The UK Approach to Assessing Conservation Status for the 2013 EU Habitats Directive Article 17 Reporting

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Contents

1. Introduction

This document sets out the approach taken within the UK to the 2013 assessment of conservation status under Article 17 of the EU Habitats Directive.

Every six years, EU Member States are required to report on the conservation status of habitats and species listed under Annexes I, II, IV and V of the Habitats Directive. This requirement comes under Article 17 of the Directive, and the reporting in 2013 was the third of its kind.

Within the Directive, favourable conservation status of a habitat is defined in Article 1(e) as when:

i. its natural range and areas it covers within that range are stable or increasing, and;
ii. the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and;
iii. the conservation status of its typical species is favourable as defined in Article 1(i).

For species, favourable conservation status is defined in Article 1(i) as when:

i. population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and;
ii. the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and;
iii. there is, and will probably continue to be, a sufficiently large habitat to maintain its population on a long term basis.

To assist Member States, the European Commission developed these definitions into a set of detailed Explanatory Notes and Reporting Guidelines for the 2013 Reporting[1]. These 'EC Reporting Guidelines' cover the concept, definitions and recommended methods to assess conservation status and its component parameters. They also described, and were accompanied by, a highly structured reporting format (Annex B for species, Annex D for habitats), which set out the reporting requirements by way of a series of reporting fields, categories and other options.

This document explains how the EC Reporting Guidelines and accompanying format were adopted and utilised for the 2013 UK reporting. A key aspect of this was the provision of various sets of reporting information by the four statutory, country-level, nature conservation agencies – the Countryside Council for Wales[2], Natural England, Northern Ireland Environment Agency and Department of the Environment (Marine Division), and Scottish Natural Heritage – hereafter referred to as the Country Agencies. This country-level information covered both terrestrial areas and marine inshore waters, depending on the habitat or species concerned. JNCC acted in its fifth agency role for offshore waters, collecting information sets for three marine habitats occurring in UK offshore waters. It also took responsibility for the collation of information for mobile marine species across all UK marine waters.

Country-level and offshore information sets were combined through an aggregation process carried out by JNCC. This formed the basis by which conservation status was assessed at a UK-level and a UK report produced. Details of how the aggregation was achieved are given within the individual sections of this document. However, for some species and habitats, aggregation was not necessary because they were located entirely within a single country. Nor was any formal aggregation undertaken for mobile marine species, as JNCC collated all the necessary reporting information for both offshore and inshore locations, and then completed the UK-level report. A similar approach was taken for one marine habitat (H1180) – as only a small proportion of this occurred in Welsh inshore waters and the information supplied by CCW was incorporated

[1] Evans, D. and Arvela, M. (2011) Assessment and reporting under Article 17 of the Habitats Directive – Explanatory Notes & Guidelines for the period 2007-2012. Final Draft, July 2011. European Topic Centre on Biological Diversity. Available to download at http://bd.eionet.europa.eu/article17/reference_portal.

[2] As of 1 April 2013, the Countryside Council for Wales, Environment Agency Wales and Forestry Commission Wales became Natural Resources Wales/Cyfoeth Naturiol Cymru.

directly into the UK report. The UK-level reports were reviewed by relevant specialists within the Country Agencies. For the marine mammal species and marine turtles, this process took place through the Inter-Agency Marine Mammal Working Group and the UK's Turtle Implementation Group.

Note that, although the format and scope of the country-level and offshore information sets was based largely on the EC reporting format used for UK reporting, there were some notable exceptions. This was partly because some fields were populated directly with UK-level information by JNCC (e.g. with range information, population trends for bats, and all information for marine mobile species), but also because some fields were not required in order to complete the UK-level report (including certain mapping, range, reasons for change and long-term trend fields, together with the Favourable Reference Value, country-level conclusions/qualifiers, and Natura 2000 surface area fields).

Also, as the EC reporting format did not allow for the submission of substantial details as regards the underlying information sources and reasoning used in the production of the UK reports, such information was, where necessary, audited in the notes accompanying the country-level or offshore reporting information or within the UK reports.

2. Habitats assessments

2.1 Habitats included

Reports were submitted to the EC for all 77 habitats listed on the Habitats Directive Annexes that occurred within the UK. These included 69 'terrestrial' and 8 'marine' habitats (see below).

List of UK terrestrial habitats that were reported on

Code	Name
H1210	Annual vegetation of drift lines
H1220	Perennial vegetation of stony banks
H1230	Vegetated sea cliffs of the Atlantic and Baltic coasts
H1310	*Salicornia* and other annuals colonising mud and sand
H1320	*Spartina* swards
H1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
H1340	Inland salt meadows
H1420	Mediterranean and thermo-Atlantic halophilous scrubs
H2110	Embryonic shifting dunes
H2120	Shifting dunes along the shoreline with *Ammophila*
H2130	Fixed dunes with herbaceous vegetation ('grey dunes')
H2140	Decalcified fixed dunes with *Empetrum nigrum*
H2150	Atlantic decalcified fixed dunes (Calluno-Ulicetea)
H2160	Dunes with *Hippophae rhamnoides*
H2170	Dunes with *Salix repens* ssp *argentea* (Salicion arenariae)
H2190	Humid dune slacks
H21A0	Machairs
H2250	Coastal dunes with *Juniperus* spp.
H2330	Inland dunes with *Corynephorus* etc.
H3110	Oligotrophic waters conatining very few minerals of sandy plains
H3130	Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoëto-Nanojuncetea
H3140	Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp.
H3150	Natural eutrophic lakes with M and H-type vegetation
H3160	Natural dystrophic lakes and ponds
H3170	Mediterranean temporary ponds
H3180	Turloughs
H3260	Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation
H4010	Northern Atlantic wet heaths with *Erica tetralix*
H4020	Temperate Atlantic wet heaths with *Erica ciliaris* and *Erica tetralix*
H4030	European dry heaths
H4040	Dry Atlantic coastal heaths with *Erica tetralix*
H4060	Alpine and Boreal heaths
H4080	Sub-Arctic *Salix* spp. scrub
H5110	Stable xerothermophilous formations with *Buxus*
H5130	*Juniperus communis* formations on heaths and calcareous substrates
H6130	Calaminarian grasslands of the Violetea calaminariae
H6150	Siliceous alpine and boreal grasslands
H6170	Alpine and subalpine calcareous grasslands
H6210	Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia)
H6230	Species-rich *Nardus* grassland etc.
H6410	*Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)
H6430	Hydrophilous tall herb fringe communities etc.
H6510	Lowland hay meadows

Code	Name
H6520	Mountain hay meadows
H7110	Active raised bogs
H7120	Degraded Raised Bogs still capable of natural regeneration
H7130	Blanket bogs
H7140	Transition mires and quaking bogs
H7150	Depression on peat substrates of the Rhynchsporion
H7210	Calcareous fens with *Cladium mariscus* and species of the Caricion davallianae
H7220	Petrifying springs with tufa formation
H7230	Alkaline fens
H7240	Alpine pioneer formations etc.
H8110	Siliceous scree of the montane to snow levels (Androsacetalia alpinae and Galeopietalia ladani)
H8120	Calcareous and calcshist screes of the montane to alpine levels
H8210	Calcareous rocky slopes with chasmophytic vegetation
H8220	Siliceous rocky slopes with chasmophytic vegetation
H8240	Limestone pavements
H8310	Caves not open to the public
H9120	Atlantic acidophilous beech forests with Ilex etc.
H9130	Asperulo-Fagetum beech forests
H9160	Sub-Atlantic and medio-European oak and oak-hornbeam forests of the Carpinion betuli
H9180	Tilio-Acerion forests of slopes, screes and ravines
H9190	Old acidophilous oak woods with *Quercus robur* on sandy plains
H91A0	Old sessile Oakwoods with *Ilex* and *Blechnum*
H91C0	Caledonian Forest
H91D0	Bog woodland
H91E0	Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae)
H91J0	*Taxus baccata* woods of the British Isles

List of UK marine habitats that were reported on[3]

Code	Name
H1110	Sandbanks which are slightly covered by seawater all the time
H1130	Estuaries
H1140	Mudflats and sandflats not covered by seawater at low tide
H1150	Coastal Lagoons
H1160	Large shallow inlets and Bays
H1170	Reefs
H1180	Submarine structures made by leaking gases
H8330	Submerged or partially submerged sea caves

[3] Note that although H1150 Coastal Lagoons were classed as a terrestrial habitat in the EC Reporting Guidelines (p.52) and when reporting to the EC, it was treated as a marine habitat for UK assessment purposes.

2.2. Range

Range status was assessed by:
- creating a distribution map;
- creating a range map and determining the surface area enclosed by this;
- assessing information on trends in range surface area;
- making reference to a Favourable Reference Range; and
- selecting a conclusion and (where necessary) status qualifier based on an evaluation matrix.

2.2.1. Distribution maps

[this section relates to the following sections of the UK and country-level reports: 1.1.1. Distribution map, 1.1.2. Method used map, 1.1.3. Year or period, 1.1.4. Additional distribution map]

UK distribution maps were created to show the occurrence of terrestrial habitats at a 10-km square scale, based on the British National Grid projection. The squares used were identified by the Country Agencies from a variety of sources (as specified in the country-level reporting information). All of the 10-km squares used and sources of these were summarised in spreadsheet format[4]. A standardised method was used to convert the UK distribution maps into the European ETRS grid for submission to the EC (see Appendix 5 for details). For the 8 marine habitats, existing UK distribution maps were used to directly populate ETRS 10-km grid squares. The ETRS distribution map data was assembled into a shape file covering both terrestrial and marine habitats[5].

The method used to create the distribution maps was based on four categories:
- 3 = complete survey (NB: if survey information was 'near-complete' this category was selected);
- 2 = estimate based on partial data with some extrapolation and/or modelling;
- 1 = estimate based on expert opinion with no or minimal sampling;
- 0 = absent data.

In general, this was assessed by considering how complete/representative the 10-km square data was of the actual distribution of the habitat. The category selected at a UK-level was based on an aggregation of the corresponding categories selected by the Country Agencies (as detailed in the country-level reporting information). This was achieved by: (i) converting the categories assigned at a country-level to the corresponding value (i.e. 3, 2, 1, or 0); (ii) weighting (multiplying) these values by the proportion of habitat in each country based on the surface area (see 2.3.1) (or, where this was incomplete, the count of 10-km squares at a country-level or estimates of range surface area were used – see 2.2.2); and (iii) summing these weighted values and using this number and the following classes as a guide to select the UK category: 0 = absent data; >0-1.5 = estimate based on expert opinion with no or minimal sampling; >1.5-2.5 = estimate based on partial data with some extrapolation and/or modelling; >2.5 = complete survey.

The period for the distribution map was based on the corresponding dates (years) given by the Country Agencies for when a habitat was actually recorded or when this information was compiled (as detailed in the country-level reporting information). In many cases, records from before the 2007-2012 reporting period were included because it was considered likely that the habitat was still present, i.e. both known and suspected locations were included. The period selected at a UK-level was based on the earliest and latest year identified at a country-level.

No additional distribution maps were created.

[4] Available to download from http://jncc.defra.gov.uk/page-6563.
[5] Available to download from http://jncc.defra.gov.uk/page-6568.

2.2.2. Range maps and surface area

[this section relates to the following sections of the UK and country-level reports: 1.1.5. Range map, 2.3.1. Surface area range, and 2.3.2 Method used range]

A UK range map was created for each habitat to show the surface area included within its range.

For terrestrial habitats this was done using: (i) the same 10-km square records provided by the Country Agencies for the distribution map (see above); (ii) a slightly revised version (see below) of the range mapping tool used in the 2007 Article 17 Report[6]; and (iii) a more accurate boundary for the UK coastline compared to 2007.

The mapping tool created a set of 'best-fitting' polygons around each series of 10-km squares. The habitat range surface area was based on the total area enclosed by each set of polygons. An adjustable 'gap distance' parameter of alpha was used to determine how tightly the polygons fitted. This was set at 25 km for all terrestrial habitats, meaning that gaps of over 50 km in the distribution were required to create separate polygons (note that a slightly different approach was used to join together polygons that were 20-30 km apart compared to 2007). The smallest (non-clipped) range unit was an individual 10-km square, except that all polygons were clipped along the coastline to exclude areas of sea, and a specific clipping was applied to coastal habitats (i.e. H1210 to H2250, excluding H1340) to exclude any areas more than 10-km inland from the coastline. In nearly all cases, the same alpha and coastal clipping values used in the 2007 Article 17 Report were applied. However, for H6210, H7110 and H7120 the alpha value was changed from 8 km in 2007 to 25 km, and for all coastal habitats the range was restricted to 10 km from the high water boundary, compared to 2007 when a quasi-1 km coastal buffer was applied.

For the 8 marine habitats a different approach was used to create the UK range maps. This was done because in many cases their range was determined primarily by physical and geological processes occurring over long time-scales, and was not related to the biological communities and processes that they supported. The approach taken varied slightly between the marine habitats:

- for H1130, H1140, H1150 and H1160 the UK range maps were taken as being equivalent to the UK distribution maps;
- for H1170 the UK range map was developed from the UK distribution map, but additionally included an area of iceberg ploughmarks off North West Scotland in offshore waters, where cobble reefs had been recorded;
- for H1110 the UK range map was taken as being the area of sloping sandy sediment habitat down to 60m and connected to sandbank habitat in less than 20m of water;
- for H1180 and H8330 the UK range map was developed from the UK distribution map, but additionally included areas that had the potential for the habitat to occur based on an understanding of seabed geology.

