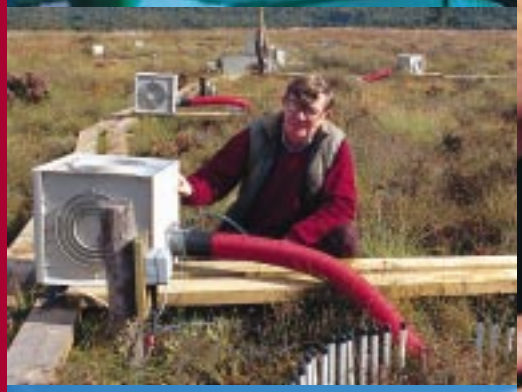
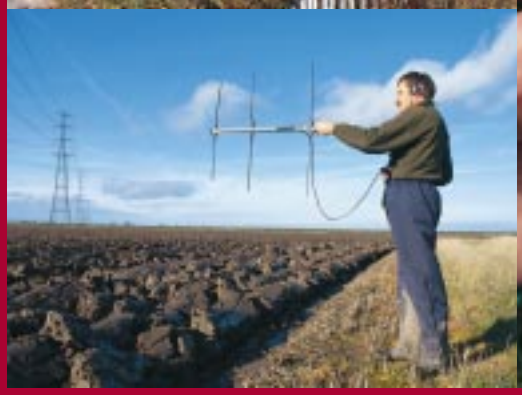
ENGLISH NATURE

Report Number
511

Lowland heathland SSSIs: Guidance on conservation objectives setting and condition monitoring

English Nature Research Reports





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Lowland Heathland SSSIs: Guidance on conservation objectives setting and condition monitoring

Based and complementing the guidance produced
by the Lowland Heathland Lead Agency Group
for the Joint Nature Conservation Committee

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ISSN 0967-876X

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1. Introduction

The Joint Nature Conservation Committee (JNCC) published a document setting out the basic framework in which the statutory conservation agencies in the UK have to monitor designated sites: Sites of Special Scientific Interest (SSSIs) in Great Britain and Areas of Special Scientific Interest (ASSIs) in Northern Ireland, according to agreed common standards (JNCC, 1998). The country agencies were then charged to produce further guidelines to assist with the interpretation and application of these standards.

See JNCC's document *Common standards monitoring: introduction to the guidance manual* (www.jncc.gov.uk) (to be released in mid-2003) for more detail information for all interest features on the following issues (among others):

- Background to generic guidance.
- Designations covered.
- Definitions of features to be monitored.
- Conservation objectives.
- Judging the condition of the site features.
- Recording threats and management measures.
- Monitoring cycle.
- Reporting arrangements.
- Selection of attributes.
- Setting targets.
- Mosaics and transitions.
- Conflict between interest features.

This report focuses on conservation objective setting and the practical monitoring aspect for lowland heathlands. It has been developed over three years by the Lowland Heathland Lead Agency (contact point at English Nature), building on the work initiated by the Lowland Heathland BAP steering group. We have collated the different existing guidelines produced by English Nature (EN), Scottish Natural Heritage (SNH) and Countryside Council for Wales (CCW). We were not aware of similar guidelines from the Environment and Heritage Service of Northern Ireland (EHS).

The monitoring method has been developed to assess the condition of designated sites in a consistent way across the UK. However, once tested and implemented it can be applicable to any lowland heathland and used by any individual or organisation with some basic knowledge of lowland heathland ecology. It is clear however that it is not suitable for detailed monitoring of lowland heathland with other objectives.

2. Scope

Lowland heathland in England, Wales and Northern Ireland comprises a range of habitats characterised by the abundance of ericoids or gorse species. It occurs on generally nutrient-poor soils, usually below 300 m. Heathland in Scotland is rarely defined as lowland

heathland; most Scottish heathland occurs above the upper limits of agricultural enclosure. However, some forms of heathland at low altitudes, similar in character to those in England, Wales and Northern Ireland and usually within the enclosed part of the landscape, do occur in Scotland, although mostly as small fragments. The most distinctive and extensive are the coastal heaths.

Lowland heathland includes dry, wet, humid, chalk/limestone, coastal and lichen heaths, and all successional stages from bare ground to shrubs. See Annex 1 for a full definition for CSM purposes of lowland heathlands in terms of components, Phase 1 habitat survey classes, NVC types and Annex I (Habitats Directive) equivalents, and section 2 below for more detailed descriptions.

Guidance on monitoring is summarised in table 1 (lowland dry heath) and table 2 (lowland wet heath). Upland heathland is covered by separate guidance, but the distinction between upland and lowland examples may sometimes be difficult. Heath vegetation on maritime cliff/slopes and dune heath are both included within the lowland heathland guidance but assessment of these types should be done in conjunction with the relevant coastal guidance section.

Lowland heathland SSSIs may be notified as examples of particular heathland types (eg wet, dry or humid heathlands), NVC heathland communities, Habitats Directive Annex I types or for plant or animal species which occur in particular areas. It may not always be practical to separate out each type or community and assess it separately. That is why only two guidance tables have been produced: one for dry and one for wet heathland. The different vegetation types must, however, be identified and mapped since this will affect the condition assessment.

Lowland heathlands in different parts of the UK are very diverse in terms of vegetation structure and species composition. Although only two guidance tables are provided, it has never been the intention to impose a homogeneous look to all existing heathlands. Whereas experience and management techniques can and should be shared across and within the countries, one should bear in mind that there is no one 'ideal' heathland which everybody should try to imitate. The process of setting local targets should take into account natural and regional variability for each attribute.

The main threats affecting lowland heathland are afforestation, development, succession, agricultural improvement, and a decline in active management. Wet heathlands may also be adversely affected by drainage or excessively frequent burning. Coastal heaths may be vulnerable to excessive erosion in exposed areas. These factors have influenced the choice of attributes for monitoring the heathlands' condition.

3. Habitat definitions in NVC terms

3.1 Dry heaths

Dry heaths typically occur on freely draining acidic soils of generally low nutrient content. Ericaceous dwarf-shrubs dominate the vegetation. The most common is heather or ling *Calluna vulgaris*, often in combination with gorse *Ulex* spp. or bilberry *Vaccinium* spp. Other dwarf-shrubs can be important locally. Most though not all dry heath is semi-natural, being derived from woodland with a long history of grazing and burning. Coastal heath, growing under extreme conditions, is of natural origin and can be maintained with only light

management. Dune heath, as an early stage of the succession after the dunes have decalcified and stabilised, is also of natural origin.

Dry heaths vary according to climate and are also influenced by altitude, aspect, soil conditions (especially base-status and drainage), maritime influence and grazing intensity. There is a gradation from southerly to northerly kinds of heath and there are both western (oceanic) and eastern (more continental) forms of dry heath. Humid heath is also included in this group and occupies soils with slightly impeded drainage.

Eleven NVC communities in Britain include forms of dry/humid lowland heathland:

H1 *Calluna vulgaris–Festuca ovina* heath
H2 *Calluna vulgaris–Ulex minor* heath
H3 *Ulex minor–Agrostis curtisii* heath
H4 *Ulex gallii–Agrostis curtisii* heath
H6 *Erica vagans–Ulex europaeus* heath
H7 *Calluna vulgaris–Scilla verna* heath
H8 *Calluna vulgaris–Ulex gallii* heath
H9 *Calluna vulgaris–Deschampsia flexuosa* heath
H10 *Calluna vulgaris–Erica cinerea* heath
H11 *Calluna vulgaris–Carex arenaria* (dune) heath
H12 *Calluna vulgaris–Vaccinium myrtillus* heath

3.2 Wet heaths

Wet heath usually occurs on acidic, nutrient-poor, shallow peat or sandy soils with impeded drainage. Mixtures of cross-leaved heath *Erica tetralix*, grasses, sedges and *Sphagnum* bog-mosses typically dominate the vegetation. Wet heath is an important habitat for a range of vascular plant and bryophytes species of an oceanic or Atlantic distribution in Europe.

Heathlands containing Dorset heath *Erica ciliaris* and cross-leaved heath *Erica tetralix* are generally found on damp, acid soils with slightly impeded drainage. These heathlands often contain heather *Calluna vulgaris* and varying proportions of bell heather *Erica cinerea*. Other associated species are purple moor-grass *Molinia caerulea*, bristle bent *Agrostis curtisii* and dwarf gorse *Ulex minor*, with the latter being replaced by western gorse *U. gallii* in south-west England. These heathlands may grade into wetter mire communities, notably valley mires with bog-moss *Sphagnum* spp. and bog asphodel *Narthecium ossifragum*.

In the UK this vegetation includes forms of the following NVC types:

H3 *Ulex minor–Agrostis curtisii* heath (when it contains *E. ciliaris*)
H4 *Ulex gallii–Agrostis curtisii* heath (when it contains *E. ciliaris*)
H5 *Erica vagans–Schoenus nigricans* heath
M14 *Schoenus nigricans–Narthecium ossifragum* mire
M15 *Scirpus cespitosus–Erica tetralix* wet heath
M16 *Erica tetralix–Sphagnum compactum* wet heath
M21 *Narthecium ossifragum–Sphagnum papillosum* valley mire (with *E. ciliaris*)

3.3 Assessing mosaics and transitions

Wet and dry heathlands often form mosaics. Lowland heathlands may also be closely associated with other habitats, eg upland heathland, grassland, woodland, valley mire. NVC types which are likely to be found as heathland components include (see also Annex 1):

U1 *Festuca ovina–Agrostis capillaris–Rumex acetosella* grassland
U2 *Deschampsia flexuosa* grassland
U3 *Agrostis curtisii* grassland
U4 *Festuca ovina–Agrostis capillaris–Galium saxatile* grassland
CG2 *Festuca ovina–Avenula pratensis* grassland
CG7 *Festuca ovina–Hieracium pilosella–Thymus praecox/pulegioides* grassland
CG9 *Sesleria albicans–Galium sterneri* grassland
M3 *Eriophorum angustifolium* bog pool community
M21 *Narthecium ossifragum–Sphagnum papillosum* valley mire (without *E. ciliaris*)
OV34 *Allium schoenoprasum–Plantago maritima* community

The targets for the attributes mentioned in the following sections are broad enough to accommodate some variation. However, if the targets do not seem applicable to the vegetation in the site, it may be necessary to develop a new attribute table combining those of the habitats forming the mosaic. Further guidance on assessing the condition of habitat mosaics and transitions is given in the general introductory section.

