activities). Resources may limit the number of records that can be verified by organisations if large numbers of records are generated in the future.

Once records are labelled as "correct" or "considered correct" they can be used to update the Record Cleaner verification rules.

4. Verification rule sets

Three types of verification rules are included in this report based on perceived identification difficulty, and on spatial and temporal distribution for each mammal species found in the UK. These rules are provided in .txt files that accompany this report.

4.1 Identification difficulty rules

Classification systems based on identification difficulty were compiled in collaboration with leading mammal experts from the Mammal Society, Bat Conservation Trust (BCT) and Orca, all of whom are familiar with identifying mammals in a variety of conditions. Classification systems take into account relative abundance, such that rarer species are given a higher rating (for example, all vagrant seal and bat species are given a high rating so that these are always highlighted by Record Cleaner). These rules will need to be updated if species become more common or established.

Record Cleaner colour-codes identification difficulty on a 1 to 5 scale; 1-2 green, 3-4 orange, 5 red. Mammal Society and Orca agreed a four point system as appropriate for all mammals except bats, therefore in order for all three colours to be used for mammal records, the numbering system for the four categories is not consecutive (point 2 is omitted)(Table 1).

BCT agreed two four point systems for use with all bat records; one for records based on the use of bat detectors (Table 2) and a second for visual records or records of bats in hand (Table 3).

Table 1. Identification difficulty rule set for all mammals excluding bats

1	Easily recognised by sight, even by beginners. Accept records from most sources.
3	Can be identified by sight with some training or experience. May pose some difficulty in some conditions. Records from beginners may need verification but records should be accepted from experienced recorders.
4	Difficult to identify in most conditions. Close inspection is necessary, for example in a trap. Records from beginners will need verification but records will be accepted from experienced recorders.
5	Needs confirmation by an expert.

Table 2. Identification difficulty rule set for bat detector records

1	Easily recognised using bat detectors in most cases. Accept records from most sources
3	Can be identified using bat detector with some training or experience. Less experienced recorders should provide additional information such as recordings of calls
4	Difficult to identify. Detailed analysis of calls by experienced recorders required
5	Detector records need confirmation by expert.

Table 3. Identification difficulty rule set for visual records of bats

1	Easily recognised visually or in hand. Accept records from most sources.
3	Can be identified in the hand with some training or experience. Less experienced recorders should provide additional information such as measurements and photographs.
4	Difficult to identify. Experienced recorders may need to provide additional information such as measurements.
5	Difficult, most recorders will need to collect additional information and possibly complete DNA analysis to confirm species.

4.2. Spatial distribution rules

Spatial distribution rule sets were created using ranges mapped in the Handbook of British Mammals (Harris and Yalden, 2008), with some additional expert knowledge from the Mammal Society regarding species distributions that have changed since the publication of the Handbook.

For the majority of species, areas are mapped in the Handbook using the definitions (i) regular or usual range (ii) scattered but regular occurrence (iii) rare occurrences, vagrants, or scarce and beyond the regular range. For these species, we considered the first two categories as within the known range and spatial distribution rules were created as follows:

1. All records falling within 10km grid squares that are <u>fully within</u> the given range <u>do not</u> require verification.
2. All records falling within 10km grid squares that are <u>fully outside</u> the given range <u>do</u> require verification.
3. All records falling within 10km grid squares that are <u>either fully or partly in</u> areas that are considered as "rare occurrences, vagrants, or scarce and beyond regular range" <u>do</u> require verification.
4. All records falling within 10km grid squares that are on the edge of the known range (i.e. only <u>partly in</u> the known range) should be treated with caution because ranges are likely to change with time; these records therefore <u>do</u> require verification (range edges defined by the coast are excepted).

For some species (fox, badger, mink and water vole), ranges are mapped as densities; either estimated number per km^2 (for badgers and foxes) or percentage of positive survey sites (for mink and water voles). Based on expert advice, spatial distribution rules for fox and badger were created

such that areas were included within the known range of those species even where records suggested low densities (<1/km^2 and <0.3/km^2 respectively) . For mink and water vole, areas where less than 10% of survey sites were positive, were excluded from the known range for those species (these being considered equivalent to the category "rare occurrences, vagrants, or scarce and beyond the regular range"). Some populations of Sika deer (e.g. in the Wicklow mountains and south Lake District) are now hybrid populations of red and Sika deer and the location of these are included within the known range of Sika deer. The spatial distribution rules for grey and common seal were based on world distribution maps and so may be less accurate. For the otter, the spatial distribution rule was partly based on results of the latest National survey for England (Crawford, 2010), which indicates a larger known distribution than the Handbook.

Due to a lack of available data, it was not possible to create spatial distribution rules for the following species:

> *Mustela furo*
> *Felis catus*

Spatial rules were not created for the following species because their range is not within the area covered by the NBN:

> *Sorex coronatus*
> *Crocidura russula*

4.3. Temporal rules; seasonal range and year range

A year-range rule set was created for mammals that have either gone extinct, or which were not recorded in the British Isles before a particular date (e.g. due to natural colonisation or introduction in known historic time).

Temporal rules for seasonal changes in presence in the UK and Ireland are largely not relevant to mammals. Although some mammals hibernate they may still be found and counted in this state. Seasonal-range rules are therefore given for two cetacean species only; *Leucopleurus acutus* and *Stenella coeruleoalba*.

4.4 Escaped species

A thorough assessment of the records of escaped species was conducted. There are many mammal species kept by zoos or as exotic pets, but mostly there have only been scattered instances of escapes and so for these species it is not feasible to create spatial or temporal rule sets. If an exotic species starts to become more frequently recorded and established in the future, then verification rules can be created. This is already true for some species (e.g. mink and muntjac deer), for which verification rules have been included.