A standardised method was used to convert the UK range maps into the European ETRS grid for submission to the EC (see Appendix 5 for details). This ETRS range map data was assembled into a shape covering both terrestrial and marine habitats[7].

The category that was selected for the method used to create the range map was the same as selected for the distribution map (see 2.2.1), given that these referred to the same 10-km square information supplied by the Country Agencies.

[6] See Joint Nature Conservation Committee (2007) Supporting documentation for making conservation status assessments: Technical Note I AlphaShapes range calculation tool. Second Report by the UK under Article 17 on the implementation of the Habitats Directive from January 2001 to December 2006. Peterborough: JNCC. Available to download at http://jncc.defra.gov.uk/pdf/FCS2007_techI_alphashapes.pdf.

[7] Available to download from http://jncc.defra.gov.uk/page-6568.

2.2.3. Range trends

[this section relates to the following sections of the UK and country-level reports: 2.3.3. Short-term trend period, 2.3.4. Short-term trend direction, 2.3.5. Short-term trend magnitude, 2.3.6. Long-term trend period, 2.3.7 Long-term trend direction, 2.3.8 Long-term trend magnitude]

UK trends in the surface area of the range of a habitat were assessed over the short- and long-term. Trend directions could be reported as stable, increasing, decreasing or unknown. However, to assist with the conclusion reached on habitat range (see 2.3.6), decreasing trends were assessed as 1% or less/year or more than 1%/year, where this was possible.

The UK short-term trend period was set as the 2001-2012 reporting period, given that the under-pinning 10-km square data was considered to be broadly representative of this period.

For terrestrial habitats, the short-term trend direction was informed by a comparison of the range areas calculated using the revised range mapping tool, based on the 10-km squares for the 2007 versus 2013 reporting. All short-term range trend directions were judged to be stable, which was partly due to the general scarcity of repeated, high-quality survey data on habitat occurrences to demonstrate a change in range. In addition: (i) in many cases differences in the 10-km square data and/or range area were relatively limited; (ii) changes for coastal habitats appeared to be primarily connected with changes in the coastal clipping routine (see above); (iii) for three habitats the difference appeared to be primarily due to changing the alpha value from 8 km to 25 km (see above); (iv) for some habitats the slightly different approach used to join together polygons (see above) appeared to be a contributing factor; and (v) other information that was available, combined with the advice given by experts within the Country Agencies, reinforced this view. No short-term trend magnitudes were given (these were optional to report on).

Long-term trends in range were optional to report on. The UK long-term trend period was set as 1994-2012 to correspond with the year that the Habitats Directive came into force in the UK, or to 1989-2012 which was the default period given in the EC Reporting Guidelines.

For terrestrial habitats, the UK long-term trend direction was based on the short-term range trend direction (see above) and the same from the 2007 Article 17 Report. Most long-term range trend directions were set as stable. However, the direction for H1320 was set as decrease 1% or less/year, and for 11 habitats (H1210, H4080, H5130, H6130, H7110-7120, H7140-7150, H7210, H7230-7240) it was set as unknown, as the trend given in the 2007 Article 17 Report was unknown. No UK long-term trend magnitudes were given.

For 6 of the marine habitats (H1110, H1130-1160, H8330), UK short- and long-term trend directions in range were assessed as being stable due to the nature of these habitats, which were defined by their physiographic nature (i.e. geological and hydrographic processes) rather than by a specific biological community. While the physical area of some of these individual habitats may have declined due to localised pressures, the geographic spread and distribution of these features had not been reduced. For the other 2 marine habitats (H1170-1180), UK short- and long-term trend directions in range were assessed as being unknown. No UK short- or long-term trend magnitudes were given for any of the marine habitats.

2.2.4. Reasons for change in range surface area

[this section relates to the following sections of the UK and country-level reports: 2.3.10 Reason for change in range]

Where the UK range surface area reported in the 2007 Article 17 Report was different from that calculated for the 2013 reporting, three options were available to account for the main reasons behind this difference: (a) genuine change in range area; (b) improved knowledge/more accurate data; and/or (c) use of a different method.

These were set to 'true' where a reason was judged to have contributed significantly to the measured change in range area. There were no cases where reason (a) applied, so this was always set as false.

For terrestrial habitats, reason (b) was assessed using the 10-km square distribution data provided by the Country Agencies: if the total count of 10-km squares used in 2007 versus 2013 differed by more than 10%, this was set as true; or if the count differed by less than 10% (or was the same) this it was set as false (unless difference due to change in 10-km square data was judged to be greater than change in range mapping tool – see below). Reason (c) was set to true where the revised range mapping tool appeared to have had a greater impact on the change in range area, compared to any change in the under-pinning 10-km square data. This was assessed by calculating the percentage difference in range areas: (i) using the 2007 10-km square data and the 2007 versus 2013 range mapping tools (to give an indication of the impact of using different tools = % diff-tool); and (ii) using the 2013 range mapping tool and 2007 versus the 2013 10-km square data (to give an indication of the impact of using different data = % diff-tool). Where % diff-tool was greater than % diff-data then reason (c) was set to true, as it appeared that the change in the range mapping tool had a greater impact on the difference in range area than the change in the 10-km square data. Where % diff-tool was less than % diff-data reason (c) was set as false and reason (b) was set to true.

For the 8 marine habitats, reason (b) was always selected based on improved knowledge and more accurate data being available in 2013 than in 2007. For H1110, reason (c) was also selected due to changes in mapping methods between 2007 and 2013.

2.2.5. Favourable Reference Range

[this section relates to the following sections of the UK and country-level reports: 2.3.9 Favourable reference range]

A UK Favourable Reference Range (FRR) was given for most habitat types. This was based on the approach taken to the FRR in the 2007 Article 17 Report, except in two cases where the approach was revised: (i) the FRR for H1210 was confirmed as not more than 10% above the current range; and (ii) the FRR for H7120 was set as less than the current range.

In nearly all cases, an updated FRR value was given based on the latest 10-km square distribution data (see 2.3.1) and a revised version of the range mapping tool (see 2.3.2), as these effectively updated the baseline data and method used to set the FRR in 2007.

For three habitats (H1210, H1320, H7120) an operator was used to describe the relationship between the current range and the FRR (instead of setting an FRR value). These operators indicated if the FRR was 'more than' (by not more than about 10%), 'much more than' (by more than 10%), or 'less than' the current range.

In only four cases (H1170-1180, H4080, H5130) did information remain inadequate to set a FRR value or operator.

2.2.6. Range conclusion and qualifier

[this section relates to the following sections of the UK report: 2.8.1. Range conclusion and qualifier]

Conclusions were set out on the range of all habitats. To guide this, the relevant part of the general evaluation matrix for assessing conservation status of a habitat (see Appendix 1) was converted into the matrix shown below. This refers to the short-term trend direction for range and the relationship between the range surface area and the FRR. The coloured cells indicate which conclusion was reached.

In most cases the conclusion for range was assessed as favourable, unfavourable-inadequate or unfavourable-bad, but for four habitats (H1170-1180, H4080, H5130) it was set as unknown.

Wherever the conclusion reached was unfavourable-inadequate or unfavourable-bad, a status qualifier was added to the conclusion based on the range short-term trend direction. The options for the qualifier were improving, declining, stable or unknown.

	Short-term trend in range 2001-2012			
	Unknown	Increasing or stable	Decline 1% or less per year	Decline >1% per year
Range area or FRR unknown	Unknown	Unknown	Unfavourable-inadequate	Unfavourable-bad
Range area > or = FRR	Unknown	Favourable	Unfavourable-inadequate	Unfavourable-bad
Range area up to 10% below FRR	Unfavourable-inadequate	Unfavourable-inadequate	Unfavourable-inadequate	Unfavourable-bad
Range area >10% below FRR	Unfavourable-bad	Unfavourable-bad	Unfavourable-bad	Unfavourable-bad

2.3. Area

Area status was assessed by:

- estimating the surface area of the habitat;
- assessing information on trends in surface area;
- making reference to a Favourable Reference Area; and
- selecting a conclusion and (where necessary) status qualifier based on an evaluation matrix.

2.3.1. Surface area

[this section relates to the following sections of the UK and country-level reports: 2.4.1 Surface area, 2.4.2 Year or period, 2.4.3 Method used area]

The UK surface area of each habitat was based on the sum of the corresponding surface area values supplied by the Country Agencies (as detailed in the country-level reporting information). In a minority of cases (H1180, H3110-3160, H3260, H7140-50, H7220, H8310, H8330), the UK surface area was set as unknown because information in one or more countries was not available or because estimates provided were known to significantly underestimate the surface area of habitat.

The period for the surface area was based on the corresponding dates (years) supplied by the Country Agencies (as detailed in the country-level reporting information). These dates generally referred to the period when the surface area was recorded within a particular country, the date when this information was compiled, or the 2007-2012 reporting period. Information from before the reporting period was used where this was considered relevant and especially where more recent information was incomplete or unavailable. The period selected at a UK-level was usually based on the earliest and latest year identified at a county-level.

The method used to determine the surface area was based on four categories:

- 3 = complete survey or a statistically robust estimate (NB: if survey information was 'near-complete' this category was selected);
- 2 = estimate based on partial data with some extrapolation and/or modelling;
- 1 = estimate based on expert opinion with no or minimal sampling;
- 0 = absent data.

The category selected at a UK-level was based on an aggregation of the corresponding categories selected by the Country Agencies (as detailed in the country-level reporting information), unless the surface area of the habitat was unknown, in which case the 'absent data' category was selected (in the sense that there was 'insufficient data' to provide a UK surface area value). The approach taken mirrored that used for the UK Distribution maps (see 2.2.1).

2.3.2. Area trends

[this section relates to the following sections of the UK and country-level reports: 2.4.4 Short-term trend period, 2.4.5 Short-term trend direction, 2.4.6 Short-term trend magnitude, 2.4.7 Short-term trend method used, 2.4.8 Long-term trend period, 2.4.9. Long-term trend direction, 2.4.10 Long-term trend magnitude, 2.4.11 Long-term trend method]

UK trends in the surface area of a habitat were assessed over the short- and long-term. Trend directions could be reported as stable, increasing, decreasing or unknown. However, to assist with the conclusion reached on habitat area (see 2.3.5), decreasing trends were assessed as 1% or less/year or more than 1%/year, where this was possible.

The UK short-term trend period was based on the corresponding dates (years) supplied by the Country Agencies (as detailed in the country-level reporting information). These dates generally referred to the period when the short-term trend was recorded within a particular country, the date when this information was compiled, or the short-term trend period recommended in the EC Reporting Guidelines, i.e. 2001-2012. Information from before the recommended short-term trend

period was used where this was considered relevant and especially where more recent information was incomplete or unavailable. The period selected at a UK-level was based on the predominant or common range of years identified at a country-level.

The UK short-term trend direction was based on the corresponding trend categories supplied by the Country Agencies, together with information contained in the notes (as detailed in the country-level reporting information). In some cases the UK trend direction was obvious, e.g. where all Country Agencies selected stable. However, where the choice was less clear-cut, consideration was given to other factors, notably: (i) the proportion of habitat in each country based on the surface area (see 2.3.1) (or, where this was incomplete, the count of 10-km squares at a country-level (see 2.2.1) or estimates of range surface area– see 2.2.2); (ii) the scale of change in each country and any statistics or descriptive text provided on this; (iii) whether very small changes at a country-level should be considered significant at a UK-level; and (iv) how 'unknown' trend directions at a country-level should be treated, bearing in mind any associated descriptive text and trend information provided for other countries.

For most habitats, the information available was considered adequate to set an actual direction for the short-term trend at a UK-level, albeit that in some cases confidence in this was low. However, for eleven habitats information was lacking and the UK short-term trend direction was set as unknown (H1110, H1130-1140, H1170-1180, H1420, H5130, H7220, H8120, H8210, H8330). No UK short-term trend magnitudes were given – these were optional to report on.

The method used to determine the UK short-term trend direction followed the same four categories used for habitat surface area (see 2.3.1), and the aggregation of country-level information mirrored that used for the UK Distribution maps (see 2.2.1).

Long-term trends in area were optional to report on. The UK long-term trend period was set as 1994-2012 to correspond with the year that the Habitats Directive came into force in the UK, or to 1989-2012 which was the default period given in the EC Reporting Guidelines. The UK long-term trend direction was based on the short-term range trend direction (see above) and the same trend from the 2007 Article 17 Report. For the majority of habitats, it was possible to set an actual direction for the long-term trend at a UK-level, but in 27 cases this was not possible and the trend was set as unknown. No UK long-term trend magnitudes were given.

The method used to determine the UK long-term trend direction was based on a combination of the method used for the short-term (see above) and the 'quality of data' category selected for the surface area in the 2007 report.

2.3.3. Reasons for change in surface area

[this section relates to the following sections of the UK and country-level reports: 2.4.13 Reason for change in area]

Where the UK surface area reported in the 2007 Article 17 Report was different from that calculated for the 2013 reporting, three options were available to account for the main reasons behind this difference: (a) genuine change in area; (b) improved knowledge/more accurate data; and/or (c) use of a different method.

These were set to 'true' if: (i) there had been a genuine change in the area, i.e. where the short-term trend was set as decreasing or increasing; (ii) improved knowledge/data had become available, including an improved approach to calculating the habitat area; and/or (iii) a different method had been used, e.g. revised habitat definition.