The term 'heathland' has more of a cultural origin than a scientific one. Historically it meant 'wasteland' and therefore it was applied to other nutrient-poor and/or species-poor vegetation communities without a significant dwarf-shrub component. That is the case particularly in some of the East Anglia heaths such as those in the Breckland. Some of the main NVC types in this area are U1 and CG7 grassland communities. These grass-heaths will not be covered by the lowland heathland guidance and should be monitored using the lowland grassland guidance.

4. Setting objectives

The term "Objective" in this context refers to the desired outcome but not the means of accomplishment. Within the Common Standards framework, Conservation Objectives will define what constitutes favourable condition of each feature by describing broad targets which should be met if the feature is to be judged favourable.

Conservation objectives are defined by one or more attributes; in the lowland heathland case they are defined by the habitat extent, the percentage of bare ground, vegetation structure and cover and the indicators of negative trends (see section 5).

Conservation objectives have to be prepared for interest features on all A/SSSIs. It could happen that the objectives for different features are conflicting. For example, the grazing management that is required to maintain the patches of open bare ground for the rare yellow centaury *Cicendia filiformis* may be at odds with the conservation needs of rare reptiles or invertebrates.

In order to set the conservation objectives for a site the basic information required is:

- current generic guidance on favourable condition;
- citation and criteria sheet;
- aerial photos;
- files (direct knowledge);
- *Guidance Assembly* spreadsheet version of guidance (available in the English Nature intranet).

Decide how to match the list of designated special interest features (for which there is no standard classification) with the generic guidance (written for NVC types, species assemblages, etc). Identify any gaps in generic guidance and notify the appropriate national specialist.

5. Attributes and targets

A series of broad habitat attributes have been defined that should normally be part of the conservation objectives or the management plan for all sites where lowland heathland is an interest feature.

There should normally be at least one target specified for each of the attributes. The targets set out here are for guidance only. They should be interpreted in terms of local knowledge of the site, its history and its surroundings. When a target is not applicable to a particular site it should be ignored, but a record of why the decision was taken should be made (eg no heather growth phases given because the coastal vegetation is wind-pruned and it is impossible to differentiate phases).

For lowland heathlands the mandatory attributes are:

- Habitat extent.
- Bare ground.
- Vegetation structure: cover of characteristic woody species, and cover of ericaceous species in different growth stages.
- Vegetation composition: frequency of characteristic species (dwarf shrubs, graminoids, forbs), and cover of bryophytes and lichens.
- Indicators of negative trends (percentage of alien or invasive species which may reduce the diversity of the habitat and affect its integrity; presence of artificial drains, soil erosion, trampling; uncontrolled burning; eutrophication).

The presence of rare species (vascular plants) or other features which make the site distinctive or special is considered to be a discretionary attribute in the sense that they do not appear in all heathlands. It will not be appropriate to use these 'quality indicators' on every heathland site, but where they are part of the reason for notification of the feature they should form an integral part (mandatory) of the condition assessment.

Guidance is given in the following sections as to what needs to be considered for the above attributes and, where appropriate, some examples are provided of the sorts of targets that should be set.

6. Recommended visiting period and frequency of visits

Whilst ideally the sites should be visited at more than one time of the year in order to take account of species which have a short life span and the effect of management treatments, this may not be practical due to limited time and resources. The visiting time should therefore be selected when a reliable assessment can be made. The characteristic plant species of heathlands are mostly perennial, which allows them to be assessed over a period of several months. The suggested visiting period is May to October, or earlier if winter browsing impacts are to be detected.

Monitoring of lowland heathland should be carried out on a six-year cycle for national reporting. However, this habitat is vulnerable to rapid and unchecked changes. It is therefore recommended that sites should be checked more frequently, at least every two years if possible, to detect any negative impacts of management or neglect.

7. Skills requirements for monitoring

The person carrying out the assessment should be capable of identifying species most likely to be encountered on lowland heathlands. He/she should also have some understanding of the management practices and other factors likely to affect heathlands, and be able to assess all the relevant habitat attributes, eg frequency of dwarf shrubs, expression of dwarf growth forms, etc. The rapid assessment method is based mostly on vascular plants, but some basic knowledge of bryophytes and lichens would be advantageous. Knowledge of the site would also be helpful.

An initial reference level/baseline survey is required to help in defining areas of different heath types. Previous assessment forms for the site may be useful. Equipment required includes: baseline maps, tape measure, hand lens, field forms, SSSI citations and the Conservation Objectives table, management plan or any type of document where the conservation aims for the site are stated.

8. Methods of assessment

The minimum recommended area for assessment is 5 ha. It is advisable to subdivide big sites into units based on management, ownership, etc. to ensure that a proper judgement of condition of the whole feature can be made (see 7.5).

Small, recently (<3 years – or until seedlings are identifiable) burnt or cut patches of heath, or areas recently cleared of scrub, should not be over-represented when sampling a heathland, as this may lead to the condition being wrongly assessed as 'unfavourable'. Such activities may have been an essential part of the prescribed management. However, it would be advisable to record the extent of the site burnt by accidental or arson fires, since this fact may turn the feature into unfavourable condition.

Exotic species and actively spreading scrub and bracken should be recorded for the whole site, not just for the sampling units.

Whenever possible, mark on a map your walk route and sampling locations, and take photographs, especially of the more dynamic parts of the habitat, eg borders.

It is recommended that most of the attributes are assessed by a structured walk (eg a 'W' shape walk) with at least 10 stops (20 stops are recommended) within each assessment unit (block, management unit, etc) to avoid excessively variable results. The number of stops should be enough to allow the assessor to have an overview of the site and judge the condition of the feature. Setting pre-determined stopping distances (eg every 20 paces) should avoid subjectivity in selecting 'good' or 'bad' areas. Pre-selection of stops based on a map or aerial photograph to cover expected variation may also help to avoid subjectivity in the selection of stops. Even in cases when the structured walk is not considered necessary, recorders should walk the site or unit and deliberately stop and look for indicator species which may not be apparent in a general overview. It is recommended that the route followed is marked on a map for future comparisons.

At each stop, the appropriate attributes (eg percentage cover and/or presence of relevant species) should be assessed within approximate 4 m^2 sampling units. There is no need to measure cover values precisely – simple visual estimates will suffice. It should not take very long (no more than 10 minutes) to record all the relevant attributes at each 'stop'.

The recommended methods of selecting the number and location of the stops are not intended to have rigorous statistical value, and the final condition of the interest feature is not simply the average of the condition of each stop. On the contrary, each stop should contribute to improve the assessor's overview of the state of the site.

The following is a quantitative definition of frequency, intended to assist with the assessment of several of the heathland attributes. This is a version of the well-known DAFOR scale which has been adapted to the particular characteristics of lowland heathland:

- **Dominant:** the species appears at most (>60%) stops and it covers more than 50% of each sampling unit.
- **Abundant:** species occurs regularly throughout a stand, at most (>60%) stops and its cover is less than 50% of each sampling unit.
- **Frequent:** species recorded from 31-60% of stops.
- **Occasional:** species recorded from 11-30% of stops.
- **Rare:** species recorded from up to 10% of stops.

9. Habitat extent

This mandatory attribute refers to the area covered by lowland heathland, and its distribution within the site.

The total area of the feature should be mapped in relation to a site-specific reference level/baseline to be determined for each site (ie first available map/aerial photograph of interest feature at the time of notification or after). If this reference level doesn't exist, a survey of the feature should be conducted as soon as possible.

On complex or large sites it is more practical to consider the overall areas of dry and wet heath on a sketch map (a detailed map is not feasible within a rapid assessment method). Another option is to record the approximate area of the relevant heathland type(s) (ie the overall areas of dry and wet heath on complex or large sites). For its condition to be regarded as favourable, the proportion of both dry and wet heath elements must meet the targets.

In general, there should be no significant loss of heathland habitat unless a target has been set to increase the extent of other habitat features on the site at the expense of lowland heathland. Decisions about the significance of any changes will need to be made on a case by case basis.

10. Bare ground

Bare ground is defined here as soil (especially sandy, exposed soil in dry heaths and peaty soil besides open water in wet heaths, but NOT rocks or stones) which is free of vegetation cover or litter, but close to or within dense vegetation. Warm, dry, bare substrate is important as basking, hunting, nesting and burrowing sites for certain plant, invertebrate, bird reptile and amphibian species. It can be of natural origin or man-made.

Management objectives sometimes erroneously interpret small-scale erosion negatively and actively encourage re-vegetation. Natural re-vegetation is acceptable providing other active processes are continually creating other bare substrate elsewhere on site. Different species, utilise vertical, sloping and horizontal bare substrate. Useful form of horizontal bare ground are mild erosion on paths & tracks, rabbit scrapes, turf strippings, patches of excessive grazing, dieback of heather, the aftermath of fires and 'beaches' caused by natural fluctuations in water level beside pools and ponds. Useful forms of vertical/sloping bare ground are paths and tracks (even when only a few cm in height), rabbit warrens & burrows, natural slippages, windblows and old sand workings.

Bare ground is considered 'undisturbed' when there are no signs of artificial or 'aggressive' impacts occurring on the site, such as poaching by livestock, motor biking (or other vehicles), etc. If disturbance of this type occurs ('heavy disturbance'), it should be confined to less than 1% of the bare ground in the site to be in favourable condition.

The percentage of bare ground is estimated visually at each stop, bearing in mind that very low percentages are usually difficult to estimate. A final value for the whole feature is calculated at the end. Wherever possible the origin or cause of this bare ground should be indicated (eg mineral soil, stock feeding, public activities), as it may indicate adverse trends in condition.

11. Vegetation structure

Variations in the structure of the vegetation, in terms of vegetation height, amount of canopy closure, and patch structure is needed to maintain high niche diversity and hence high species richness of plants and animals. Many species also utilise interfaces between vegetation types or use different vegetation types in different life states or regularly for thermoregulation. The structural character of the vegetation is given by the growing habits of the dominant species, which in most cases will be ericoids (plants that look like heathers, including members of the Ericaceae and Empetraceae families) or gorse *Ulex* species. In wet heathlands, sedges or

grasses such as *Schoenus nigricans* (locally important, eg in the Lizard Peninsula) or *Molinia caerulea* may provide the distinctive tussocky appearance of the vegetation.