5. Sensitive records

Access to biodiversity data may need to be controlled if making the data available is likely to result in environmental harm. For this reason, 25 mammal species were reviewed in order to assess whether their records should be treated as sensitive i.e. not freely shared. Where possible, criteria were developed in line with the Countryside Agencies' Open Information Network's Environmental Information Regulations Guidance Note 1, which defines a criteria-based approach to assessing sensitivity against a) the risk of harm occurring, b) the impact of harm, and c) the likelihood that releasing the data in question would be a catalyst. In the majority of cases sufficient information (e.g. areas where hare coursing or badger baiting is currently a problem) does not exist to allow the creation of spatially explicit criteria. For 24 species of the 25 species reviewed it is considered that sharing the records of that species is likely to increase the likelihood of harm to that species or its habitat; guidance for those species is provided in Table 4. Red squirrels were reviewed but do not need to be treated as sensitive. In addition, specific guidance is given below regarding records of cetaceans and seals.

Cetaceans
Due to the highly transient nature of cetaceans, most records of cetaceans can be freely shared as long as there is a delay between observation and the record being shared. There are some cases where records should be treated as sensitive:

1. Adult female bottlenose dolphins with calves from resident populations in Cardigan Bay, Moray Firth and Penzance could be sensitive to disturbance and for this reason records should only be shared at the 10km square level.
2. Lone individuals (especially bottlenose dolphins, which can habituate to humans) can suffer from disturbance as they tend to stay in the same location for several days. They can get stuck and die in the propellers of boats and for this reason records should only be shared at the 10km square level.
3. Records of unusual species (e.g. sperm whales off Redcar) or animals at risk of stranding should be treated as sensitive until the animal is safely back to sea. Historic records of strandings can be freely shared, but current strandings or records of animals at risk of stranding should be treated as sensitive and not shared.

Seal pupping sites
Seal pup mortality can and does occur due to abandonment as a result of human disturbance. Although some seal pupping sites are well protected (e.g. Donna Nook, Lincolnshire) and therefore can cope with visitors, isolated pupping sites are more vulnerable. For this reason records of small numbers of seals with pups should be treated as sensitive and should only be shared at the 10km square level.

Table 4. Mammal species whose records should be treated as sensitive

Latin name	Common name	TaxonVersionKey	Reasons for inclusion	Additional criteria	Resolution at which records can be shared
Chiroptera					
Rhinolophus ferrumequinum	Greater horseshoe bat	NHMSYS0000080176	All bat species are at risk of disturbance.		1km square.
Rhinolophus hipposideros	Lesser horseshoe bat	NHMSYS0000080177			
Myotis mystacinus	Whiskered bat	NHMSYS0000080183			
Myotis brandtii	Brandt's bat	NHMSYS0000528026	Bat Conservation Trust feel strongly that the observer should decide the level of sensitivity in order to encourage data sharing. If an observer indicates a record is sensitive but does not indicate the level of sensitivity, then records should only be shared at the 10km square resolution.		Hibernation sites: 10km square (unless observer indicates can be freely shared)
Myotis nattereri	Natterer's bat	NHMSYS0000080184			
Myotis bechsteinii	Bechstein's bat	NHMSYS0000528024			
Myotis myotis	Mouse-eared bat	NHMSYS0000080182			
Myotis daubentonii	Daubenton's bat	NHMSYS0000528028			
Myotis alcathoe	Alcathoe's bat	NHMSYS0020636762			
Eptesicus serotinus	Serotine	NHMSYS0000528008			
Nyctalus noctula	Noctule	NHMSYS0000080186			
Nyctalus leisleri	Leisler's bat	NHMSYS0000080185			
Pipistrellus pipistrellus	Common pipistrelle	NHMSYS0000332257			
Pipistrellus pygmaeus	Soprano pipistrelle	NBNSYS0100004720			
Pipistrellus nathusii	Nathusius' pipistrelle	NHMSYS0000080187			
Barbastella barbastellus	Barbastelle	NHMSYS0000080178			
Plecotus auritus	Brown long-eared bat	NBNSYS0000005102			
Plecotus austriacus	Grey long-eared bat	NBNSYS0000005103			
Lagomorpha					
Lepus timidus	Mountain/Irish hare	NBNSYS0000005106	Risk of persecution		10km square
Rodentia					
Muscardinus avellanarius	Hazel dormouse	NHMSYS0000080214	Many woodlands in private ownership. Nest boxes within woodland allow location to be easily identified. Risk of disturbance.		10km square
Carnivora					
Martes martes	Pine marten	NHMSYS0000080190	Risk of disturbance and persecution		10km square
Meles meles	Badger	NHMSYS0000080191	Risk of persecution	Setts only	10km square
Lutra lutra	Otter	NBNSYS0000005133	Risk of disturbance and persecution	Holts only	10km square
Felis silvestris	Wildcat	NHMSYS0000332741	Risk of disturbance		5km square

References

Crawford, A. (2010). *Fifth Otter Survey of England 2009-2010.* Technical Report. Environment Agency, Bristol.

Harris, S. and Yalden, D.W. (2008). *Mammals of the British Isles: Handbook, 4th Edition*. Southampton: The Mammal Society.

Countryside Agencies' Open Information Network. *The 'Environmental Exception' and access to information on sensitive features.* Version 1.3.3. Environmental Information Regulations Guidance Note No. 1.