2.3.4. Favourable Reference Area

[this section relates to the following sections of the UK and country-level reports: 2.4.12 Favourable reference area]

A UK Favourable Reference Area (FRA) was given for most habitat types. In most cases, this was based on the approach taken to the FRA in the 2007 Article 17 Report. However, in certain cases, the approach was revised to or confirmed as: (i) for H2330, H3110, H3130, H3140 and H3150, the FRA was confirmed as equal or approximately equal to the current surface area; (ii) for H1210, H1230, H1420, H2110 and H2250, the FRA was confirmed as or revised to not more than 10% above the current surface area; and (iii) for H7120, the FRA was confirmed as much less than the current surface area.

In many cases, an updated FRA value was given based on the latest surface area figures. In effect, these values updated the baseline data and method used to set the FRA in 2007.

For 20 habitats an operator was used to describe the relationship between the current surface area and the FRA (instead of setting an FRA value). These operators indicated if the FRA was 'approximately equal to', 'more than' (by not more than about 10%), or 'much more than' (by more than 10%) the current area.

In 12 cases (H1170-1180, H3160-3170, H4080, H6430, H7140-7150, H7220-7240, H8330) information remained inadequate to set a FRA value or operator.

2.3.5. Area conclusion and qualifier

[this section relates to the following sections of the UK report: 2.8.2. Area conclusion and qualifier]

Conclusions were set out on the area of all habitats. To guide this, the relevant part of the general evaluation matrix for assessing conservation status of a habitat (see Appendix 1) was converted into the matrix shown below. This refers to the short-term trend direction for area and the relationship between the habitat surface area and the FRA. The coloured cells indicate which conclusion was reached.

	Short-term trend in area 2001-2012			
	Unknown	**Increasing or stable**	**Decline 1% or less per year**	**Decline >1% per year**
Area or FRA unknown	Unknown	Unknown	Unfavourable-inadequate	Unfavourable-bad
Area > or = FRA	Unknown	Favourable	Unfavourable-inadequate	Unfavourable-bad
Area up to 10% below FRA	Unfavourable-inadequate	Unfavourable-inadequate	Unfavourable-inadequate	Unfavourable-bad
Area >10% below FRA	Unfavourable-bad	Unfavourable-bad	Unfavourable-bad	Unfavourable-bad

In most cases the conclusion for area was assessed as favourable, unfavourable-inadequate or unfavourable-bad, but for 15 habitats (H1110-1140, H1170-1180, H3160-3170, H6430, H7140, H7220-7240, H8120, H8210, H8330) it was set as unknown.

Wherever the conclusion reached was unfavourable-inadequate or unfavourable-bad, a status qualifier was added to the conclusion based on the area short-term trend direction. The options for the qualifier were improving, declining, stable or unknown.

2.4. Structures and functions

Structures and functions were assessed by:
- evaluating the main pressures affecting the habitat;
- determining the current habitat condition; and
- selecting a conclusion and (where necessary) status qualifier based on an evaluation matrix.

2.4.1. Pressures

[this section relates to the following sections of the UK and country-level reports: 2.5 Main pressures, 2.5.1 Method used pressures]

For each habitat, a list of the main pressures currently affecting the habitat was identified. These related to the reporting period 2007-2012. The pressure codes/categories were based on a standard list provided via the EC Reporting Guidelines. The full list of EC pressures amounted to 400 separate categories – for UK reporting purposes only the second-level of categories were used, which reduced the list to 79 categories (see Appendix 3).

Each pressure was ranked as follows:
- H = High importance/impact (important direct or immediate influence and/or acting over large area);
- M = Medium importance/impact (medium direct or immediate influence, mainly indirect influence and/or acting over moderate part of the area/acting only regionally);
- L = Low importance/impact (low direct or immediate influence, indirect influence and/or acting over small part of the area/acting only regionally).

In some cases, a pollution qualifier was identified [these were optional to report on]. The qualifiers used were:
- N = Nitrogen input;
- P = Phosphor/Phosphate input;
- A = Acid input/ acidification;
- T = toxic inorganic chemicals;
- O = toxic organic chemicals;
- X = Mixed pollutants.

The UK list of pressures and pollution qualifiers was based on an aggregation of the corresponding, country-level lists supplied by the Country Agencies (as detailed in the country-level reporting information). This was achieved for each pressure by: (i) converting the ranks assigned at a country-level to a value (i.e. L = 1, M = 2, H = 3); (ii) weighting (multiplying) these values by the proportion of habitat in each country based on the surface area (see 2.3.1) (or, where this was incomplete, the count of 10-km squares at a country-level (see 2.2.1) or estimates of range surface area were used – see 2.2.2); and (iii) summing these weighted values and using this number and the following classes as a guide to select the UK rank: <1.1 = L, 1.1-2.1 = M, >2.1= H. The overall list was reduced to a maximum of 20 pressures, by eliminating those with the lowest weighted overall score. In addition, no more than five pressures were ranked as H. This was achieved by ranking the five pressures with the highest aggregation scores as H, and the remainder as M. Pollution qualifiers were added to each pressure wherever these had been listed by the Country Agencies.

For 41 habitats, where a specific method was applied to take account of air pollution impacts (see Appendix 6 for details), a different approach was taken to the listing of: (i) pressure code ‘H04 Air pollution, air-borne pollutants’; and (ii) pollution qualifiers for Nitrogen (N) and Acid (A) input. In these cases, nutrient Nitrogen critical load exceedance data for current deposition was used to rank code H04 and list N as a pollution qualifier, depending on the area of habitat where the nutrient N critical load was exceeded:

- if >25% exceedance, pressure code H04 was ranked as High and N was listed;
- if 5-25% exceedance, pressure code H04 was ranked as Medium and N was listed;
- if <5% exceedance, pressure code H04 was ranked as Low and N was listed;
- if no exceedance, pressure code H04 was not listed;
- wherever N was listed, A was added if the habitat area exceeding the current acid critical load was >5%.

The method used to determine the list of pressures was based on three categories:
- 3 = based exclusively or to a larger extent on real data from sites/occurrences or other data sources;
- 2 = mainly based on expert judgement and other data;
- 1 = based only on expert judgements.

The method category selected at a UK-level was based on an aggregation of the corresponding categories selected by the Country Agencies (as detailed in the country-level reporting information). The approach taken followed that described above for the list of pressures, using the following classes: <1.5 = based only on expert judgements, 1.5-2.5 = mainly based on expert judgement and other data, >2.5 = based exclusively or to a larger extent on real data from sites/occurrences or other data sources).

2.4.2. Current condition (including typical species)

[this section relates to the following sections of the UK and country-level reports: 2.7.4 Structures and functions methods used, 2.7.1 Typical species, 2.7.2 Typical species method used, 2.7.5 Other relevant information]

The condition of most habitats was assessed using information provided by the Country Agencies. This was based on the Common Standards Monitoring Guidance relevant to each particular habitat type[8]. The information supplied summarised the condition of all sites assessed at a country-level for one or more of the following site types: (i) SACs; (ii) other SSSI/ASSIs; (iii) other site types. It was subdivided into the following condition classes: (i) favourable maintained, recovered or unclassified; or (ii) unfavourable declining, no change, recovering or unclassified. Values for each class were given in hectares or the number of sites/features/monitoring units. In some cases, where this information was considered representative of a particular site type as a whole, it was scaled-up by the Country Agencies to the total area of that site type. For two marine habitats (H1110, H1170) this approach was not followed in the offshore marine area. Instead a vulnerability assessment was used to calculate the area of habitat in the following three condition classes: (i) favourable; (ii) unfavourable; and (iii) unknown. Further details on this approach are available in the associated offshore audit trails. All of the information on habitat condition was summarised in spreadsheet format[9].

The overall date range (earliest and last year) was supplied for when the site condition assessments were carried out. Most assessments had been conducted during the 2007-2012 reporting period, but in some cases they pre-dated this because more recent information was not available. Nevertheless, assessments had only been included if they were considered to be still relevant.

The method used to assess habitat condition (*sensu* structures and functions) followed the same four categories used for habitat surface area (see 2.3.1), and the aggregation of country-level information mirrored that used for the UK Distribution maps (see 2.2.1).

The EC Reporting Guidelines asked that, as background information, a list of the typical species considered when assessing structures and functions, together with a description of the method

[8] For details go to http://jncc.defra.gov.uk/page-2199.
[9] Available to download from http://jncc.defra.gov.uk/page-6563.

used to assess the status these, was provided. Although the status of various 'typical' plant or other species was considered when the condition of individual sites were assessed using Common Standards Monitoring Guidance, a list of the specific species used during the reporting period was not available.

To guide the conclusions reached on structures and functions (see 2.4.3), the country-level site condition statistics were summed for each habitat to give the total area or number of features/sites/units across the UK that were in favourable (maintained, recovered or unclassified) condition v unfavourable (declining, no change, recovering or unclassified) condition. For some habitats, when the summed area of unfavourable habitat was divided by the UK habitat surface area (see 2.3.1), it was possible to say that at least 25% of the UK habitat area was in unfavourable condition. However, for other habitats this was not possible because: (i) the UK surface area was unknown; or (ii) this generated a value of less than 25%. In these cases, for terrestrial habitats, the percentage of unfavourable habitat was based purely on the summed country-level site condition statistics.

To guide the status qualifier reached on structures and functions (see 2.4.3), the country-level site condition statistics were summed for each habitat to give the total area or number of features/sites/units at a UK-level that was in unfavourable declining v unfavourable recovering condition.

In addition, 41 habitats were the subject of a specific method to take account of air pollution impacts (see Appendix 6 for details). For these habitats, the area of habitat in unfavourable recovering condition was reduced proportionally by the percentage of the UK habitat area where the nutrient Nitrogen critical load was assessed as being exceeded. The condition of this portion of the habitat was then treated as unfavourable declining. As an illustration, for a habitat where the nutrient Nitrogen critical load was being exceeded across 50% of the UK habitat area, and 100ha was in unfavourable recovering condition and 50ha in unfavourable declining condition, then the area in unfavourable recovering condition was reduced by 50% to 50ha, and the area in unfavourable declining condition was increased by 50ha to 100ha.

2.4.3. Structures and functions conclusion and qualifier

[this section relates to the following sections of the UK report: 2.8.3. Structures and functions conclusion and qualifier]

Conclusions were set out on the structures and functions of all habitats. To guide this, the relevant part of the general evaluation matrix for assessing conservation status of a habitat (see Appendix 1) was converted into the matrix shown below. This refers to the percentage of habitat at a UK-level in unfavourable condition, as described under 2.4.2. The coloured cells indicate which conclusion was reached.

Amount of habitat in unfavourable condition			
Unknown	**Less than c.5%**	**Between c.5-25%**	**More than c.25%**
Unknown	Favourable	Unfavourable-inadequate	Unfavourable-bad

In most cases the conclusion for structures and functions was assessed as favourable, unfavourable-inadequate or unfavourable-bad, but for 3 habitats (H1180, H8310, H8330) it was set as unknown.

Wherever the conclusion reached was unfavourable-inadequate or unfavourable-bad, a status qualifier was added to the conclusion. This was based on the balance between the area or number of features/sites/units across the UK in unfavourable-recovering or unfavourable-declining condition (see 2.4.2 for details):

· if more unfavourable habitat was recovering, then the qualifier was set as improving;

- if more unfavourable habitat was declining, then the qualifier was set as declining;
- if the balance between unfavourable-recovering and unfavourable-declining was about equal, then the qualifier was set as stable (in most cases, the threshold used to decide on this was that the difference in area between unfavourable-recovering and unfavourable-declining, divided by the area or number of features assessed, was within +/-2%).

2.5. Future prospects

Future prospects were assessed by:

- evaluating the main threats to the habitat;
- determining the likely future habitat range, area and condition;
- making reference to the Favourable Reference Range and Favourable Reference Area; and
- selecting a conclusion and (where necessary) status qualifier based on an evaluation matrix.

2.5.1. Threats

[this section relates to the following sections of the UK and country-level reports: 2.6 Main threats, 2.6.1 Method used threats, 2.7.5 Other relevant information]

For each habitat, a list of the main threats was identified. These were considered likely to impact on the habitat over the next two reporting periods, i.e. 2013-2025. The codes/categories, ranks, pollution qualifiers, and aggregation of country-level threat lists and threat method categories (as detailed in the country-level reporting information) followed the same as used for pressures (see 2.4.1), except that method used to determine the list of threats was based on the following two categories: 1 = expert opinion; 2 = modelling.

For the 41 habitats where a specific method was applied to take account of air pollution impacts (see Appendix 6 for details), a different approach was taken to the listing of: (i) threat code 'H04 Air pollution, air-borne pollutants'; and (ii) pollution qualifiers for Nitrogen (N) and Acid (A) input. In these cases, nutrient Nitrogen critical load exceedance data for 2020 deposition was used to rank code H04 and list N as a pollution qualifier, depending on the expected area of habitat where the nutrient N critical load was exceeded:

- if >25% exceedance, threat code H04 was ranked as High and N was listed;
- if 5-25% exceedance, threat code H04 was ranked as Medium and N was listed;
- if <5% exceedance, threat code H04 was ranked as Low and N was listed;
- if no exceedance, threat code H04 was not listed;
- wherever N was listed, A was added if the habitat area exceeding the 2020 acid critical load was >5%.

2.5.2. Future range, area and condition

this section relates to the following sections of the UK and country-level reports: 2.7.5 Other relevant information, 2.8.4. Future prospects conclusion and qualifier]

To guide the conclusion reached on future prospects (see 2.5.3), the relevant part of the general evaluation matrix for assessing conservation status of a habitat (see Appendix 1) was converted into the tables shown below. These refer to the likely future relationship (in c.2025) between the range/area of a habitat and Favourable Reference Range (FRR)/Favourable Reference Area (FRA), and to the likely future condition of a habitat.