Calluna vulgaris constitutes an important component of dry heathlands. The life cycle of *Calluna* was firstly described by Watt (1955), who defined four stages: pioneer, building, mature and degenerate (see illustrations below). Each phase also represents different microclimatic conditions and microhabitats which may provide shelter or food to other organisms. Therefore, it is important to maintain a mosaic of heather in different phases of growth. An extensive monoculture of *Calluna vulgaris* of the same age and height is usually of limited conservation value. Heather plants can take as little as 13 years (East Anglia) or as much as 40-50 years to go through the whole life cycle. This has to be taken into account when producing management plans or objectives for the feature.

However, it is important to note that in some sites, eg maritime heaths, the structure of the vegetation may be determined by the wind and salt spray. In these extreme conditions heather plants do not show the typical growth phases. Wind-pruned dwarf-shrubs can be short and at the same time fairly mature. The structure can be altered if grazing is introduced.

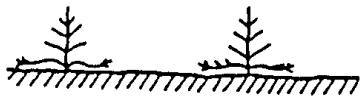
The contribution of the dwarf shrubs to the overall vegetation cover shows big geographical differences. There are also differences due to the management of the sites. It has been agreed that the cover of dwarf-shrubs should be at least 25% for a site to be considered a heathland. Some heathland types such as dune heath, lichen heath, chalk heath or grass-heath (with more than 25% shrub cover; if less it should be considered a grassland) present a naturally low dwarf-shrub cover. This fact is therefore reflected in the suggested target. Some sites, on the other hand, show an almost a continuous cover of heathy components. An upper limit of 90% cover should allow for some bare ground and other landscape components such as grassland, pools or scrub. The Conservation Objectives tables or the management plan for the site should however show a narrower range of dwarf shrub cover, which reflect the local physiognomy (eg 50-75%).

The pattern of stands of heather at different ages or stages of development is the result of burning cycles or other forms of management such as cutting or localised, intermittent browsing. Recovery of tussocky grasses is usually rapid (one to two growing seasons), with other plants such as dwarf-shrubs taking longer to recover. The amount of habitat which is regularly affected by fire and/or cutting and the frequency of some management activities are therefore important in order to maintain structural and species diversity. For example, controlled burning on a 10-20 year cycle may be appropriate for wet heaths.

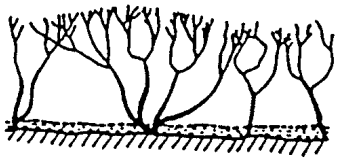
The percentage cover of each growth phase should be recorded as the proportion of the dwarf shrubs occurring within each 2 m x 2 m sampling unit, eg there may be 10% heather cover at a sampling point, of which 60% is in pioneer and 40% in building phase. On some occasions it may be difficult to assign a stand to a particular growth stage. A tape measure is recommended for more accurate height estimates, particularly when the plants are more than 20 cm tall.

The following are schematic representations of the heather growth phases:

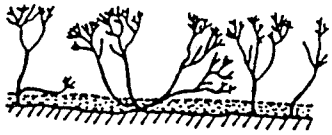
Pioneer phase: This is the establishment phase in which heather develops from seed into small pyramid shaped plants. The height is usually less than 10-15 cm. Short (mown, burnt or grazed) swards can be included as 'pseudo-pioneer'.



Building phase: In this phase the heather forms a closed canopy. It grows up to 40 cm.



Mature phase: In this phase heather plants become woody, with thick stems and fewer green shoots. The heather canopy begins to open up and other plant species, especially mosses, begin to increase in cover. Taller vegetation (60-100 cm) provides some shelter and cover for animal species, but too much can indicate a long-term decline in habitat quality.



Degenerate phase: In the degenerate phase the central branches of heather plants tend to die off, creating gaps in the centre of the bush in which heather seedlings may sometimes establish.

Figures adapted from Gimingham, 1972

Dead heather: Areas of dead heather are commonly found on lowland heaths and have an ecological role in providing gaps for new colonisation. However, large areas of dead heather are not particularly valuable for nature conservation.

12. Vegetation composition

Frequency of dwarf-shrub species: the presence of dwarf-shrub species (eg heathers, gorses) at high frequencies compared with the other habitat components is the key feature in defining this habitat.

Variety of dwarf-shrub species: The ericaceous species heather or ling *Calluna vulgaris*, bell heather *Erica cinerea*, cross-leaved heath *Erica tetralix*, Dorset heath *Erica ciliaris*, Cornish heath *Erica vagans*, bilberry or blaeberry *Vaccinium myrtillus* and cowberry *Vaccinium vitis-idaea* are the commonest and most characteristic dwarf-shrubs. Hybrids of Dorset and cross-leaved heath and of bilberry and cowberry can be locally abundant. *Calluna* is usually the most abundant. Crowberry *Empetrum nigrum*, another common species in some coastal and transitional heaths, is not strictly ericaceous (it belongs to the Empetraceae) but for the purposes of this exercise can be treated as an ericoid species. In addition there may also be other species locally dominant, such as petty whin *Genista anglica*, hairy greenweed *Genista pilosa*, dwarf gorse *Ulex minor* and western gorse *Ulex gallii* in specific situations. The latter four species are not ericaceous and since they are N-fixers and could lead to persistent and dramatic changes in the community, they should make up no more than 50% of the total cover of dwarf-shrubs.

Graminoids (ie plants which look like grasses, including true grasses, sedges and rushes) are an important component of lowland heathlands. The characteristic species vary depending on the geographical location and other factors such as altitude and soil type. Changes in the percentage cover or the species composition in this group may reflect changes in environmental conditions (eg increasing nutrients due to atmospheric deposition) or management (eg overgrazing). The presence of some characteristic heathland species such as *Nardus stricta* and *Deschampsia flexuosa* can constitute a problem if their cover is too high. It is suggested to introduce an upper limit to their cover: <25% in cover or no more than occasional throughout the sward. Other local rarities (eg *Schoenus nigricans*) should be over 20% cover when naturally present.

The number and cover of **forbs** depend also on geographical, climatic and soil factors. Changes in the composition of this group of species for a particular site may also be early indicators of environmental and management conditions. For example, high-intensity grazing can result in flower heads not being developed, or disappearing before producing seeds.

The presence of native **bryophytes** (except some acrocarpous mosses, ie those with main stem usually erect and a terminal inflorescence) and **lichens** adds value to the condition of the site. In most cases they are restricted to specific geographical locations, and this must be taken into account when monitoring each site, ie we cannot set a 10% cover target if they never occurred in the site in the first place! Suggested targets are >10% cover of bryophytes, when naturally present (in particular Sphagna for wet heaths) and > 5% cover of *Cladonia* (if specific to site). Site specific targets should reflect natural occurrence but allow for annual fluctuations: eg if a site has a 50% lichen cover do not allow it to go down to 5% before raising the alarm; annual variations between, say, 60 and 30% may be acceptable. To determine when a species is naturally present refer to existing information and surveys of the site.

Limestone (chalk) heath and dune heath are two distinctive types of heathland in which nutrient-poor, acidic topsoil lies over more basic layers. The transitions between both substrata are more species-rich than the "pure" heathland stands. The guidance table for dry heaths shows some of the species which can be found in each of those heathland types.

In naturally species-poor sites (again, refer to existing information and previous surveys), a lower target of just one ericaceous, one graminoid and one forb species will be sufficient. For example, Rodwell *et al.* (1991) indicated that the species-poor sub-community of H1 is characterised by unbroken canopies of heather with virtually no associates.

On the other hand, in species-rich sites, the targets can be stricter than the general guidance and more than two species being at least occasional will be needed to meet the target, for example for the heaths on The Lizard, Cornwall. These differences in targets are due to the recognition of the diverse nature of heathlands in different geographical areas.

13. Vegetation composition - indicators of negative trends

The target for the cover or frequency of indicators of negative trends (referred as 'negative indicators' in the tables) is for the whole feature, not for each individual stop. Most of the species mentioned below are not 'negative' *per se* (except exotic species of no conservation value mentioned in the next paragraph). However, the conservation value of the habitat diminishes if they are present over a threshold. 'Negative indicators' are mostly alien and/or invasive species. The presence of these species indicates problems with management: eg under/over grazing (high cover of tree seedlings/unpalatable grasses), eutrophication (eg *Urtica dioica*, high cover of coarse grasses and other herbaceous species) or disturbance from various sources (eg *Digitalis purpurea*). The list of species below is not exhaustive.

Rhododendron *Rhododendron ponticum*, Gaultheria or Shallon *Gaultheria shallon*, sea buckthorn *Hippophae rhamnoides* and Japanese knotweed *Fallopia japonica* can spread rapidly and have a negative nature conservation value. Their dense cover casts deep shade which excludes semi-natural vegetation. These species should be eradicated from heathland stands but for practical reasons a target of <1% in cover is accepted.

Gorse species support a rich invertebrate and vertebrate fauna. However, common gorse *Ulex europaeus* cover should account for less than 25% of the total vegetation cover of the dry heathland (and <10% within the wet heathland, in the drier areas) to maintain the stand diversity. Otherwise it is considered a negative indicator.

The spread of bracken *Pteridium aquilinum* is a problem on many lowland heathlands, but this fern has also some nature conservation value. Management of bracken should be directed more to control than eradication and therefore only where its cover is expanding and covering more than 10% of the feature in any given site (<5% in wet heathland) and excluding other heathland flora underneath is it considered as a negative indicator. Special attention should be given to sites where fritillary butterflies occur and utilise bracken litter habitat.

Scrub (mainly trees or tree saplings) above 1 m in height and in clumps, not as isolated trees, is very important in providing warmth, shelter, cover, foodplants, perches, territorial markers and sources of prey for heathland, invertebrates and vertebrates. It should ideally be fairly sparse, with a structurally complex edge and still have heathland vegetation as ground cover, However, cover should not represent more than 15% of the total vegetation cover of dry heathland and no more than 10% of wet heathland. Again allow for local differences, where a much lower scrub cover may be desirable. If scrub is locally important for any species, and this is indicated in the conservation objectives or management plan of the site, up to 25% cover of scrub is still accepted within the favourable condition category. The area of scrub/tree cover should be stable or not increasing as a whole (to be determined using aerial photographs or from the baseline map). Otherwise it is considered a negative indicator.

Other species such as brambles *Rubus* spp., ragwort *Senecio* spp., nettles *Urtica dioica*, creeping or spear thistles *Cirsium* spp., hottentot fig *Carpobrotus* spp., foxgloves *Digitalis purpurea* and willow herbs *Epilobium* spp. (except *E. palustre*) and *Chamerion angustifolium* should not appear more than occasionally (note that some of these species are nectar sources for invertebrates and should not be eradicated. 'Coarse grasses' such as *Holcus lanatus* and *Dactylis glomerata* are also included in this group. These species (the list is not exhaustive)

occur mainly in disturbed or eutrophic areas and their presence may be a sign of unfavourable condition which will need to be followed up.

Dense mats of acrocarpous mosses (eg *Campylopus introflexus*) should not be more than occasional, both in dry and in wet heaths.

14. Other negative indicators

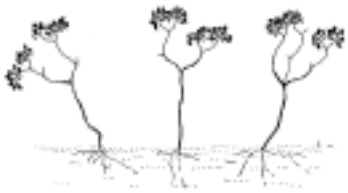
The presence of artificial drains, erosion into peat, sand and gravel, and over-grazing or over-burning all affect the condition of heathland sites. The effects of too frequent or intense fires and over-grazing will hopefully be reflected in other attributes, such as the extent of bare ground and the relative proportions of heather growth phases, but may usefully be recorded on the field forms to inform management.

Overgrazing may create difficulty for the assessment of the heather growth phases. Signs of overgrazing can include areas of dead heather and very low mature heather, shoots grazed to the previous season's growth, up-rooted or broken shoots, the reduction of heather cover to almost invisible miniature shoots and the development of distinct heather growth forms. Prolonged high but sub-lethal levels of grazing by vertebrate herbivores tend to produce distinct growth forms of heather (MacDonald, 1990). These can be classified as 'carpet', 'topiary' and 'drumstick' (or 'mop') forms. Occasional heather plants may exhibit these growth forms even when grazing is not heavy. If in doubt, it is therefore important to check for browsed shoots. It is also important to note that some heather plants naturally have a more spreading or prostrate habit. The following figure illustrates chronic heavy damage.

'Carpet' heather: 'Carpet' heather is found where sustained heavy grazing on **seedlings** produces a dense mat-like growth form. 'Carpet' forms of heather can occur in coastal situations, even when browsing is not heavy. *Erica cinerea* plants may also exhibit this growth form.

'Topiary' heather: Persistent heavy grazing on **older, branched plants,** may produce heather plants with dense, compact canopies, in which the size of bushes is considerably reduced. Note: in wind-pruned vegetation, this maybe difficult to separate and other indicators of overgrazing, such as uprooted *Calluna* should be looked for.

'Drumstick' or 'mop' heather: Prolonged heavy grazing on **mature plants** may also produce 'drumstick' or 'mop' heather bushes in which the heather canopy is reduced to small, compact masses of intertwined and contorted shoots on the ends of scattered long, bare stems. Note that tall drumstick-like heather can occur on wet heaths when browsing is not heavy. This can be checked by looking for browsed shoots and contorted shoot growth.



Figures adapted from MacDonald, 1990.

15. Indicators of local distinctiveness

Indicators of local distinctiveness are features of a heathland that make it 'special' but which are not covered by the attributes already described. They should be apparent from the SSSI citations or past surveys. This is a discretionary attribute in that it may not be applicable to every site; but where local distinctiveness has contributed to the selection of a site for lowland heath it should be mandatory. The target(s) should be tailored to each site. Such indicators may include the following:

i. notable species which are not notified features in their own right;
ii. structural attributes, such as pools, edge habitats, etc.
iii. associations between lowland heathland and other habitats, eg mosaics of vegetation types, transitions to woodland, grassland or mire.

The quality of the edge habitat can influence the value of the heath. It is here that there is often a greater diversity of flowers (eg ragwort *Senecio jacobaea*, heath bedstraw *Galium saxatile*, harebell *Campanula rotundifolia*, sallow *Salix cinerea*, goldenrod *Solidago virgaurea*, tormentil *Potentilla erecta*, yarrow *Achillea millefolium*, mouse-ear hawkweed *Pilosella officinarum* and other composites, supporting specialist insects as well as providing nectar during periods when heather is not in flower. Scrub or woodland edges may contribute to the shelter of a site.

Table 1. UK guidance on conservation objectives for Monitoring Designated Sites

Interest feature: Lowland dry heath

Includes the following NVC types: **H1** *Calluna vulgaris-Festuca ovina* heath; **H2** *Calluna vulgaris-Ulex minor* heath; **H3** *Ulex minor-Agrostis curtisii* heath; **H4** *Ulex gallii-Agrostis curtisii* heath; **H6** *Erica vagans-Ulex europaeus* heath; **H7** *Calluna vulgaris-Scilla verna* heath; **H8** *Calluna vulgaris-Ulex gallii* heath; **H9** *Calluna vulgaris-Deschampsia flexuosa* heath; **H10** *Calluna vulgaris-Erica cinerea* heath; **H11** *Calluna vulgaris-Carex arenaria* (dune) heath; **H12** *Calluna vulgaris-Vaccinium myrtillus* heath. Upland stands of **H4**, **H8**, **H9**, **H10** and **H12** are covered by the upland dry heath guidance. Stands of **H3** and **H4** with *Erica ciliaris* are covered by the Lowland wet heath guidance.

Equivalent Phase 1 categories are **D1** Dry dwarf shrub heath (lowland stands), **D3** Lichen/bryophyte heath (part only), **D5** Dry heath/acid grassland mosaic (part only), **H8.5** Coastal heath, **H6.6** Dune heath

Includes the Annex I priority types 4040 **Dry coastal heaths with *Erica vagans*, 2150 Atlantic decalcified fixed dunes (Calluno-Ulicetea)** and lowland forms of type 4030 **European dry heaths**.

Reporting category: Dwarf-shrub heath

NB All attributes listed are mandatory, unless indicated as discretionary. See section 7.8 for definitions of DAFOR terms.

Attributes	Targets	Method of assessment	Comments
Habitat extent (ha)	No unconsented decline in the area of the habitat, except where a target has been set to increase the extent of other habitat features on the site at the expense of lowland heathland	Field survey and/or aerial photography, in relation to baseline map. It is particularly important to check the boundaries and edges when they are defined by trees, scrub or bracken, to avoid encroachment into the heathland. Aerial photographs may provide good means of measuring these changes in extent or position of the boundaries.	Lowland heathlands are habitats created mostly through human management by grazing, cutting and burning. If they are left to natural processes, then they lose their open character and disappear under thick scrub or secondary forest. However some fluctuations and variations from year to year are normal and acceptable.
Bare ground (%)	At least 1% but not more than 10% cover of the area of the feature should consist of firm, sunlit, horizontal, sloping or vertical, exposed bare ground.	Visual assessment of cover, using structured walk or transects	Bare ground should form a patchwork with vegetation and be present mainly in south-facing slopes. Exclude rock, stone or litter. Tracks or paths can also be a source or bare ground for nesting invertebrates. See also target below for signs of disturbance. A higher percentage of bare ground is acceptable if the site is important for certain bird species, eg curlews, woodlarks, nightjars.
Vegetation structure: % cover of dwarf shrubs [1]	Dwarf shrub cover 25-90% (see section 10.4)	Visual assessment of cover, using structured walk or transects and aerial photographs, maps.	Assess over whole feature. Annual variation and succession should be accounted for within the targets.
Vegetation structure: % cover of *Ulex* spp.	Total *Ulex* and/or *Genista* spp. cover <50%, with *Ulex europaeus* <25%.	Visual assessment of cover, using structured walk or transects and aerial photographs, maps.	Assess over whole feature. Gorse species support a rich invertebrate and vertebrate fauna. However, the can affect the soil characteristics. See also 'negative indicators'.
Vegetation structure: growth phase composition of ericaceous cover	Pioneer phase (including pseudo-pioneer): 10-40%; Building/mature phase: 20-80%; Degenerate phase: <30%; and Dead: <10%, of total ericaceous cover.	Visual assessment of cover, using structured walk or transects	Both a young stand of eg 40-60-0-0 (P-B/M-Dg-Dd) and a mature stand of eg 10-65-20-5 (P-B/M-Dg-Dd) would meet the conservation objectives, though structurally they will be very different. Annual variation and succession should be accounted for within the targets. This attribute should be assessed only where it is possible to differentiate the growth phases.

[1] **Dwarf-shrubs** include*: Arctostaphylos uva-ursi, Calluna vulgaris, Empetrum nigrum, Erica ciliaris, E. cinerea, E. tetralix, E. vagans, Genista anglica, G. pilosa, Ulex gallii, U. minor, Vaccinium myrtillus, V. vitis-idaea* (and hybrids).

Attributes	Targets	Method of assessment	Comments
Vegetation composition: dwarf shrubs [1]	At least two species of dwarf shrubs present and at least frequent.	Visual assessment of cover, using structured walk or transects	In naturally species-poor sites the presence of just one dwarf-shrub species may be enough to meet the target. For species-rich sites a higher target may be appropriate (see text).
Vegetation composition: graminoids [2]	At least 1 species at least frequent and 2 species at least occasional throughout the sward; but *Deschampsia flexuosa* and *Nardus stricta* no more than occasional and <25% cover	Record presence, using structured walk or transects	In naturally species-poor sites, the presence of just one graminoid species may be enough to meet the target. For species-rich sites a higher target may be appropriate (see text).
Vegetation composition: desirable forbs [3]	At least 2 species at least occasional throughout the sward	Record presence, using structured walk or transects	In naturally species-poor sites, the presence of just one forb species may be enough to meet the target. For species-rich sites a higher target may be appropriate (see text).
Vegetation composition: bryophytes and lichens	% cover maintained or increased (when naturally present)	Visual assessment of cover, using structured walk or transects	Not applicable on all sites. Refer to existing information and surveys of the site. Does not include dense mats of acrocarpous mosses (eg *Campylopus introflexus*) which should not be more than occasional (see negative indicators)
Negative indicators: signs of disturbance	<1% of habitat heavily eroded.	Visual assessment of cover, using structured walk or transects	Signs of overgrazing or intensive fires should also be recorded (see section 13).
Negative indicators: Species	<1% exotic species [4] < 1 % ragwort, nettle, thistles and other herbaceous spp [5] < 15% trees & scrub [6] <10% bracken (dense canopy) Acrocarpous mosses <occasional	Visual assessment of cover, using structured walk or transects	Exotic species should be eradicated if possible. Other species in this list may be beneficial for a range of invertebrates and only become indicators of negative quality if they are over the established limit. Up to 25% scrub cover can be accepted if indicated in conservation objectives or management plan.
Indicators of local distinctiveness: eg transitions, pools or notable species *Discretionary attribute – for any site-specific 'quality indicators' not considered above (see note 4.4)*	Targets to be set to maintain distinctive elements at current extent/levels and/or in current locations, eg to maintain transitions between habitats, or to maintain existing populations of notable species.	As appropriate to feature.	This attribute is intended to cover any site-specific aspects of this habitat feature (forming part of the reason for notification) which are not covered adequately by the previous attributes, or by separate guidance eg for notified species features. For notable species (vascular plants) it is not intended to set a target for detailed species monitoring, rather to provide a rapid indication of presence/ absence and/or approximate extent, allowing for natural fluctuations in population size.