Future relationship between the habitat range/area in c.2025 and the FRR/FRA (see below for details)	Future prospects
= or > FRR/FRA	Good
< FRR/FRA	Poor
<< FRR/FRA	Bad
Unknown	Unknown

Column 1 in the table above was assessed principally on: (i) the current relationship of range/area to the FRR/FRA (see 2.2.5/2.3.4); (ii) the short-term trend (see 2.2.3/2.3.2), and if this continued how the future relationship to the FRR/FRA might be altered; and (iii) the list of threats and conservation measures (see 2.5.1/2.7.2) and how these might alter the future relationship to FRR/FRA.

Future condition – amount of habitat in unfavourable condition in c.2025 (see below for details)	Future prospects
<5%	Good
5-25%	Poor
<25%	Bad
Unknown	Unknown

Column 1 in the table above was assessed principally by treating habitat that was currently in: (i) favourable or unfavourable-recovering condition as 'future-favourable'; and (ii) any other unfavourable condition category as 'future-unfavourable' (see 2.4.2 as to how current condition was assessed). The amount of habitat classed as future-unfavourable was compared to the above percentage thresholds to assess the likely future prospects.

In addition, for 41 habitats the following specific rules were applied to take account of the potential impacts of nutrient Nitrogen air pollution deposition (see Appendix 6 for details). For these habitats, the area of future-favourable habitat was reduced by: (i) taking the area of habitat that was currently assessed as unfavourable-recovering condition; and (ii) proportionally reducing this by the percentage of the UK habitat area that was expected to exceed the nutrient Nitrogen critical load in 2020. The condition of this portion of the habitat was then treated as future-unfavourable (see 2.4.2. for an illustration of this method).

In addition, where the level of threat assigned to this factor (under the threat code H04 Air pollution, air-borne pollutants) was assessed as 'High', it was expected that at least 25% of the habitat would be in future-unfavourable condition in c.2025. And where the level of threat was assessed as 'Medium', it was expected that at least 5-25% of the habitat would be in unfavourable condition in c.2025.

For most habitats this provided a reasonable indication of the likely future condition. However, for a few terrestrial habitats an adjustment was made based on the list of threats and conservation measures, as described in the UK reports. For marine habitats, a more systematic approach was taken: (i) if a number of threats of high or medium importance had been listed (see 2.5.1), then the likely future trend in condition was assessed as decreasing; (ii) if the list of threats were all of low importance, then the likely future trend in condition was assessed as stable or potentially increasing; and (iii) where the threats suggested a substantial decline in condition, the future prospects were assessed as bad rather than poor, or poor rather than good.

2.5.3. Future prospects conclusion and qualifier

[this section relates to the following sections of the UK report: 2.8.4. Future prospects conclusion and qualifier]

Conclusions were set out on the future prospects of all habitats using the following matrix given in the EC Reporting Guidelines as a guide. This refers to the future prospects for range, area, and structures and functions. Note that where the level of threat assigned to N deposition (under the threat code H04 Air pollution, air-borne pollutants) was assessed as 'High', the conclusion on future prospects was always set as unfavourable-bad, and where the threat was assessed as 'Medium', the conclusion was set as at least unfavourable-inadequate (see 2.5.2 for details).

Conclusion on future prospects			
Favourable	**Unfavourable-Inadequate**	**Unfavourable-bad**	**Unknown**
All parameters have good prospects OR prospects of one parameter unknown, the other prospects good	Other combination	One or more parameters have bad prospects	Two or more unknown and no parameter with bad prospects

In most cases the conclusion for future prospects was assessed as favourable, unfavourable-inadequate or unfavourable-bad, but for 5 habitats (H1170-80, H7220, H8310, H8330) it was set as unknown.

Wherever the conclusion reached was unfavourable-inadequate or unfavourable-bad, a status qualifier was added to the conclusion. This was based on an assessment of individual qualifiers for range, area and condition.

For the range and area qualifiers, these were based on the short-term trend direction in range/area (see 2.2.3 and 2.3.2):

- if trend increasing, qualifier = improving;
- if trend stable, qualifier = stable;
- if trend decreasing, qualifier = declining;
- if trend unknown, qualifier = unknown.

For the structures and functions qualifier, this was based on the amount of future-favourable habitat in c.2025 (see 2.5.2). This was compared to the current amount of favourable habitat (the difference being the amount that was unfavourable-recovering), and if the overall amount of favourable habitat looked set to:

- increase, then qualifier = improving;
- decrease, then qualifier = declining;
- remain about equal, then qualifier = stable (the threshold used to decide on within +/-2%);
- is unknown, then qualifier = unknown.

However, in two cases (H7130-7140) the future prospects qualifier was assessed as declining because, although the overall amount of favourable habitat looked set to increase, the area of nutrient Nitrogen critical load exceedance was predicted to increase by at least 5% by c.2025. This followed on from the application of the specific rules for 41 habitats to take account of the potential impacts of air pollution impacts (see Appendix 6 for details).

For most habitats this provided a reasonable indication of the likely qualifier for habitats with unfavourable future prospects, but for a few habitats an adjustment was made based on the list of threats and conservation measures.

2.6. Overall conclusion and qualifier

[this section relates to the following sections of the UK report: 2.8.4. Future prospects conclusion and qualifier]

Overall conclusions were set out on the conservation status of each habitat. To guide this, the relevant part of the general evaluation matrix for assessing conservation status of a habitat (see Appendix 1) was converted into the list shown below, which refers to the individual conclusions for range, area, structures and function, and future prospects (see 2.2.6, 2.3.5, 2.4.3, 2.5.3).

Overall conclusion	**Number of individual conclusions**
Favourable	4 favourable; or 3 favourable plus 1 unknown
Unfavourable-inadequate	All other combinations
Unfavourable-bad	1 or more unfavourable-bad
Unknown	4 unknown; or 2 or 3 unknown plus 1 or 2 favourable

In most cases the overall conclusion was assessed as favourable, unfavourable-inadequate or unfavourable-bad, but for 3 habitats (H1180, H8310, H8330) it was set as unknown.

Wherever the overall conclusion reached was unfavourable-inadequate or unfavourable-bad, a status qualifier was added to the conclusion. This was based on the qualifiers or (where the conclusion was favourable or unknown) short-term trends for range, area, structures and functions, and future prospects. The following matrix was used to guide which overall qualifier should be selected, although the final choice also depended on the strength of the trends for the individual parameters.

	Number of individual qualifiers (based on short-term trend for range/area/structures and functions, and status qualifier for future prospects)			
Overall qualifier usually selected	Improving	Stable	Declining	Unknown
Improving	3 or 4	0 or 1	0 or 1	0 or 1
	2	0, 1 or 2	0	0, 1 or 2
	1	0 or 1	0	2 or 3
Improving or stable	1	2 or 3	0	0 or 1
Stable	2	0	2	0
	1	0, 1 or 2	1	0, 1 or 2
	0	1, 2, 3, or 4	0	0, 1, 2 or 3
Declining or stable	0	2 or 3	1	0 or 1
Declining	0 or 1	0 or 1	3 or 4	0 or 1
	1	0, 1 or 2	2	0, 1 or 2
	0	0, 1, 2 or 3	1	0, 1, 2 or 3
Unknown	0	0	0	4

2.7. Natura 2000 coverage and conservation measures

[this section relates to the following sections of the UK and country-level reports: 3.1.1 Surface area SACs, 3.1.2 Method used SAC area, 3.1.3 Trend of surface area within SAC network]

2.7.1. SAC area and trend in area

For the majority of habitats, the UK surface area within Special Areas of Conservation (SACs) was completed using information submitted to the European Union as part of a Standard Data Form (SDF) for each candidate SAC. The source information for this was the JNCC Spreadsheet of UK SAC information[10]. Note that these extent figures were based on the best available information at the time of the original submission of the site as a candidate SAC to the European Union, which, in many cases, meant they were compiled in the early 2000s. An alternative approach was taken for 20 terrestrial habitats, because in these cases the total area from the SDFs exceeded the total given for the UK habitat area (see 2.3.1). In these cases, the latter was used to populate the SAC area instead of the total area from the SDFs. Finally, for two of the marine habitats (H1110, H1170), updated information was available to complete the SAC area statistics[11].

The method used to determine the UK surface area within SACs followed the same four categories used for habitat surface area (see 2.3.1), and the aggregation of country-level information mirrored that used for the UK Distribution maps (see 2.2.1).

The direction of the UK trend in the area of habitats within SACs was given for the reporting period 2001-2012. Trend directions could be categorised as stable, increasing, decreasing or unknown. The UK trend was based on the corresponding information supplied by the Country Agencies, together with information contained in the notes (as detailed in the country-level reporting information). In most cases the UK trend direction was obvious, but for a few habitats very small changes at a country-level were not considered significant at a UK-level.

For most habitats, the information available was considered adequate to set an actual trend direction for the UK SAC area. However, for 13 habitats information was lacking and the trend was set as unknown (H1110, H1130-1140, H1170, H2140, H4060, H5130, H6430, H7220, H8120, H8210, H8330, H91C0).

2.7.2. Conservation measures

[this section relates to the following sections of the UK and country-level reports: 3.2. Conservation measures]

For each habitat, a UK list of conservation measures was identified based on information provided by the Country Agencies (as detailed in the country-level reporting information). The measures identified represented activities undertaken primarily during the reporting period 2007-2012. They were selected from a standard list of codes/categories that was provided via the EC Reporting Guidelines (see Appendix 4).

Each measure was assigned to one or more of the following types:

- legal/statutory;
- administrative;
- contractual;
- recurrent;
- one-off.

[10] Available on an individual site basis within a downloadable spreadsheet at http://jncc.defra.gov.uk/page-1461, and in PDF format at http://jncc.defra.gov.uk/page-1458.

[11] See Joint Nature Conservation Committee (2013) Progress towards completion of the UK network of marine Special Areas of Conservation for Annex I qualifying features. JNCC, Peterborough. Available to download at http://jncc.defra.gov.uk/PDF/comm13P03revised.pdf.

They were ranked as High, Medium or Low importance, based on the proportion of the target habitat benefiting from the measure.
The geographic area (location) that each measure primarily impacted on was classed as either:

- inside the SAC network;
- outside the SAC network;
- both inside and outside the SAC network.

Finally, a broad evaluation was given to indicate the effectiveness of each measure in maintaining, enhancing or reaching favourable conservation status (FCS). This was based on the following categories:

- maintain – used for measures that were required to maintain FCS;
- enhance – used for measures that enhanced conservation status:
- long-term – used for measures where a positive effect was expected only in the long-term;
- no effect – used for ineffective measures or measures that need to be improved, had not delivered conservation benefits, had failed to achieve their objectives, or had adverse effects;
- unknown effect – used for measures whose effect was unknown;
- not evaluated – used for measures that not been evaluated.

The aggregation of the lists of conservation measures provided for each country followed that used for the lists of pressures (see 2.4.1).

2.8. Information sources

[this section relates to the following sections of the UK and country-level reports: 2.2. Published sources]

A list of the information sources used for each of the UK habitat reports was provided. This was based on the information sources identified by the Country Agencies for their reporting information. It also included a summary of the sources to create the UK distribution maps (see 2.2.1).

3. Species assessments

3.1 Species included

Reports were submitted to the EC for all 125 species listed on the Habitats Directive Annexes that occurred within the UK (see below).

Full assessments were prepared for 93 species, 77 of which were terrestrial and 16 marine (see below). In addition, partial assessments were prepared for 32 vagrant species, 6 of which were terrestrial and 26 marine (see below). These vagrant species were only occasional visitors to the UK and it was therefore inappropriate to undertake a full assessment of their conservation status.

List of 77 terrestrial species reported on

Code	Name
S1013	Geyer's whorl snail
S1014	Narrow-mouthed whorl snail
S1015	Round-mouthed whorl snail
S1016	Desmoulin's whorl snail
S1026	Roman snail
S1029	Freshwater pearl mussel
S1034	Medicinal leech
S1044	Southern damselfly
S1058	Large blue butterfly
S1065	Marsh fritillary butterfly
S1078	Jersey tiger moth
S1079	Violet click beetle
S1083	Stag beetle
S1092	White-clawed crayfish
S1095	Sea lamprey
S1096	Brook lamprey
S1099	River lamprey
S1102	Allis shad
S1103	Twaite shad
S1106	Atlantic salmon
S1109	Grayling
S1149	Spined loach
S1163	Bullhead
S1166	Great crested newt
S1202	Natterjack toad
S1207	Pool frog
S1213	Common frog
S1261	Sand lizard
S1283	Smooth snake
S1303	Lesser horseshoe bat
S1304	Greater horseshoe bat
S1308	Barbastelle
S1309	Common pipistrelle
S1312	Noctule
S1314	Daubenton’s bat
S1317	Nathusius' pipistrelle
S1320	Brandt’s bat
S1322	Natterer’s bat
S1323	Bechstein's bat
S1326	Brown long-eared bat
S1327	Serotine
S1329	Grey long-eared bat

Code	Name
S1330	Whiskered bat
S1331	Leisler's bat
S1334	Mountain hare
S1341	Common dormouse
S1355	Otter
S1357	Pine marten
S1358	Polecat
S1363	Wildcat
S1378	Cladonia subgenus Cladina subgenus of lichens
S1385	Bruchia moss
S1386	Green shield-moss
S1390	Western rustwort
S1393	Slender green feather-moss
S1395	Petalwort
S1400	Large white-moss
S1409	Bog-mosses
S1413	Clubmosses
S1421	Killarney fern
S1441	Shore dock
S1528	Marsh saxifrage
S1614	Creeping marshwort
S1654	Early gentian
S1831	Floating water-plantain
S1833	Slender naiad
S1849	Butcher's broom
S1902	Lady's-slipper orchid
S1903	Fen orchid
S2492	Vendace
S2494	Whitefish
S4035	Fisher's estuarine moth
S4056	Little ramshorn whirlpool snail
S5003	Alcathoe bat
S5009	Soprano pipistrelle
S5076	Pollan
S5085	Barbel