[2] **Graminoids** include*: Agrostis* spp*., Ammophila arenaria, Carex* spp., *Danthonia decumbens, Deschampsia flexuosa, Festuca* spp*., Molinia caerulea, Nardus stricta, Trichophorum cespitosum*.

[3] **Desirable forbs** include: *Armeria maritima, Galium saxatile, Genista anglica, Hypochaeris radicata, Lotus corniculatus, Plantago lanceolata, Plantago maritima, Polygala serpyllifolia, Potentilla erecta, Rumex acetosella, Scilla verna, Serratula tinctoria, Thymus praecox, Viola riviniana*, and for limestone heath only*: Filipendula vulgaris, Galium verum, Helianthemum nummularium, Sanguisorba minor*. For dune heath only: *Aira praecox, Corynephorus canescens, Phleum arenarium, Erodium ciciutarium, Filago minima, Sedum acre, Peltigera spp*.

[4] **Negative indicators – exotics** include: *Rhododendron ponticum, Gaultheria shallon, Fallopia japonica*.

[5] **Negative indicators – other herbaceous spp** include: *Cirsium arvense, Digitalis purpurea, Epilobium spp. (*excluding. *E. palustre), Chamerion angustifolium, Juncus effusus, J. squarrosus, Ranunculus* spp*., Senecio* spp*., Rumex obtusifolius, Urtica dioica,* 'coarse grasses'.

[6] **Tree and scrub spp** include: *Betula* spp*., Prunus spinosa, Pinus* spp*., Rubus* spp*., Sarothamnus scoparius, Quercus* spp., *Hippophae rhamnoides*.

Table 2. UK guidance on conservation objectives for monitoring designated sites

Interest feature: Lowland wet heath

Includes the following NVC types: **H5** *Erica vagans-Schoenus nigricans* heath; **M14** *Schoenus nigricans-Narthecium ossifragum* mire; **M15** *Scirpus cespitosus-Erica tetralix* wet heath; and **M16** *Erica tetralix-Sphagnum compactum* wet heath. Also includes stands with *Erica ciliaris* of the following NVC types: **H3** *Ulex minor-Agrostis curtisii* heath; **H4** *Ulex gallii-Agrostis curtisii* heath; and **M21** *Narthecium ossifragum-Sphagnum papillosum* valley mire. Upland stands of **H5**, **M14**, **M15** and **M16** are covered by the upland wet heath guidance.

Equivalent Phase 1 categories are **D2** Wet dwarf shrub heath (lowland stands) and **D6** Wet heath/acid grassland mosaic (part).

Includes the Annex I priority type 4020 **Temperate Atlantic wet heaths with *Erica ciliaris* and *Erica tetralix*** and lowland stands of 4010 **Northern Atlantic wet heaths with *Erica tetralix*.**

Reporting category: Dwarf-shrub heath

NB All attributes listed are mandatory, unless indicated as discretionary. See section 7.8 for definitions of DAFOR terms.

Attributes	Targets	Method of assessment	Comments
Habitat extent (ha)	No unconsented decline in the area of the habitat, except where a target has been set to increase the extent of other habitat features on the site at the expense of lowland heathland	Field survey and/or aerial photography, in relation to baseline map. It is particularly important to check the boundaries and edges when they are defined by trees, scrub or bracken, to avoid encroachment into the heathland. Aerial photographs may provide good means of measuring these changes in extent or position of the boundaries.	Lowland heathlands are habitats created mostly through human management by grazing, cutting and burning. If they are left to natural processes, then they lose their open character and disappear under thick scrub or secondary forest. However some fluctuations and variations from year to year are normal and acceptable.
Bare ground (%)	At least 1% but not more than 10% cover of the area of the feature should consist of muddy exposed bare ground	Visual assessment of cover, using structured walk or transects	Bare ground should form a patchwork with vegetation and be present mainly in south-facing slopes. Exclude rock, stone, litter or bryophyte/lichen mats or heavily trampled soil.
Vegetation structure: % cover of dwarf shrubs [7]	Dwarf shrub cover 25-90% (see section 10.4)	Visual assessment of cover, using structured walk or transects	Assess over whole feature. Annual variation and succession should be accounted for within the targets.
Vegetation structure: growth phase composition for ericaceous spp.	Presence of heather in all stages of growth.	Visual assessment of cover, using structured walk or transects	No one growth form should be dominant. Annual variation and succession should be accounted for within the targets. This attribute should be assessed only where it is possible to differentiate the growth phases.
Vegetation composition: dwarf shrubs [7]	At least two species of dwarf shrubs present and at least frequent.	Visual assessment of cover, using structured walk or transects	In naturally species-poor sites the presence of just one dwarf-shrub species may be enough to meet the target. For species-rich sites a higher target may be appropriate (see text).
Vegetation composition: graminoids [8]	At least 1 species at least frequent and 2 species at least occasional throughout the sward;	Visual assessment of cover, using structured walk or transects	*Molinia* no more than occasional and *Schoenus* at least occasional when naturally present. In naturally species-poor sites, the presence of just one graminoid species may be enough to meet the target. For species-rich sites a higher target may be appropriate (see text).

[7] **Dwarf-shrubs** include*: Calluna vulgaris, Erica ciliaris, E. cinerea, E. tetralix, E. vagans, Ulex gallii, U. minor, Vaccinium* spp.

Attributes	Targets	Method of assessment	Comments
Vegetation composition: desirable forbs [9]	At least 2 species at least occasional throughout the sward	Visual assessment of cover, using structured walk or transects	In naturally species-poor sites, the presence of just one forb species may be enough to meet the target. For species-rich sites a higher target may be appropriate (see text).
Vegetation composition: bryophytes and lichens	>10% cover of Sphagna (if naturally present) >5% cover of lichens (if naturally present)	Visual assessment of cover, using structured walk or transects	Not applicable on all sites.
Negative indicators: signs of disturbance	No artificial functioning drains <1% of habitat showing signs of trampling/paths No silt or leachate	Visual assessment, using structured walk or transects	Drains can adversely affect hydrology Signs of intensive fires or overgrazing should also be recorded (see section 13).
Negative indicators: Species	<1% exotic species [10] < 1 % ragwort, nettle, thistles and other herbaceous spp [11] < 10% trees & scrub [12] <5% bracken (dense canopy) <10% *Ulex europaeus* Acrocarpous mosses < occasional	Visual assessment of cover, using structured walk or transects	Exotic species should be eradicated if possible. Other species in this list may be beneficial for a range of invertebrates and only become indicators of negative quality if they are over the established limit. Up to 25% scrub cover can be accepted if indicated in conservation objectives or management plan.
Indicators of local distinctiveness: eg transitions, pools or notable species *Discretionary attribute – for any site-specific 'quality indicators' not considered above (see note 4.4)*	Targets to be set to maintain distinctive elements at current extent/levels and/or in current locations, eg to maintain transitions between habitats, or to maintain existing populations of notable species.	As appropriate to feature.	This attribute is intended to cover any site-specific aspects of this habitat feature (forming part of the reason for notification) which are not covered adequately by the previous attributes, or by separate guidance eg for notified species features. For notable species (vascular plants) it is not intended to set a target for detailed species monitoring, rather to provide a rapid indication of presence/ absence and/or approximate extent, allowing for natural fluctuations in population size.

[8] **Graminoids** include*: Carex panicea, Carex pulicaris, Eleocharis* spp.*, Eriophorum angustifolium, Juncus acutiflorus, Juncus articulatus, Molinia caerulea, Rhynchospora alba, Schoenus nigricans, Trichophorum cespitosum.*

[9] **Desirable forbs** include: *Anagallis tenella, Drosera* spp.*, Galium saxatile, Genista anglica, Myrica gale, Narthecium ossifragum, Pinguicula* spp.*, Polygala serpyllifolia, Potentilla erecta, Serratula tinctoria, Succisa pratensis*.

[10] **Negative indicators – exotics** include: *Rhododendron ponticum, Gaultheria shallon, Fallopia japonica*.

[11] **Negative indicators – other herbaceous spp** include: *Apium nodiflorum, Cirsium arvense, Digitalis purpurea, Epilobium* spp. (excl. *E. palustre), Glyceria fluitans, Juncus effusus, J. squarrosus, Oenanthe crocata, Phragmites spp., Ranunculus repens, Fallopia japonica, Senecio jacobaea, Rumex obtusifolius, Typha* spp.*, Urtica* spp.

[12] **Tree and scrub spp** include: *Alnus glutinosa, Betula* spp.*, Pinus* spp.*, Prunus spinosa, Quercus* spp.*, Rubus* spp.*, Salix* spp..

16. Recording field forms

The field forms in Annex 2 and 3 are intended to help assess the condition of lowland heathlands in SSSIs and SACs across England, Wales, Scotland and Northern Ireland. Annex 4 shows an example of a completed field form and assessment.

It is advisable to record as much information on the route and the habitat as resources and time allow in a consistent manner during different visits and to keep all the records in a file. This will provide a track of the history of the condition of the site and the relation with the management.

The 'key management activities' and 'other activities likely to have an impact' sections are intended as a reminder to look at management activities (or the lack of them) which could be the cause of present condition. The recorder can add any other information.

The tables provided are for guidance only. Lists of species should be produced on a site-specific basis, and the assessment should be carried out based on the particular conservation objectives tables or management plans.

The 'structured walk' section of the form is for writing down the species which appear in the site and recording the percentage cover if necessary, or only their presence, to determine frequency. Due to the limited space it is suggested to use only the initials of the species which occur in the site, which will be a small selection of those listed in the forms.

17. How to determine the condition of the feature

Annex 5 summarises how to reach a decision on the condition of the lowland heathland feature in a site.

It should be stressed that this method is a tool to assess condition, not management, but noting current management or other activity may help in interpreting the condition assessment.

All targets have to be met for the feature to be considered in favourable condition. Some of the targets have wide thresholds but there is not a sudden step-change in condition at the threshold point. Just missing (or indeed just achieving) such thresholds is less significant than knowing whether the trend is up or down, and what factors are influencing that trend. An unforeseen event (eg Foot and Mouth outbreak) that is being rectified is likely to be less serious that lack of or inappropriate management.

In exceptional circumstances there may be a good reason why a target has not been met. A full written justification of the case is then needed to support the final decision on the condition of the feature. A follow-up may be necessary within few months to determine in the situation has changed.

The condition of the feature is not the sum or the average of the condition of the component parts; on the contrary, some "missed" targets in a unit can be compensated in other units. For example, in large sites some units may have a high percentage of scrub cover. However, when

the whole feature is considered the scrub contributes to less than 15% of the total vegetation cover.

When a feature judged to be in **Favourable condition**, was also so in a previous assessment, we say the feature is in **Favourable maintained condition**. If in a previous visit it was in unfavourable condition it is judged to be now in **Favourable recovered condition**.

If one or more targets have not been met but the appropriate management or corrective measure is in place the feature in is **Unfavourable recovering condition**. If such measures are not in place but the feature is not apparently getting worse it is in **Unfavourable no change condition**. If the lack of appropriate management is leading to the feature deteriorating it is in **Unfavourable declining condition**.

When part of the feature has been removed or irretrievably altered it is **Partially destroyed**. If, in the worst case, the entire feature has been removed or irretrievably altered it is **Destroyed**.

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Guidance to local staff

CCW: *Performance indicators for heathland under Tir Gofal Prescriptions* (copies from document supplied by J. Foot).

SNH: *Guidance on setting targets for attributes for Lowland and upland heath* (copies from document supplied by I. Strachan).

English Nature: 1999. *National Specialist guidance for conservation objectives. Vol. 1. Habitats and Earth Features.*

19. Acknowledgements

Various staff of English Nature, CCW, SNH, local authorities and NGOs contributed, mainly through the Lowland Heathland HAP Steering Group, with comments and field testing to the improvement of this guidance and the field forms.

20. Annexes

Annex 1. Suggested definition for CSM purposes of lowland heathland in terms of Phase 1, NVC and Annex I of the Habitats Directive, taking into account the character of a "mosaic" in most locations.

Annex 2. Dry heath field form

Annex 3. Wet heath field form.

Annex 4. Example of a completed field form.

Annex 5. Reaching a decision on the condition of the feature.

Annex 1. Suggested definition for CSM purposes of lowland heathland in terms of Phase 1, NVC and Annex I of the Habitats Directive, taking into account the character of a "mosaic" in most locations (see text).

Lowland Heathland			
Components	**Phase 1**	**NVC**	**Annex I habitat equivalents**
Dry Heath	D1- Dry dwarf shrub heath H8.5- Coastal heath H6.6- Dune heath	H1-H4; H7-H10; H12 H6 H11	European dry heaths (4030) *Dry Atlantic coastal heaths with *Erica vagans* (4040) *Atlantic decalcified fixed dunes (Calluno-Ulicetea) (2150) *Decalcified fixed dunes with *Empetrum nigrum* (2140)
Dry heath/acid grassland mosaic (1)	D5 - Dry heath/acid grassland mosaic	H1-H4; U1-U4	European dry heaths (4030)
Dry heath/calcareous grassland		H2; H8; CG2; CG7; CG9	European dry heaths (4030)
Lichen/bryophyte heath	D3- Lichen/bryophyte heath	H1; U1a; CG7c	European dry heaths (4030)
Wet heath	D2 - Wet dwarf shrub heath	M14 - M16 H5	Northern Atlantic wet heath with *Erica tetralix* (4010)
		H3-H4, M16, M21 (when these contain *E. ciliaris*),	*Temperate Atlantic wet heaths with *Erica ciliaris* and *E. tetralix* (4020)
Wet heath/acid grassland mosaic	D6 - Wet heath/acid grassland mosaic	M16; M24; M25	Northern Atlantic wet heaths with *Erica tetralix* (4010)

(1) East Anglian heaths (Brecklands) are grass-heaths, where the percentage of acid grassland (U1) is high and dwarf shrubs are less frequent. It is suggested that the monitoring guidance for lowland acid grasslands is used for those sites.
Associated **elements**, which may form an integral part of some of the above "heathlands".

Fen mire	E3.1- Valley mire	M21 (M16?)	Depressions on peat substrates (*Rhynchosporion* 7150)
Wet heath	E4- Bare peat	No NVC	
Wet heath/ acid grassland mosaic	B5- Marsh/marshy grassland	M24; M25	
Pools	G1.4- Dystrophic standing waters	OV34 M3	*Mediterranean temporary ponds (3170) Natural dystrophic lakes and ponds (3160)
Scrub	A2.2- Scrub, scattered	no real woodlands/shrublands (W in NVC), just scattered trees/shrubs	

* Priority Habitat Type

NVC Communities in lowland heathlands, including commonly associated non-heathland types

Heaths

H1 *Calluna vulgaris-Festuca ovina* heath
H2 *Calluna vulgaris-Ulex minor* heath
H3 *Ulex minor-Agrostis curtisii* heath
H4 *Ulex gallii-Agrostis curtisii* heath
H5 *Erica vagans-Schoenus nigricans* heath
H6 *Erica vagans-Ulex europaeus* heath
H7 *Calluna vulgaris-Scilla verna* heath
H8 *Calluna vulgaris-Ulex gallii* heath
H9 *Calluna vulgaris-Deschampsia flexuosa* heath
H10 *Calluna vulgaris-Erica cinerea* heath
H11 *Calluna vulgaris-Carex arenaria* heath (H11a *Erica cinerea* sub-community)
H12 *Calluna vulgaris-Vaccinium myrtillus* heath

Acid Grasslands

U1 *Festuca ovina-Agrostis capillaris-Rumex acetosella* grassland (U1a *Cornicularia aculeata-Cladonia arbuscula* sub-community)
U2 *Deschampsia flexuosa* grassland
U3 *Agrostis curtisii* grassland
U4 *Festuca ovina-Agrostis capillaris-Galium saxatile* grassland

Open Habitats

OV34 *Allium schoenoprasum-Plantago maritima* community

Mires

M3 *Eriophorum angustifolium* bog pool community
M14 *Schoenus nigricans-Narthecium ossifragum* mire
M15 *Scirpus cespitosus-Erica tetralix* wet heath
M16 *Erica tetralix-Sphagnum compactum* wet heath
M21 *Narthecium ossifragum-Sphagnum papillosum* valley mire
M24 *Molinia caerulea-Cirsium dissectum* fen meadow
M25 *Molinia caerulea-Potentilla erecta* mire

Calcareous grasslands

CG2 *Festuca ovina-Avenula pratensis* grassland
CG7 *Festuca ovina-Hieracium pilosella-Thymus praecox/pulegioides* grassland (CG7c *Ditrichum flexicaule-Diploschistes scruposus* var. *bryophilus* sub-community)
CG9 *Sesleria albicans-Galium sterneri* grassland

Annex 2. DRY Lowland Heathland - Condition Assessment field form

Site Name:	**Grid reference (if known):**	**Assessed by:**
Date: **Time:**	**Photographs taken - Film and Frame Nos.**	**NVC type (if available)**

Condition (please circle): Favourable maintained / Favourable recovered / Unfavourable recovering / Unfavourable no change / Unfavourable declining / Partially destroyed / Destroyed

Recommended visiting period: May-October

Recommended frequency of visits: **Every six years for national reporting**

Key management activities affecting condition to discuss with manager:			**Other activities likely to have an impact (tick + or - if appropriate)**	
Grazing intensity/stocking rate	Burning / presence of fire-breaks		Farming/agriculture	Military activities
Stock type	Rolling and chain harrowing		Conservation activities	Mineral extraction
Grazing period	Bracken management		Urban development	Natural events
Supplementary feeding	Other (specify)		Forestry	Recreation/tourism
Scrub and weed control	Manag. agreement/scheme/grant	Yes/No	Infrastructure/transport	Water abstraction
Cutting	Agri-env. schemes/grants	Yes/No		

Structured walk Frequencies: totals out of 20 stops. 1-2 = **rare,** 3-6 = **occasional,** 7-12 = **frequent,** all stops (<50% cover) = **abundant,** all stops (>50% cover) = **dominant.** An A4 is appr. 1.5% of a 2x2m quadrat.

Attribute (*= mandatory attribute. One failure among mandatory attributes = unfavourable condition)	**Targets (for the entire feature)**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**Estimate for attribute**
***Extent of habitat**	No un-consented loss of area	(Describe and refer to map)																				
***Bare ground (not rock)** % cover of ephemerally exposed bare ground in intimate mosaic with vegetation or in tracks/paths	'Undisturbed' 1-10% 'Heavily disturbed' <1%																					
***Vegetation structure**																						
TOTAL % cover shrubs	Cover of dwarf shrubs between 25-90%																					
Ulex spp. cover	<50%																					
Calluna vulgaris (pseudo-)Pioneer %	10-40%																					
(when possible to Building/Mature %	20-80%																					
Differentiate) Degenerate %	<30%																					
Dead %	<10%																					
***Vegetation composition**	Lists to be tailored to each site																					
Dwarf shrubs Frequency of any of the following species: *Arctostaphylos uva-ursi, Calluna vulgaris, Erica ciliaris, Erica cinerea, Erica tetralix, Erica vagans, Ulex gallii, Ulex minor, Vaccinium myrtillus, V. vitis-idaea, Genista anglica, Empetrum nigrum.*	At least 2 species at least **frequent** (see guidance for species-poor sites)																					
Graminoids Frequency of any of the following species: *Agrostis* spp., *Ammophila arenaria, Carex* spp., *Danthonia decumbens, Deschampsia flexuosa*, Festuca* spp., *Molinia caerulea, Nardus stricta*, Trichophorum cespitosum.*	At least 1 species at least **frequent** and 2 species at least **occasional** throughout the sward (see guidance for species-poor/rich sites) except *, which should be not more than occasional & <25% cover.																					