List of 16 marine species that were reported on

Code	Name
S1223	Leatherback turtle
S1349	Bottlenose dolphin
S1350	Common dolphin
S1351	Harbour porpoise
S1364	Grey seal
S1365	Harbour seal
S1376	Lithothamnium coralloides, Maerl
S1377	Phymatholithon calcareum, Maerl
S2027	Killer whale
S2029	Long-finned pilot whale
S2030	Risso's dolphin
S2031	Atlantic white-sided dolphin
S2032	White-beaked dolphin
S2618	Minke whale
S2621	Fin whale
S5031	Sperm whale

List of 6 vagrant terrestrial species that were reported on

Code	Name
S1313	Northern bat
S1318	Pond bat
S1321	Geofferies bat
S1324	Greater Mouse-Eared bat
S1332	Particoloured bat
S2016	Kuhl's Pipistrelle

List of 26 vagrant marine species that were reported on

Code	Name
S1101	Common sturgeon
S1224	Loggerhead turtle
S1225	Hawksbill turtle
S1226	Kemp's Ridley turtle
S1227	Green turtle
S1345	Humpback whale
S1348	Northern right whale
S2028	False killer whale
S2034	Striped dolphin
S2035	Cuvier's beaked whale
S2037	True's beaked whale
S2038	Sowerby's beaked whale
S2619	Sei whale
S2622	Pygmy sperm whale
S2625	Blainville's beaked whale
S2626	Narwhal
S2637	Hooded seal
S2638	Bearded seal
S2640	Ringed seal
S5018	Harp seal
S5020	Blue whale
S5023	Fraser's dolphin
S5029	Beluga
S5033	Northern bottlenose whale
S5034	Gervais' beaked whale
S6298	Melon-headed whale

3.2. Range

The range of a species was defined as the area enclosed by the outer limits of the area in which it occurred. Range status was assessed by:

- creating a distribution map;
- creating a range map and determining the surface area enclosed by this;
- assessing information on trends in range surface area;
- making reference to a favourable reference range area; and
- applying various thresholds/rules as set out in an evaluation matrix.

3.2.1. Distribution maps

UK distribution maps were created for species using the most appropriate data sources (see below). For terrestrial and marine maerl species, these maps were limited to actual records rather than predicted distributions, making them a conservative estimate of distribution. The distribution map showed their occurrence at a 10-km square scale. A standardised method was used to convert the UK distribution maps into the European ETRS grid for submission to the EC (see Appendix 5 for details). For mobile marine species, the distribution maps were based on 50-km ETRS grid squares. Whenever possible, these maps were limited to actual records rather than predicted distributions, making them a conservative estimate of distribution. However, where raw data were unavailable, as was the case for some regular cetacean species, interpretation of predicted distributions from modelled datasets was assessed. A threshold density of animals was set and values of density greater than the threshold represented presence. All of the species ETRS distribution map data was assembled into a single shape file[12].

The distribution maps were based on species records which were considered to be representative of the distribution within the current reporting period. Generally, the UK approach was to provide the most recent and most comprehensive data that was representative of the distribution between 2007-2012. Where data from before this period were used they were considered to still be representative of the distribution in the current reporting period. For well-surveyed species with clearly defined distributions, it was possible to provide very recent and accurate estimates, post-2007. However, for most species the date class was much wider, dictated by data availability and an expert understanding of current species distribution. The date range of data used was specified in the reporting form.

Records identified as erroneous, or likely to be vagrants, were omitted. Similarly, records were omitted for species that had been introduced to areas outside their natural range (to areas where they would have been unlikely to spread to). However, records of species that had been reintroduced to their former range were included. In some cases, knowledge had improved as to whether a species was considered native to a particular area, which led to slight differences in the distribution/range reported. This was fully audited on a case-by-case basis.

The category reported for ‘method used’ reflected our view of how complete the distribution data was. Method 3 was chosen for a distribution based on a complete survey, method 2 for partial data and to method 1 for a distribution based on minimal sampling. The category reported for terrestrial species and the marine maerl species was an average of an assessment of methods made for the different countries of the UK, weighted by the proportion of the species population found in each country. This was carried in the same manner as for habitats. In essence the different categories were assigned numbers, 1, 2 or 3, multiplied by the proportion of the resource associated with each category, and summed together, before converting the number back to the closest category (See section 2.2.1 for further details). For mobile marine species, assessments were made directly at UK level and the ‘method used’ reflected the view of JNCC.

[12] Available to download from http://jncc.defra.gov.uk/page-6568.

3.2.2. Data sources

Key sources of distribution data for terrestrial and freshwater species included the NBN Gateway[13]. Additional datasets and updates to datasets on the NBN were identified and mobilised through a contract set up by JNCC. Data were provided by key non-government organisations for particular species or species groups. Some data were acquired through country agency in-house or contracted surveys.

For the marine maerl species, the key source of data was the Marine Recorder database. This records data collected from inshore marine surveys for maerl species and maerl beds.

For regular cetacean species, distribution was primarily based on data from: large-scale systematic surveys such as CODA; the Joint Cetacean Protocol; Sea Watch Foundation and the Cetacean Stranding Investigation Programme (CSIP). Data were scarce for vagrant species and distribution was assessed primarily using maps produced for the Atlas of cetacean distribution in north-west European waters[14]. Seal maps were based on long-term telemetry deployments and haul-out count data. Information pertaining to the occurrence and distribution of turtles was extracted from the UK 'TURTLE' database.

3.2.3. Range maps and range surface area

Terrestrial species

The distribution records formed the basis for the UK terrestrial species range maps, which showed the surface area (or envelope) included within the range. The maps were created using a slightly revised version of the range mapping tool used in the 2007 Article 17 Report[15], combined with a more accurate boundary for the UK coastline. The mapping tool created a set of 'best-fitting' polygons around each series of 10-km squares. The range surface area was based on the total area enclosed by each set of polygons. An adjustable 'gap distance' parameter of alpha was used to determine how tightly the polygons fitted. The same alpha values used for the 2007 reporting were re-used to ensure maximum comparability. The values used were documented in the UK reports for each species and range from a value of 18 to 50 km. The alpha values were adjusted to reflect the dispersal behaviour of individual species; to allow a buffer around incomplete records; and to provide the most realistic range estimate in the absence of complete census. For all terrestrial species, a set of clipping rules were applied to ensure that only inland land areas were included. A standardised method was used to convert the terrestrial species range maps into the European ETRS grid for submission to the EC (see Appendix 5 for details). All of the ETRS range map data was assembled into a shape covering both terrestrial and marine species[16].

It should be noted that the range maps were highly dependent on available records and the standard method used. Although the alpha values were chosen to allow some buffering around incomplete records, it was inevitable that with poorly recorded species, some areas were 'missing' from the range which should be included. For instance, for some widely distributed species, small areas of land appear to be excluded from the range because there were no records in those areas, even though the species was considered to occur there. On the other hand, the simple mechanistic method used means that some areas were captured in the range that did not support the species. For example, if a species was recorded at the extreme edge of its range, the alpha hull process allows for a buffer around that data point although it was not

[13] See www.searchnbn.net.

[14] Reid, J.B., Evans, P.G.H. and Northridge, S.P. 2003. Atlas of cetacean distribution in north-west European waters. Joint Nature Conservation Committee, Peterborough.

[15] Joint Nature Conservation Committee (2007) Supporting documentation for making conservation status assessments: Technical Note I AlphaShapes range calculation tool. Second Report by the UK under Article 17 on the implementation of the Habitats Directive from January 2001 to December 2006. Peterborough: JNCC. Available to download at http://jncc.defra.gov.uk/pdf/FCS2007_techI_alphashapes.pdf.

[16] Available to download from http://jncc.defra.gov.uk/page-6568.

needed. These erroneous 'gaps' or 'additions' to range could have been corrected by including artificial records or manual deletion of parts of the range, but there was no means of standardising this process. Given that these anomalies would not alter the overall conclusion, these inaccuracies were not 'corrected' for.

Marine species

For the marine maerl species, the range maps were based on species records which were considered to be representative of the distribution within the current reporting period. Additional records of maerl derived gravel were included, as these were considered to represent potential habitat for maerl species, and therefore range. The records were converted to the 10-km square ETRS scale and submitted in the ETRS LAEA 5210 projection. For mobile species, the distribution records formed the basis for the range maps. Range maps showed the area (or envelope) enclosed by the species range at a 50-km ETRS square resolution. The edge of the range was based on expert opinion taking into account the distribution and frequency of records throughout UK waters and information within the published literature. Range was a difficult parameter to define for this group of species, which were highly mobile and their distribution varied considerably in time and space. However, the range area was estimated to convey the maximum extent of the range taking into account seasonal variability. All of the ETRS range map data was assembled into a shape covering both terrestrial and marine species[17].

The reported 'method used' was the same as for production of the distribution map since it relied on the same data. Where the range surface area differed from that recorded in the 2007 reporting round, it was indicated whether this was considered to be a genuine change, a result of improved knowledge/more accurate data, and/or due to the use of a different method to calculate the area.

3.2.4. Range trends

The trend in the range surface area of a species was determined using the most appropriate data sources.

For all mobile marine species, the current reporting round was the first time that an area was reported for range. For the majority of species, therefore, a quantitative assessment of trends in range were not possible. Instead, current range was visually compared to historical sources, such as range inferred from the Cetacean Atlas[18] and predicted from analysis of the Joint Cetacean Protocol[19]. The views of experts from the four country conservation agencies were considered to help assess whether an apparent change in the map was genuine or due to differences in recording effort/data availability. The long-term monitoring programme of UK seal populations, as reported on annually through the Special Committee on Seals, were used as the source of trend information for both grey and harbour seals.

Short term trend

Short-term trends in the range surface area were required for the period 2001-2012. Although data on range were not always collected between the exact dates 2001-2012, the trend reported was considered to be representative of this period, and the short term trend period was generally reported as such. Short-term trend was derived by the following processes:

- comparing the range map and surface area of range reported this time with the map and area figure produced for the last reporting round, whilst taking into account the minor difference caused by the revised range mapping tool and coastal clipping dataset;
- considering the range trend reported in the 2007 report;

[17] Available to download from http://jncc.defra.gov.uk/page-6568
[18] Reid, J.B., Evans, P.G.H. and Northridge, S.P. 2003. Atlas of cetacean distribution in north-west European waters. Joint Nature Conservation Committee, Peterborough.
[19] Joint Cetacean Protocol – available at http://jncc.defra.gov.uk/page-5657.

- considering the views of experts from the four country conservation agencies to help assess whether an apparent change in the map was genuine or due to differences in recording effort/data availability;
- considering if there was any published analysis or range trend already available, e.g. analysis of the Butterflies for the New Millennium dataset.

For the marine maerl species, trend was based on the country-level assessments, and was therefore reported as unknown due to limited data availability.

The direction of trend was categorised as stable, increasing, decreasing or unknown. Note, only trends believed to be genuine were reported. For example, if the surface area of range reported in 2013 was much larger than in 2007 but the country agency specialists considered that this was merely due to better recording and actually the range had remained stable, then the short term trend was reported as stable rather than increasing.

It was generally not possible to report a range trend magnitude, because of uncertainty over how much of the change in surface area of range was due to better data and how much was genuine.

Long-term trend

Although optional, the long-term trends in the range surface area were reported where possible. The reporting format specifies that 'long-term' refers to the last 24 years, i.e. 1989-2012. In most cases, data were not available for this specific period, but trends reported were thought to be representative of this period. The trend was derived using the same processes as for the short term trend, but with greater reliance on expert judgement from the country agency specialists. The direction of trend was categorised as stable, increasing, decreasing or unknown. Again, only trends believed to be genuine, as opposed to recording artefacts, were reported.

3.2.5. Reason for change

Field 2.3.10 requires reporting of whether the difference in surface area of range reported this time compared to the figure reported in 2007 was mostly a genuine change, mostly due to better data, or mostly due to use of a different method.

The decision of whether the change was genuine was closely linked to the trend reported in 2.3.4 and was strongly reliant on the views of species specialists from the country agencies. Where the figure given for surface area of range was higher than reported in 2007, but this the country agency specialists considered this was only due to under recording in the past, the 'reason for change' field had the option 'better data' selected.

To work out if the revised range mapping tool (including the revised coastal clipping data set) had much influence in a change in surface area of range, the data used in the 2007 report was run through the revised range tool, and the resulting figure compared with the figure reported in 2007. Generally the percentage change caused by the revised method was very small (e.g. 1%), and of much less consequence than genuine changes or changes in recording effort.

Where the figure for surface area of range was reported as unknown in 2007, it was not possible to report the reason for change in this reporting round.

3.2.6. Favourable Reference Range

Favourable Reference Range (FRR) values were established for each species, where this was possible. The default reporting position was to repeat the FRR as used in the 2007 report. However, in the many cases where the FRR had been set as equal to the surface area of range value reported in 2007, the FRR was updated by running the data used in 2007 through the revised algorithm range tool. This generally resulted in a very similar value.

In some cases a species was clearly under recorded in the past and the surface area of range reported this time was substantially bigger, despite there not being a genuine increase in range. In these cases, if in 2007 the FRR was set as equal to the 2007 reported surface area range value, the FRR was updated to be the surface area range value reported in 2013 or set as 'approximately equal to current'.