Attribute (*= mandatory attribute. One failure among mandatory attributes = unfavourable condition)	**Targets (for the entire feature)**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**Estimate for attribute**
Desirable forbs Frequency of any of the following species *Armeria maritima, Galium saxatile, Genista anglica, Hypochaeris radicata, Lotus corniculatus, Plantago lanceolata, Plantago maritima, Polygala serpyllifolia, Potentilla erecta, Rumex acetosella, Scilla verna, Serratula tinctoria, Thymus praecox, Viola riviniana.* Limestone heath only*: Filipendula vulgaris, Galium verum, Helianthemum nummularium, Sanguisorba minor.* Dune heath only: *Aira praecox, Corynephorus canescens, Phleum arenarium, Erodium cicutarium, Filago minima, Sedum acre, Peltigera*	At least 2 species at least **occasional** (see guidance for species-poor/rich sites)																					
Bryophytes and lichens Cover of all spp. (except dense acrocarpous spp.) eg *Cladonia* spp., *Dicranum scoparium, Hylocomium splendens, Hypnum cupressiforme, Pleurozium schreberi, Polytrichum* spp., *Racomitrium lanuginosum.*	Site-specific target to be set (see guidance)																					
***Negative indicators**	List to be tailored to each site																					
Signs of disturbance Record presence of erosion.	<1% of habitat showing signs of erosion.																					
Species (-ve if over target threshold) % cover of any of the following species:	(% of entire feature)																					
Rhododendron ponticum, Gaultheria shallon, Fallopia japonica.	*Rhododendron* and exotic species <1%.																					
Cirsium arvense, Digitalis purpurea, Epilobium spp. (excl. E. palustre), Chamerion angustifolium, Juncus effusus, J. squarrosus, Ranunculus spp., *Senecio* spp., *Rumex obtusifolius, Urtica dioica*, "coarse grasses".	< 1 % *Senecio* spp., *Urtica dioica*, *Cirsium* spp. and other herbaceous, in clumps.																					
Betula spp., *Prunus spinosa, Pinus* spp., *Rubus* spp., *Cytisus scoparius, Quercus* spp., *Hippophae rhamnoides*	< 15% trees, tree seedlings or other species of scrub. <1% *Rubus* spp. (see guidance 12.6.)																					
Pteridium aquilinum.	< 10% *P. a.* in dense canopy																					
Ulex europaeus.	<25% *U. europaeus*																					
Dense mats of acrocarpous mosses (*C. introflexus*).	Acr. mosses < occasional																					
Indicators of local distinctiveness	List to be tailored to each site																					
Rare species, pools, edges Eg *Cladonia arbuscula, Cladonia incrassata, Cornicularia* spp., *Viola lactea*, etc.	Monitor and set targets according to cons. objectives or management plan.																					

Annex 2. cont.

Comments (eg indicator fauna species: eg woodlark, nightjar, sand lizard, green tiger beetle, silver studded blue, etc.**); number and extent of fires since last survey if known; firebreaks.**
Rationale underpinning the condition assessment decision

Annex 3. WET Lowland Heathland - Condition Assessment field form

Site Name:	**Grid reference (if known):**	**Assessed by:**
Date: **Time:**	**Photographs taken - Film and Frame Nos.**	**NVC type (if available)**

Condition (please circle): Favourable maintained / Favourable recovered / Unfavourable recovering / Unfavourable no change / Unfavourable declining / Partially destroyed / Destroyed

Recommended visiting period: May-October — Recommended frequency of visits: **Every six years for national reporting**

Key management activities affecting condition to discuss with manager:

Grazing intensity/stocking rate — Burning / presence of fire-breaks
Stock type — Rolling and chain harrowing
Grazing period — Bracken management
Supplementary feeding — Other (specify)
Scrub and weed control — Manag. agreement/scheme/grant — Yes/No
Cutting — Agri-env. schemes/grants — Yes/No

Other activities likely to have an impact (tick + or - if appropriate)

Farming/agriculture — Military activities
Conservation activities — Mineral extraction
Urban development — Natural events
Forestry — Recreation/tourism
Infrastructure/transport — Water abstraction

Structured walk Frequencies: totals out of 20 stops. 1-2 = **rare,** 3-6 = **occasional,** 7-12 = **frequent,** all stops (<50% cover) = **abundant,** all stops (>50% cover) = **dominant.** An A4 is appr. 1.5% of a 2x2m quadrat.

Attribute (*= mandatory attribute. One failure among mandatory attributes = unfavourable condition)	**Targets (for the entire feature)**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**Estimate for attribute**
***Extent of habitat**	No un-consented loss of area	(Describe and refer to map)																				
***Bare ground (not rock)** % cover of ephemerally exposed bare ground in intimate mosaic within vegetation and in tracks/paths.	'Undisturbed' 1-10% 'Heavily disturbed' <1%																					
***Vegetation structure**																						
TOTAL % cover shrubs	Cover of dwarf shrubs: 25-90%																					
Calluna vulgaris	Presence of heather in all stages of growth. No one growth form should be dominant.																					
***Vegetation composition**	Lists to be tailored to each site																					
Dwarf shrubs Frequency of any of the following species: *Calluna vulgaris, Empetrum nigrum, Erica ciliaris, E. cinerea, E. tetralix, E. vagans, Myrica gale, Salix repens*, *Ulex gallii, Ulex minor, Vaccinium* spp.	At least **2** species at least **frequent**																					
Graminoids Frequency of any of the following species: *Carex panicea, Carex pulicaris, Eleocharis* spp., *Eriophorum angustifolium, Juncus acutiflorus, Juncus articulatus, Molinia caerulea*, Rhynchospora alba, Schoenus nigricans!, Trichophorum cespitosum.*	At least **1** species at least **frequent** and **2** species at least **occasional** throughout the sward (except *, which should be not more than occasional, and !, which should be >20% when naturally present)																					

Attribute (*= mandatory attribute. One failure among mandatory attributes = unfavourable condition)	Targets (for the entire feature)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Estimate for attribute
Desirable forbs Frequency of any of the following species *Anagallis tenella, Drosera* spp., *Galium saxatile, Genista anglica, Narthecium ossifragum, Pinguicula* spp., *Polygala serpyllifolia, Potentilla erecta, Serratula tinctoria, Succisa pratensis*.	At least **2** species at least **occasional**																					
Bryophytes and lichens % cover and frequency of: *Sphagnum* spp Locally occurring lichens	when naturally present >10% cover of Sphagna >5% of lichens																					
***Negative indicators**	List to be tailored to each site																					
Signs of disturbance - Drains	Artificial drainage channels adversely affecting hydrology are absent.																					
- Obvious visual pollution.	No signs of silt or leachate.																					
- Trampling	<1% trampling signs/paths (eg on Sphagnum)																					
Species (-ve if over target threshold) % cover of any of the following species:	(% of entire feature)																					
Rhododendron ponticum	*Rhododendron* and exotic species <1%.																					
Apium nodiflorum, Cirsium arvense, Digitalis purpurea, Epilobium spp. (excl. *E. palustre), Glyceria fluitans, Juncus effusus, J. squarrosus, Oenanthe crocata, Phragmites spp., Ranunculus repens, Fallopia japonica, Senecio jacobaea, Rumex obtusifolius, Typha* spp., *Urtica* spp	<1% undesirable herbaceous/forb spp.																					
Alnus glutinosa, Betula spp., *Pinus* spp., *Prunus spinosa, Quercus* spp., *Rubus* spp., *Salix* spp.	< 10% trees, tree seedlings or other species of scrub.																					
Pteridium aquilinum.	< 5% *P. aquilinum*																					
Ulex europaeus.	<10% *U. europaeus*																					
Dense mats of acrocarpous mosses (*Campylopus introflexus*).	Acr. mosses < occasional																					
Indicators of local distinctiveness	List to be tailored to each site																					
Rare species, pools, edges Monitor and set targets according to conservation objectives or management plan. *Cicendia filiformis*, *Gentiana pneumonanthe, Hammarbya paludosa*, *Lycopodiella inundata*, *Radiola linoides, Rhynchospora fusca*…																						

Annex 3. cont.

Comments (eg indicator fauna species: eg woodlark, nightjar, sand lizard, green tiger beetle, silver studded blue, etc.**); number and extent of fires since last survey if known; firebreaks.**
Rationale underpinning the condition assessment decision

Annex 4. Example of completed form. DRY Lowland Heathland - Condition Assessment field form

Site Name: *Thursley Common* **Grid reference (if known):** *SU9151410* **Assessed by:** *group*

Date: *9/8/01* **Time:** *2:30 pm* **Photographs taken - Film and Frame Nos.** *5 to 1* **NVC type (if available)**

Condition (please circle): Favourable maintained / Favourable recovered / (Unfavourable recovering) / Unfavourable no change / Unfavourable declining / Partially destroyed / Destroyed

Recommended visiting period: May-October

Recommended frequency of visits: **Every six years for national reporting**

Key management activities affecting condition to discuss with manager:

Grazing intensity/stocking rate — Burning / presence of fire-breaks
Stock type — Rolling and chain harrowing
Grazing period — Bracken management √
Supplementary feeding — Other (specify)
Scrub and weed control √ — Manag. agreement/scheme/grant — Yes/No
Cutting — Agri-env. schemes/grants — Yes/No

Other activities likely to have an impact (tick + or - if appropriate)

Farming/agriculture — Military activities
Conservation activities — Mineral extraction
Urban development — Natural events
Forestry — Recreation/tourism √
Infrastructure/transport — Water abstraction

Structured walk Frequencies: totals out of 20 stops. 1-2 = **rare,** 3-6 = **occasional,** 7-12 = **frequent,** all stops (<50% cover) = **abundant,** all stops (>50% cover) = **dominant.** An A4 is appr. 1.5% of a 2x2m quadrat.

Attribute (*= mandatory attribute. One failure among mandatory attributes = unfavourable condition)	**Target**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**Estimate for attribute**
***Extent of habitat**	No un-consented loss of area	(Describe and refer to map) 324 ha (NNR)																				√
***Bare ground (not rock)** % cover of bare ground in intimate mosaic within vegetation	'Undisturbed' 1-10%	1	10	<1	2	1.5	5	3	7	10	2											√
***Vegetation structure**																						
TOTAL % cover shrubs vs. herbaceous species	Cover of dwarf shrubs between 25-90%	98	80	75	70	90	60	70	75	90	80											√
Ulex spp.	< 50% *Ulex spp.*																					
Calluna/Erica spp (pseudo-)Pioneer %	10-40%	-	5	*10*	-	-	*5*	*3*	*10*	-	-											X
(when possible to Building/Mature %	20-80%	*95*	95	*90*	*100*	*85*	*70*	*95*	*80*	*100*	*90*											X
differentiate) Degenerate %	<30%	2	-	-	-	10	25	2	5	-	10											√
Dead %	<10%	3	-	-	-	5	-	-	5	-	-											√
***Vegetation composition**	List to be tailored to each site																					
Dwarf shrubs Frequency of any of the following species: *Arctostaphylos uva-ursi, Calluna vulgaris, Erica ciliaris, Erica cinerea , Erica tetralix, Erica vagans, Ulex gallii, Ulex minor, Vaccinium myrtillus, V. vitis-idaea, Genista anglica, Empetrum nigrum.*	At least 2 species at least **abundant** (see guidance for species-poor sites)	Cv Ecn Um	Cv Ecn Um	Cv Ecn Um	Cv Ecn Um	Cv Ecn Um	Cv Ecn	Cv Ecn Um	Cv Ecn Um	Cv Ecn	Cv Ecn Um											√
Graminoids Frequency of any of the following species: *Agrostis* spp., *Ammophila arenaria, Carex* spp., *Danthonia decumbens, Deschampsia flexuosa*, Festuca* spp., *Molinia caerulea, Nardus stricta*, Scirpus cespitosus.*	At least 1 species at least **frequent** and 2 species at least **occasional** throughout the sward (see guidance for species-poor/rich sites) except *, which should be not more than occasional.	-	Car	Df Fo	Car Df Agr	Df	Agr	-	Car Fo	Car Agr											√ Cx-frq Df-occ Fo-occ Agr-occ

Attribute (*= mandatory attribute. One failure among mandatory attributes = unfavourable condition)	**Target**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**Estimate for attribute**
Desirable forbs Frequency of any of the following species *Armeria maritima, Galium saxatile, Genista anglica, Hypochaeris radicata, Lotus corniculatus, Plantago lanceolata, Plantago maritima, Potentilla erecta, Rumex acetosella, Scilla verna, Serratula tinctoria, Thymus praecox, Viola riviniana.* ***For limestone heath only**: Filipendula vulgaris, Galium verum, Helianthemum nummularium, Sanguisorba minor.*	At least 2 species at least **occasional** (see guidance for species-poor sites)	-	-	-	-	-	Ga	-	-	Ga	-											X
Bryophytes and lichens % cover of: *Cladonia* spp., *Dicranum scoparium, Hylocomium splendens, Hypnum cupressiforme, Pleurozium schreberi, Polytrichum* spp., *Racomitrium lanuginosum.*	>10% bryophytes, when naturally present > 5% cover of *Cladonia* (if specific to site)	1 1	3 <1	10 5	15 7	10 2	5 5	7 2	10 5	3 7	15 1											√
***Negative indicators**	List to be tailored to each site																					
Signs of disturbance - erosion.	<1% of habitat showing signs of erosion.																					√
Species (-ve if over target threshold) % cover of any of the following species:	(% of entire feature)																					
Rhododendron ponticum, Gaultheria shallon, Fallopia japonica.	*Rhododendron* and exotic species <1%.																					
Cirsium arvense, Digitalis purpurea, Epilobium spp. (excl. E. palustre), Chameriun angustifolium, Juncus effusus, J. squarrosus, Ranunculus spp., *Senecio* spp., *Rumex obtusifolius, Urtica dioica*, " coarse grasses".	< 1 % *Senecio* spp., *Urtica dioica*, *Cirsium* spp. and other herbaceous, in clumps																					
Betula spp., *Prunus spinosa, Pinus* spp., *Rubus* spp., *Sarothamnus scoparius, Quercus* spp., *Hippophae rhamnoides*	< 15% trees, tree seedlings or other species of scrub. <1% *Rubus* spp. (see guidance 13.6.)			10																		√
Pteridium aquilinum	< 10% *P. a.* in dense canopy				3		10		5		5											√
Ulex europaeus	<25%		20	10			15	20		5												√
Dense mats of acrocarpous mosses. (*Campylopus introflexus*).	Acr. mosses < occasional					1																√
Quality indicators	List to be tailored to each site																					
Rare species, pools, edges Monitor and set targets according to conservation objectives or management plan. Eg. *Cladonia arbuscula, Cladonia incrassata, Cornicularia* spp., *Viola lactea.* Birds, etc.																						

Annex 4. cont.

Comments (eg indicator fauna species: eg woodlark, nightjar, sand lizard, green tiger beetle, silver studded blue, etc.**); number and extent of fires since last survey if known; firebreaks.**

Several species of conservation importance are present in the site: woodlark, Dartford warbler, nightjar, sand lizard, smooth snake and silver-studded blue.

Rationale underpinning the condition assessment decision

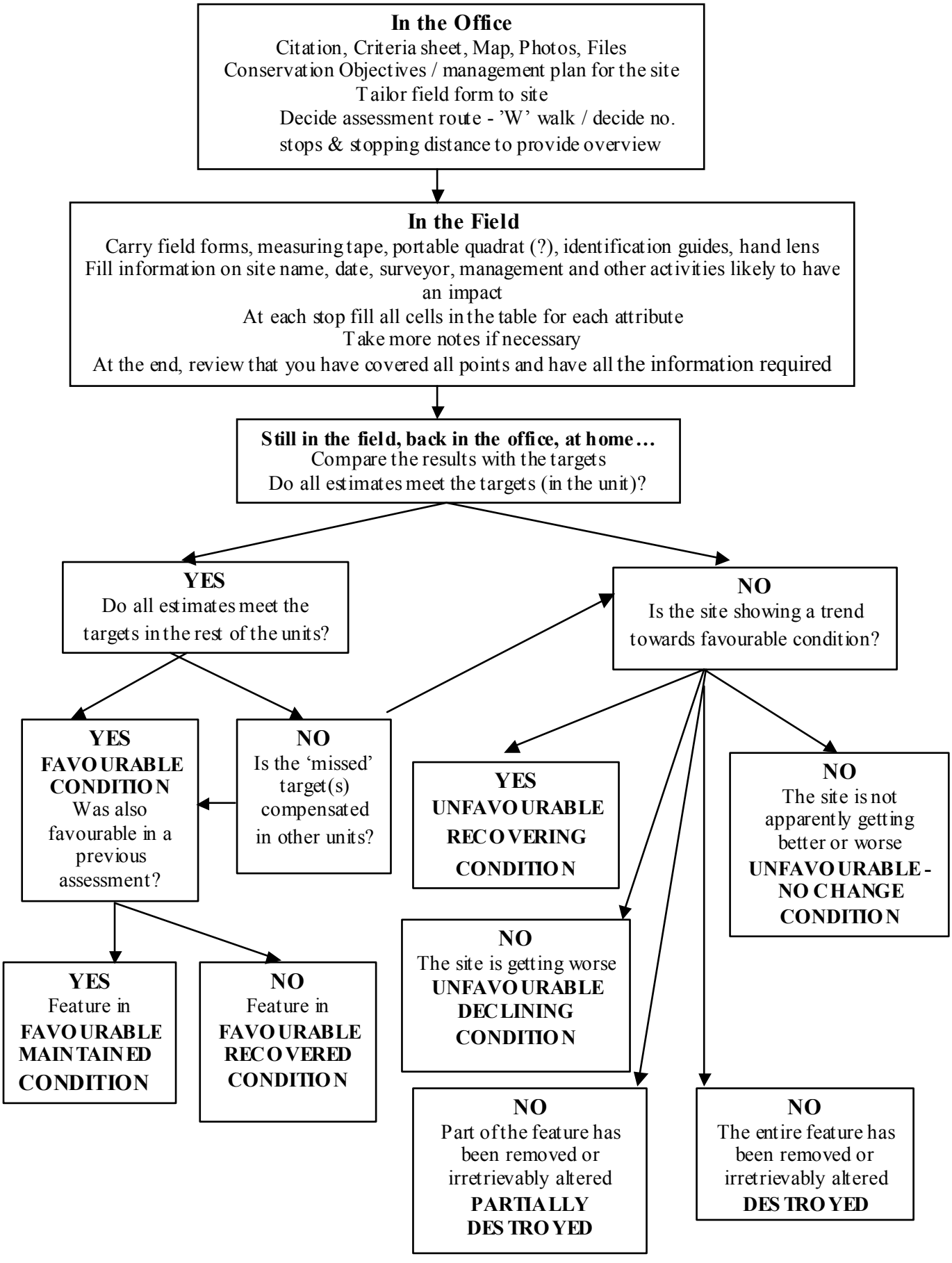
At this site, heathland communities range from dry heath through humid and wet heath to mire. Only dry heath was monitored for this exercise. The NNR has not been grazed since the 1920s. There was a wild fire in 1976.

The structure of the dwarf shrubs presents too high a proportion of mature heather and a low cover of bare ground. This could be the reason for the low presence of grasses and forbs.

Some over grown scrub has been cleared (...ha) and bracken is also being managed. It is right to say therefore, that the condition of the site is improving.

Ideally grazing should be introduced to create a more diverse structure. If this is not possible, cutting of some patches may be necessary to this purpose.

Annex 5. Reaching a decision on the condition of the feature



ENGLISH NATURE

English Nature is the Government agency that champions the conservation of wildlife and geology throughout England.

This is one of a range of publications published by:
External Relations Team
English Nature
Northminster House
Peterborough PE1 1UA

www.english-nature.org.uk

Cover printed on Character Express, post consumer waste paper, ECF.

ISSN 0967-876X

Cover designed and printed by Status Design & Advertising, 2M, 5M, 5M.

Front cover photographs:
Top left: Using a home-made moth trap.
Peter Wakely/English Nature 17,396
Middle left: Co_2 experiment at Roudsea Wood and Mosses NNR, Lancashire.
Peter Wakely/English Nature 21,792
Bottom left: Radio tracking a hare on Pawlett Hams, Somerset.
Paul Glendell/English Nature 23,020
Main: Identifying moths caught in a moth trap at Ham Wall NNR, Somerset.
Paul Glendell/English Nature 24,888