There were several species where the FRR was reported as 'unknown' in 2007. Where possible, an FRR was set for these species in 2013, or an operator was used to indicate if the FRR was thought to be "approximately equal to", "more than", "much more than", or "less than" the current range. However, for some species, the FRR was still recorded as unknown due to limited data availability.

In creating or amending values for FRR, the same general approach was used as documented in the 2007 UK Approach, a brief summary of which is outlined below. A brief summary of the method used was reported in field 2.3.9 of the reports.

Main considerations used to determine the Favourable Reference Range (FRR) for a species

Component	**Interpretation**	**Exceptions**
1) Post-1994 trend in range surface area	*Increasing trend:* Suggests range is large enough and has sufficient coverage to support species survival. FRR likely to be equal to 1994* estimate.	Trend attributed to introduction programme only, or increased survey effort only, rather than natural range increase; OR The 1994 range was at risk from stochastic events (informed by Consideration 2), and reported increase was not been sufficient to suitably eliminate this risk.
	Stable trend: Suggests range is large enough and has sufficient coverage to support species survival. FRR likely to be equal to 1994* estimate.	The 1994 range was at risk from stochastic events (informed by Consideration 2).
	Decreasing trend: Suggests range may <u>not</u> be large enough, or have sufficient coverage, to support species survival. FRR may need to be <u>greater than</u> the 1994* estimate.	Trend attributed to natural fluctuation
2) Size/ coverage of range area	The longer a species has persisted within a naturally restricted range, the greater the confidence that it is resilient to stochastic events and natural change, thus the greater likelihood it will be equivalent to the FRR.	None.

* or nearest, most relevant alternative.

In order to determine a favourable reference value for an individual species range, 1994 was used as a preliminary baseline. Where 1994 data were not available, the nearest, most recent/relevant alternative was considered. Consideration was given to whether the range was sufficiently large to support a long-term viable population of the species. If it were considered large enough, this was set as the FRR, but if not the figure was set as higher. In the absence of detailed modelling, it was hard to assess whether the range size in 1994 was large enough to support a long term viable population of the species. To help inform this decision, current trend data were considered – a decreasing trend could suggest that the range area was not big

enough to support a viable population. Decisions also took into account conservation management and vulnerability to stochastic events.

3.2.7. Conclusion on range

The conclusion as to whether the UK range of a species was favourable, unfavourable-inadequate, unfavourable-bad or unknown, was dictated by the following general evaluation matrix taken from the EC Reporting Guidelines.

Favourable	Unfavourable-inadequate	Unfavourable-bad	Unknown
Stable (loss and expansion in balance) or increasing AND not smaller than the 'favourable reference range'	Any other combination	Large decline: Equivalent to a loss of more than 1% per year within period specified by MS OR more than 10% below favourable reference range	No or insufficient reliable information available

This was translated into the following assessment matrix, which shows the conclusions reached based on the short-term trend in range and the relationship between current range and FRR area.

		Short-term trend in range 2001-2012		
	Unknown	**Increasing or stable**	**Decline 1% or less per year**	**Decline >1% per year**
Range area or FRR Unknown	Unknown	Unknown or favourable	Unfavourable-inadequate	Unfavourable-bad
Range area > or = FRR	Unknown or favourable	Favourable	Unfavourable-inadequate	Unfavourable-bad
Range area up to 10% below FRR	Unfavourable-inadequate	Unfavourable-inadequate	Unfavourable-inadequate	Unfavourable-bad
Range area >10% below FRR	Unfavourable-bad	Unfavourable-bad	Unfavourable-bad	Unfavourable-bad

Where range was judged as unfavourable (-bad or -inadequate) there was a requirement to add a qualifier as to whether the status was improving, stable, declining or unknown. The decision on this was based on the short-term trend in range.

3.3 Population

Population status was one of the fundamental attributes by which the conservation status of a species was judged. It was assessed by:

- estimating the population size;
- information on trends in population size;
- making reference to a Favourable Reference Population value; and
- applying various thresholds/rules as set out in an evaluation matrix.

3.3.1 Population estimate

Population units used

For the majority of assessments the population units used were the same as in the 2007 report. This was to ensure maximum comparability and ensure that values for the Favourable Reference Population were still relevant.

The preferred unit used to estimate a species population size was individuals, or another agreed exception as requested in the EC Reporting Guidelines. However, the units used varied depending on the availability and applicability of information. For example, for some species, numbers of discrete populations were the most useful unit for comparison, whilst for others it was breeding individuals or another specific life-stage. For some species lacking detailed population data, distribution data was used as a proxy for population size, and the unit used was occupied grid squares. Where information at this rather coarse level was considered too incomplete, a judgement of unknown was reported.

Population size

For some species there was an agreed UK population estimate based on a published source[20]. However, for the majority of terrestrial and marine maerl species, the Country Agencies estimated the current population size in their country, and these were aggregated together to get a UK population estimate. The minimum country population estimates were added together to get the minimum UK population estimate, and the maximum country population estimates were added together to get the maximum UK population estimate.

For mobile marine species, population estimates within UK waters for many of the regular cetacean species were derived from the most robust population estimates available from the Small Cetacean Abundance in the North Sea and European Atlantic and North Sea (SCANS-II) and Cetacean Offshore Distribution and Abundance (CODA) surveys. These surveys covered European waters, on and beyond, the continental shelf edge. The estimates from these surveys were pro-rated by area to derive a UK estimate with an associated coefficient of variation. Estimates from these sources were not available for all regular species, and other sources had to be relied on. For more local populations, estimates were taken from the results of relevant photo-identification studies. In all cases, the lower and upper 95% confidence interval was used to represent the minimum and maximum population estimates. For seals, the population information was taken from the most recent SCOS report[21]. Information on turtles was made available through The Turtle Implementation Group. Population sizes could not be assessed for marine turtles and a proxy was chosen for the more common species.

Where the population size estimate differed from that recorded in the 2007 reporting round, it was indicated whether this was considered to be a genuine change, a result of improved

[20] For example, some of the mammal population estimates were based on Harris S., Morris, P., Wray, S. and Yalden, D. (1995) A review of British mammals: population estimates and conservation status of British mammals other than cetaceans. JNCC, Peterborough.

[21] Special Committee on Seals. Main Advice 2012. Scientific Advice on matters relating to the management of seal populations 2012. SCOS Draft report August 2012.

knowledge/more accurate data, and/or due to the use of a different method to calculate the population size.

As for range, there was no set guidance for classifying the 'year or period' when data for population size was recorded. Generally, the approach was to provide the most recent and most comprehensive assessment of population. Ideally data used were collected between 2007-2012. However, for most species the date class was much wider, dictated by data availability and a professional understanding of current species population. If a published estimate was used, that date was reported; for other estimates, the year or period recorded reflects the period when data were collected. Where data from before this 2007 were used it was considered to be representative of the current population.

The method used to estimate the population size of a species was categorised as being based on a complete survey, partial data with some extrapolation and/or modelling, or expert opinion with no or minimal sampling. The category reported was based on the methods used in the different countries of the UK, weighted by the proportion of the population found in each country. This was carried in the same manner as for habitats. In essence the different categories were assigned numbers, 1, 2 or 3, multiplied by the proportion of the resource associated with each category, and summed together, before converting the number back to the closest category (See section 2.2.1 for further details).

3.3.2 Population trends

The trend in the population of a species was determined using the most appropriate data sources. There were varying levels of data available; some species trends were based on robust surveillance schemes, whilst trends for other species were based on expert opinion.

Only trends believed to be genuine were reported. For example, if the population reported was much larger than in 2007 but the country agency specialists considered that this was merely due to better recording and actually population had remained stable, then the short term trend was reported as stable rather than increasing.

For mobile marine species, JNCC relied on published information to make an assessment of population trend. There were few data for many mobile species on which to assess magnitude and direction of trends in populations. The JNCC commissioned report, Joint Cetacean Protocol, aimed to provide trend magnitude and direction for seven regular cetacean species in UK waters over the period 1994-2010 and assessments considered the outputs of this report. Trend information was also gleaned from long-term monitoring programmes of coastal resident populations e.g. bottlenose dolphins and for seals, the national monitoring programmes funded by NERC and conducted by the Sea Mammal Research Unit.

Short term trend period

Short-term trends in the population size of a species were required for the period 2001-2012. A time period as close as possible to this time period was used. For some species the period varied slightly due to data availability, and in order to make use of existing data analysis from monitoring schemes.

Short term trend direction

In some cases, trends were available from a UK (or GB, or other cross country) scheme. For other species the Country Agencies produced separate estimates of population trends and these were combined to produce the UK population trend. The direction of trend was categorised as stable, increasing, decreasing or unknown. In addition, for species that were declining, the country-level reports often report whether or not the decline was estimated to be by more than 1

% per year. When aggregating country trends to decide on the UK trend, a trend of 'stable' combined with a trend of 'increasing' or 'decreasing' generally resulted in an overall 'increase' or 'decrease' trend being reported rather than stable. However, the proportion of the species population in each country was considered and if less that 5% resource showed a trend but the rest reported stable, the UK trend was judged on a case by case basis to consider whether this was sufficient to sway the overall UK trend. The following factors were considered: the proportion of the resource associated with the trend, the magnitude of the trend, the confidence the country agency had in reporting the trend, the ecology of the species, and any other comments from the country conservation agencies. If a country (or countries) with over 50% of the resource reported the trend as 'unknown' then the overall UK trend was reported as 'unknown'.

Short term trend magnitude

Where possible, the trend magnitude over the short term trend period was estimated. This was only possible if the trend was reliant on a cross country surveillance scheme, or if all countries hosting the species reported the trend magnitude for their country. If combining trend magnitudes provided by the country agencies, consideration was given to the proportion of the population in each country at the start and end of the trend periods, to ensure the UK trend magnitude best reflected the situation at the UK-level.

A confidence interval was reported if the UK estimate was based on a statistically reliable sampling scheme, or if all Country Agencies reported the same confidence interval.

Long-term trend

Although optional, the long-term trends in population were reported where possible. The reporting format specifies that 'long-term' refers to the last 24 years, i.e. 1989-2012; however, this differed for some mobile marine species depending on the available data. The approach for completing the long-term trend was the same as for the short term trend.

3.3.3. Favourable Reference Population

Favourable Reference Population (FRP) values were established for each species, where this was possible. The FRP values established for species in the 2007 report were mostly retained for the 2013 report. However, in a few cases, particularly marine mobile species, updated knowledge justified a revision and a new value was set. There were several species where the FRP was reported as 'unknown' in 2007. Where possible, an FRP was set for these species in 2013, or an operator was used to indicate if the FRP was thought to be "approximately equal to", "more than", "much more than", or "less than" the current population. However, for some species, the FRP was still recorded as unknown due to limited data availability.

In creating or amending values for the FRP, the same general approach was used as documented in the 2007 UK Approach, a brief summary of which is outlined below. A brief summary of the method used was reported in field 2.4.14 of the reports.

In order to determine an FRP for an individual species population, 1994 was used as a preliminary baseline. Where 1994 data were not available, the nearest, most recent/relevant alternative was considered. Consideration was given to whether the population was sufficiently large be a long-term viable population. Viability was defined as 'the condition that a habitat or species needs to be in to perpetuate itself indefinitely over time under the likely conditions of future land and water management'. If it was considered large enough, the FRP was set at this level, but if not, a higher value was used. Current trend data was used as an initial indicator for determining viability. A decreasing trend suggested that the population was not large enough to be viable. Decisions were then informed by population structure, conservation management and vulnerability to stochastic events, as described in the table below.

Main considerations used to determine the Favourable Reference Population (FRP) for a species

FAVOURABLE REFERENCE POPULATION		
Consideration	**Interpretation**	**Exceptions**
1) Current (post-1994) trend	*Increasing trend:* Suggests populations are perpetuating themselves, indicating viability (in terms of both population size and structure). Therefore, FRP likely to be equal to the 1994* estimate.	Trend attributed to introduction programme only, or increased survey effort only, rather than natural population increase; OR The 1994 population was at risk from stochastic events (informed by Consideration 2), and reported increase has not been sufficient to suitably eliminate this risk. OR Increase in absolute population numbers recognised as masking inadequacies in population structure (informed by Consideration 3)
	Stable trend: Suggests populations are maintaining themselves, indicating viability (in terms of both population size and structure). FRP may need to be equal to the 1994* estimate.	The 1994 population was at high risk from stochastic events (informed by Considerations 2) OR Stability in absolute population numbers recognised as masking inadequacies in population structure (informed by Consideration 3)
	Decreasing trend: Suggests populations are not maintaining themselves, indicating they may not be viable (in terms of both population size and structure). Therefore, FRP is more than the 1994* estimate.	Trend attributed to natural fluctuations.
2) Size	The longer a species has persisted with naturally low populations, the greater the confidence that these populations are resilient to stochastic events.	None
3) Structure Where known.	Not deviating from normal: This indicates viable populations.	Where evidence suggests there are other external factors likely to affect viability.
	Deviating from normal: Indicates populations are not viable.	None

* or nearest, most relevant alternative.

3.3.4. Conclusion on population

The conclusion as to whether the UK population of a species was favourable, unfavourable-inadequate, unfavourable-bad or unknown, was dictated by the following general evaluation matrix taken from the EC Reporting Guidelines.

Favourable	**Unfavourable-inadequate**	**Unfavourable-bad**	**Unknown**
Population(s) not lower than favourable reference population AND reproduction, mortality and age structure not deviating from normal (if data available)	Any other combination	Large decline: Equivalent to a loss of more than 1% per year (indicative value MS may deviate from if duly justified) within period specified by MS AND below favourable reference population OR More than 25% below favourable reference population OR Reproduction, mortality and age structure strongly deviating from normal (if data available)	*No or insufficient reliable information available*

This matrix included an assessment of how strongly population reproduction, mortality and age structure deviated from normal. Information on this was scarce, so short-term trend in population size was usually taken as a proxy measure of the degree to which these aspects of population status were imbalanced, as follows:

- population stable or increasing = reproduction/ mortality/ age structure normal;
- population declining by < 1% per year = reproduction/ mortality/ age structure moderately imbalanced;
- population declining by more than 1% per year = reproduction/ mortality/ age structure strongly imbalanced.

This information was translated into the following assessment matrix, which shows the conclusions based on the short-term trend in population size and the relationship between current population and the FRP size.

	Short-term trend in population 2001-2012			
	Unknown	**Increasing or stable**	**Decline 1% or less per year**	**Decline >1% per year**
Population or FRP Unknown	Unknown	Unknown or favourable	Unfavourable-inadequate	Unfavourable-bad
Population > or = FRP	Unknown or favourable	Favourable	Unfavourable-inadequate	Unfavourable-bad
Population up to 10% below FRP	Unfavourable-inadequate	Unfavourable-inadequate	Unfavourable-inadequate	Unfavourable-bad
Population >10% below FRP	Unfavourable-bad	Unfavourable-bad	Unfavourable-bad	Unfavourable-bad

If data were available that indicated that the reproduction, mortality and age structure strongly deviated from normal, the conclusion was set as unfavourable-bad, even if the population was not declining.

Where population was judged as unfavourable (-bad or -inadequate), there was a requirement to add a qualifier as to whether the status was improving, stable, declining or unknown. The decision on this was based on the short-term population trend.

3.4. Habitat for the species

Habitat for the species was defined as the range of biological and physical resources used by a species during its life. It was assessed by:

- estimating the area of habitat for the species;
- assessing the quality of habitat for the species;
- information on trends in the area and quality of habitat for the species;
- estimating the area of suitable habitat for the species; and
- applying various thresholds/rules as set out in an evaluation matrix.

3.4.1. Area of habitat

Some difficulties were faced in trying to estimate the area of habitat occupied by a species. Although the general habitat requirements of many UK species were reasonably well-documented, information on micro-habitat requirements was generally insufficient and/or maps of the extent of relevant habitat types were not available. In addition, many species reported on were generalists that use a range of different types of habitat.

For mobile marine species, the approach taken in 2007 was to equate habitat area with range, and this approach was maintained for the 2013 reporting. These species used a range of habitats and were not directly measured.

For other species, the Country Agencies assessed the area of habitat for their countries separately, and these were summed to produce the UK estimate. A range of different methods were used by the Country Agencies, including:

- habitat mapping of species (generally only possible for specialist species that occupy a restricted area);
- spatial habitat modelling approaches, e.g. Maxent – this approach was resource intensive, but proved was useful in a few instances;
- Using area of broad habitats associated with the species;
- Using surface area of range or area of occupied (or modelled) 10-km squares as a proxy for area of habitat.

The Country Agencies specified the dates when data for habitat area was collected. If the method used relied directly on distribution data or range then the year or period specified for production of the distribution and range maps was repeated here. For the UK report the overall date period covering all country responses was reported.

The specific methods used by the Country Agencies were documented in the country-level reports. The Country Agencies also categorised the method as being based on a complete survey, partial data with some extrapolation and/or modelling, or expert opinion with no or minimal sampling. The responses were combined at a UK-level, after weighting them according to the proportion of the species population found in each country. This was carried in the same manner as described in section 2.2.1. In essence the different categories were assigned numbers, 1, 2 or 3, multiplied by the proportion of the resource associated with each category, and summed together, before converting the number back to the closest category.

To help in completion of the assessment matrices, the Country Agencies also answered an additional question: “is the area of habitat considered to be sufficiently large to ensure the long term survival of the species (irrespective of habitat quality)?”

The responses to this question were weighted by the proportion of the UK population in each country and combined to produce the answer most appropriate to be used in completing the assessment matrix for habitat for species in the UK.

3.4.2. Quality of habitat

The quality of the habitat for species was assessed as good, moderate or bad, and an explanation provided as to how this assessment was reached.

- Good = species survival not limited by the quality of its habitat;
- Moderate = species survival limited by the quality of its habitat but not to the extent that it prevents the population from being viable;
- Bad = habitat quality a major problem for species survival; and
- Unknown.

For terrestrial species, the Country Agencies assessed the quality of habitat in their countries, based on a mixture of data from Common Standards Monitoring of protected sites, surveillance schemes in the wider countryside, monitoring of pressures, relevant publications and expert opinion. Certain species were classed as 'habitat generalists' as they used a relatively wide range of habitats. For these species it was considered less likely that habitat quality was a limiting factor controlling their population size or reproduction.

For the marine maerl species, Common Standards Monitoring data of protected sites was provided by the country agencies for maerl bed habitat. This data was used to estimate the amount of maerl bed habitat in favourable and unfavourable condition, as a proxy for quality. However, due to large proportions of the habitat not being assessed, quality was ultimately reported as unknown.

For mobile marine species, the quality of the habitat was inferred from the range and trend in range due to the lack of data on habitats that directly support these species. Information on habitat quality was also judged from the published literature and using 'expert opinion'.

Country assessments of quality of habitat were weighted according to the proportion of the species population in each country and combined to produce the UK category for quality of habitat.

Where the area of habitat recorded differed from that recorded in the 2007 reporting round, it was indicated whether this was considered to be a genuine change, a result of improved knowledge/more accurate data, and/or due to the use of a different method.

3.4.3. Trends in habitat for a species

The trend in habitat for a species considered both the area and the quality of available habitat.

Trends were assessed separately by the Country Agencies based on a mix of expert opinion, trends in range or distribution (where this was being used as a proxy for area of habitat), information from surveys, (e.g. CSM on protected sites, or surveys in the wider countryside) and pressures information. The direction of trend was categorised as stable, increasing, decreasing or unknown. The country trends were combined to produce the UK trend, taking into account the proportion of the species population in each country. When aggregating country trends to decide on the UK trend, a trend of 'stable' combined with a trend of 'increasing' or 'decreasing' generally resulted in an overall 'increase' or 'decrease' trend being reported rather than stable. However, the proportion of the species population in each country was considered and if less that 5% resource showed a trend but the rest reported stable, the UK trend was judged on a case by case basis to consider whether this was sufficient to sway the overall UK trend. The following factors were considered: the proportion of the resource associated with the trend, the magnitude of the trend, the confidence the country agency had in reporting the trend, the ecology of the species, and any other comments from the country conservation agencies. If a country (or

countries) with over 50% of the resource reported the trend as 'unknown' then the overall UK trend was reported as 'unknown'.

Short-term trends in the habitat for species were based on a period as close as possible to 2001-2012. Long term trends, from 1989-2012, were optional, but were completed in a few cases where data allowed, following the same method as for short term trends.

3.4.4. Area of suitable habitat for a species

The area of suitable habitat for a species refers to the total area of habitat thought to be suitable for the species, including both currently occupied and unoccupied habitat.

In many cases there was insufficient information to determine a value for the area of suitable habitat. This could not be quantified for mobile marine species. However, where possible, the Country Agencies assessed the area of suitable habitat separately for their countries using a variety of methods, including the following:

- Assuming suitable habitat was the same as area of habitat unless specifically aware of extra habitat;
- Spatial habitat modelling approaches, e.g. Maxent – this approach was resource intensive, but proved was useful in a few instances;
- Using area of broad habitats associated with the species;
- Using surface area of range or area of occupied (or modelled) 10-km squares as a proxy for area of habitat.

The country values for area of suitable habitat were summed to obtain the UK value for area of suitable habitat for the species. The specific methods used by the Country Agencies were documented in the country-level reports.

3.4.5. Conclusion on habitat for the species

As far as possible the conclusion as to whether the UK habitat of a species was favourable, unfavourable-inadequate, unfavourable-bad or unknown, was dictated by the following general evaluation matrix taken from the EC Reporting Guidelines.

Favourable	Unfavourable-inadequate	Unfavourable-bad	Unknown
Area of habitat is sufficiently large (and stable or increasing) AND habitat quality is suitable for the long term survival of the species	Any other combination	Area of habitat is clearly not sufficiently large to ensure the long term survival of the species OR Habitat quality is bad, clearly not allowing long term survival of the species	*No or insufficient reliable information available*

The matrix was interpreted as follows:

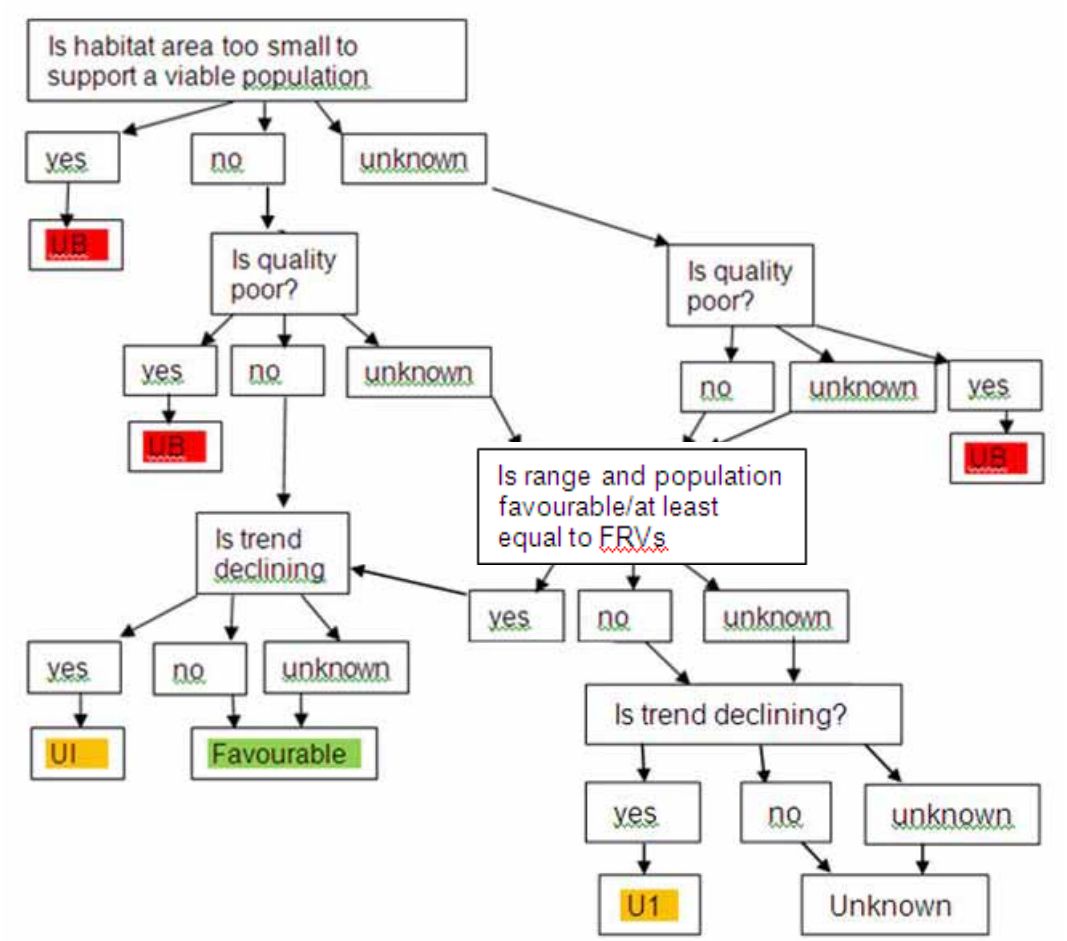
- Unfavourable-bad = not sufficiently large or poor quality;
- Unfavourable-inadequate = sufficiently large, good or moderate quality, but declining;
- Favourable = sufficiently large, not poor quality and not declining.

This information was translated into the following assessment matrix which considers the whether the area of habitat was sufficient (based on response to question discussed in 3.4.1), the quality of habitat and the trend in habitat.

	Sufficiently large to support a viable population			Not sufficiently large to support a viable population		
	increasing	**stable**	**declining**	**increasing**	**stable**	**declining**
Habitat quality good or moderate	Favourable	Favourable	Unfavourable -inadequate	Unfavourable-bad		
Habitat quality poor	Unfavourable -bad	Unfavourable -bad	Unfavourable -bad			

Where habitat for a species was judged as unfavourable (bad or inadequate) there was a requirement to add a qualifier as to whether the status was improving, stable, declining or unknown. The decision on this was based on the short-term trend in habitat.

For some species, limitations in data meant that it was not possible to fully complete this assessment matrix. Sometimes this did not have any implications on coming up with the assessment conclusion because another piece of data had already determined the conclusion. However, in other cases it was more of an issue. For mobile marine species, there was a lack of data on habitat, so as a pragmatic solution habitat was assumed to be favourable if both population and range parameters were favourable. For terrestrial species, a series of rules were used as a guide to help determine what the assessment should be in the case of missing pieces of data. These are set out below in a decision tree, the steps of which are described beneath.



· If it was judged that either the amount of habitat was insufficient to support a viable population, or the quality was bad, then the overall assessment was assessed as Unfavourable-bad, regardless of any other information or lack of information.

- If it was uncertain as to the habitat quality and/or whether there was sufficient amount of habitat to support a viable population, then the range and population parameters were taken into account. If range and population were at least equal to the FRVs/assessed as favourable, then the habitat for species parameter was assessed as favourable. This was based on the fact that habitat was unlikely to be a major problem if there was currently sufficient amount/quality to support the current population which was judged to be viable.

- If the habitat trend was unknown, but there was no evidence for a decrease and all other pieces of information pointed to a favourable assessment (quality good or, moderate, sufficient amount of habitat) then habitat for species was generally still assessed to be favourable.

3.5. Future prospects

'Future prospects' was one the fundamental attributes by which the conservation status of a species was judged. This was assessed by:

- listing and assessing the relative importance of pressures and threats and conservation measures to a species;
- assessing 'future status' of each parameter ('range', 'population' and 'habitat for species') through consideration of trends, pressures and threats and conservation measures; and
- applying various thresholds/rules as set out in an evaluation matrix.

3.5.1. Pressures and threats

The main pressures and threats affecting species were identified and matched against a standard list of pressures and threats set out by the EC. The full list of EC pressures amounted to 400 separate categories – for UK reporting purposes only the second-level of categories were used, which reduced the list to 79 categories (see Appendix 3). The time period pressures were assessed over was the reporting period 2007-2013, whilst for threats the period was the next two reporting periods, i.e. 2013-2025. Only those threats that were considered reasonably likely to occur were considered.

The relative importance of pressure and threats was categorised as follows:

- high importance/ impact – important direct or immediate influence and/or acting over large areas (score = 3);
- medium importance/ impact - medium direct or immediate influence, mainly indirect influence and/or acting over moderate part of the area/acting only regionally (score = 2); or
- low importance/ impact – low direct or immediate influence, indirect influence and/or acting over small part of the area/ acting only regionally (score = 1).

A qualifier was added to relevant threats and pressures to denote the following types of pollutants:

- N Nitrogen input;
- P Phosphor/Phosphate input;
- A Acid input/ acidification;
- T Toxic inorganic chemicals;
- O Toxic organic chemicals;
- X Mixed pollutants.

The UK list of pressures was based on an aggregation of the corresponding, country-level lists supplied by the Country Agencies (as detailed in the country-level reporting information).

This was achieved for each pressure by: (i) converting the ranks assigned at a country-level to a value (i.e. L = 1, M = 2, H = 3); (ii) weighting (multiplying) these values by the proportion of the population in each country (or, where this was incomplete, the count of 10-km squares at a country-level); and (iii) summing these weighted values and using this number and the following classes as a guide to select the UK rank: <1.1 = L, 1.1-2.1 = M, >2.1= H.

A maximum of 20 pressures and 20 threats (the highest scoring) were included in the UK list, and only five of these could be categorised as high. If more than 5 pressures came out as high after aggregating the Country Agency scores, only the 5 highest scoring pressures/threats were classified as 'high' on the UK list. Any others had their classification re-graded to 'medium'. Any qualifiers from the country assessments were included with the pressures/threats in the UK list.

The Country Agencies used data from a variety of sources when assessing pressures and threats, for example: the adverse factors reported as part of the Common Standards Monitoring

site condition assessment process[22]; current factors affecting the status of the UK BAP priority species as listed in their Habitat Action Plans; data on specific pressures, and expert knowledge.

For mobile marine species, pressure rankings were based on 'expert opinion' gathered through the Inter Agency Marine Mammals Working Group to assign a UK-level ranking.

For pressures, the method used was classified as:
- based exclusively or to a larger extent on real data from sites/occurrences or other data sources;
- mainly based on expert judgement and other data;
- based only on expert judgements.

For threats, the method used was categorised as being based mainly on modelling or expert opinion.

The responses for 'method used' were combined at a UK-level, after weighting them according to the proportion of the species population found in each country.

3.5.2. Assessing future status

Future Prospects considered future trends and future status for each of the three species reporting parameters, i.e. 'range', 'population' and 'habitat for species'. Future status referred to an estimation of the range, or population in 12 years time, in relation to the favourable reference value. For habitat for species, future status referred to an estimate of whether the area and quality of habitat would be adequate for the survival of the species in 12 years time. Trend was a key factor in predicting the 'Future status'. This is illustrated by the following matrix taken from the EC Reporting Guidelines.

Actual status of parameter	**Future trend**	**Future status**	**Prospects (numbers refer to notes below)**		
At/above FRV	+ (increasing)	> (above FRV)	Good		
At/above FRV	= (stable)	=/> (on/above FRV)	Good		
At FRV	- (decreasing)	</<< (under FRV)	Poor (1)	Bad (1)	
Above FRV	- (decreasing)	>/=/</<< (above/on/under FRV)	Good (2)	Poor (2)	Bad (2)
Below FRV	+ (increasing)	>/=/< (above/on/under FRV)	Good (3)	Poor (3)	Bad (3)
Below FRV	= (stable)	< (under FRV)	Poor (1)	Bad (1)	
Below FRV	- (decreasing)	< (under FRV)	Poor (1)	Bad (1)	
Unknown	+ (increasing)/ - (decreasing)/ = (stable)/ X (unknown)	X (unknown)	unknown		
under FRV on/above FRV	X (unknown)	X (unknown)	unknown		

Notes: 1 - Depending whether or not the future status is anticipated to be below the threshold for Unfavourable-bad in two reporting cycles (12 years); 2 - Depending on whether the future status is anticipated to be on/above or under the FRVs or even below the threshold for Unfavourable-bad in two reporting cycles (12 years); 3 - Depending whether the future status will exceed the FRV or the threshold for Unfavourable-bad in two reporting cycles (12 years).

To estimate the future status for each parameter ('range', 'population' and 'habitat for species'), information on the current trends reported individually for the different parameters were taken into

[22] See http://www.jncc.gov.uk/page-3520.

account, along with assessments of pressures, threats and conservation measures, to help predict whether the current trend would continue into the future.

If a 'trend magnitude' for range or population had been calculated, this was projected into the future to inform an estimate of whether the status in the future would be higher or lower than the FRV. If there were no trend magnitudes reported it was generally assumed that the future status would be higher than or equal to the FRV if the trend was increasing, but lower than the FRV if the trend were decreasing. These initial estimates were modified by consideration of pressures and threats and whether these were likely to be counteracted by conservation measures. It was generally considered that the trend was likely to continue into the foreseeable future *if* future threats identified were no worse than current pressures, and *if* current conservation measures and other provisions were expected to continue.

An estimate of future status was made for each of the three parameters – range, population and habitat for species.

3.5.3. Concluding on future prospects

The conclusion as to whether the future prospects of a species was favourable, unfavourable-inadequate, unfavourable-bad or unknown, was dictated by the following general evaluation matrix taken from the EC Reporting Guidelines.

Favourable	**Unfavourable-inadequate**	**Unfavourable-bad**	**Unknown**
Main pressures and threats to the species not significant; species will remain viable on the long-term	Any other combination	Severe influence of pressures and threats to the species; very bad prospects for its future, long-term viability at risk.	No or insufficient reliable information available

The EC Reporting Guidelines further recommended that the future prospects of each of the three previous parameters (range, population and habitat for species) were assessed separately, and that the overall Future Prospects should be assessed using the following rules:

	Favourable	**Unfavourable-inadequate**	**Unfavourable-bad**	**Unknown**
Future prospects	All parameters have good prospects OR prospects of one parameter unknown, the other prospects good	Other combination	One or more parameters have bad prospects	Two or more x and no parameter with bad prospects

This assessment matrix was followed directly by using the results of the future status assessment of the three parameters – 'range', 'population' and 'habitat for species'.

3.6. Determining overall conservation status for species

3.6.1. Overall conclusion

The EC Reporting Guidelines Annex C evaluation matrix (see Appendix 1) summarises the rules by which overall conclusions for species were reached. This includes the following definitions:

- Favourable: habitat or species can be expected to prosper without any change to existing management or policies;
- Unfavourable-inadequate: habitat or species require a change in management or policy but the danger of extinction was not so high;
- Unfavourable-bad: where the habitat or species was in serious danger of becoming extinct (at least locally).

The assessment procedure followed the precautionary principle; if any assessment of a parameter was unfavourable-bad, whether it was range, population, habitat for species or future prospects, the overall conclusion was reported as unfavourable-bad, even if all remaining parameters were favourable. Similarly, one unfavourable-inadequate conclusion combined with all favourable conclusions resulted in an overall conclusion of unfavourable-inadequate. An overall conclusion of favourable was only reached where all parameters were favourable or three parameters were favourable, and one was unknown. In cases where there were two or more unknown conclusions combined with other favourable conclusions, the overall conclusion was unknown.

3.6.2. Overall qualifier

An overall status qualifier (improving, stable, declining or unknown) was reported for species with an overall assessment of Inadequate. The qualifier was based on the trends for range, population, habitat for species and for future prospects. These were considered irrespective of what conclusion was reached for the individual parameters. The following matrix was used to guide which overall qualifier should be chosen, though the choice depended on the strength of the trends for individual parameters.

	Number of individual qualifiers (based on short-term trend for range/area/structures and functions, and status qualifier for future prospects)			
Overall qualifier usually selected	Improving	Stable	Declining	Unknown
Improving	3 or 4	0 or 1	0 or 1	0 or 1
	2	0, 1 or 2	0	0, 1 or 2
	1	0 or 1	0	2 or 3
Improving or stable	1	2 or 3	0	0 or 1
Stable	2	0	2	0
	1	0, 1 or 2	1	0, 1 or 2
	0	1, 2, 3, or 4	0	0, 1, 2 or 3
Declining or stable	0	2 or 3	1	0 or 1
Declining	0 or 1	0 or 1	3 or 4	0 or 1
	1	0, 1 or 2	2	0, 1 or 2
	0	0, 1, 2 or 3	1	0, 1, 2 or 3
Unknown	0	0	0	4

3.7. Natura 2000 coverage

Additional information was required on the population and trends of Annex II species within the Natura 2000 SAC network.

3.7.1. Population size

The Country Agencies estimated the population size within SACs in their country. The figures were summed together to produce a UK population estimate within SACs.

Their estimates were generally based on data collected through the Common Standards Monitoring Scheme/ Site Condition Monitoring scheme. The Country Agencies recorded the method used to come up with their population estimate. The categories chosen were '3 = Complete survey or a statistically robust estimate', '2 = Estimate based on partial data with some extrapolation and/or modelling', '1 = Estimate based on expert opinion with no or minimal sampling' or '0 = Absent data'.

The category of method used reported for the UK was based on the categories chosen by the Country Agencies, weighted by the proportion of the species population within SACs in each country. For example the category chosen by a country containing 600 individuals in its SACs would have more weight than the category chosen by a country containing 250 individuals in its SACs.

3.7.2. Population trends

Each country within the UK estimated the population trend (stable, increasing, decreasing or unknown) within SACs in their country. Their estimates were generally based on data collected through the Common Standards Monitoring Scheme/ Site Condition Monitoring scheme. To get an overall UK trend within SACs the trend categories chosen by the Country Agencies were weighted by the population estimate within SACs for that country, and then combined. A trend of 'stable' combined with a trend of 'increasing' or 'decreasing' generally resulted in an overall 'increase' or 'decrease' trend being reported rather than stable. However, if less that 5% resource showed a trend but the rest reported stable, the UK trend was judged on a case by case basis to consider whether this was sufficient to sway the overall UK trend. The following factors were considered: the proportion of the SAC resource associated with the trend, the magnitude of the trend, the confidence the country agency had in reporting the trend, the ecology of the species, and any other comments from the country conservation agencies. If a country (or countries) with over 50% of the SAC resource reported the trend as 'unknown' then the overall UK trend was reported as 'unknown'.

Appendix 1: General evaluation matrix for assessing conservation status of a habitat – taken from Annex E of the Explanatory Notes & Guidelines provided to EU Member States for the 2007-2012 Article 17 Reporting

Parameter	Conservation Status			
	Favourable ('green')	Unfavourable – Inadequate ('amber')	Unfavourable - Bad ('red')	Unknown (insufficient information to make an assessment)
Range	Stable (loss and expansion in balance) or increasing AND not smaller than the 'favourable reference range'	Any other combination	Large decrease: Equivalent to a loss of more than 1% per year within period specified by MS OR More than 10% below 'favourable reference range'	No or insufficient reliable information available
Area covered by habitat type within range	Stable (loss and expansion in balance) or increasing AND not smaller than the 'favourable reference area' AND without significant changes in distribution pattern within range (if data available)	Any other combination	Large decrease in surface area: Equivalent to a loss of more than 1% per year (indicative value MS may deviate from if duly justified) within period specified by MS OR With major losses in distribution pattern within range OR More than 10% below 'favourable reference area'	No or insufficient reliable information available
Specific structures and functions (including typical species)	Structures and functions (including typical species) in good condition and no significant deteriorations / pressures.	Any other combination	More than 25% of the area is unfavourable as regards its specific structures and functions (including typical species)	No or insufficient reliable information available
Future prospects (as regards range, area covered and specific structures and functions)	The habitats prospects for its future are excellent / good, no significant impact from threats expected; long-term viability assured.	Any other combination	The habitats prospects are bad, severe impact from threats expected; long-term viability not assured.	No or insufficient reliable information available
Overall assessment of CS	All 'green' OR three 'green' and one 'unknown'	One or more 'amber' but no 'red'	One or more 'red'	Two or more 'unknown' combined with green or all "unknown'

Appendix 2: General evaluation matrix for assessing conservation status of a species – taken from Annex C of the Explanatory Notes & Guidelines provided to EU Member States for the 2007-2012 Article 17 Reporting

Parameter	Conservation Status			
	Favourable ('green')	Unfavourable – Inadequate ('amber')	Unfavourable - Bad ('red')	Unknown (insufficient information to make an assessment)
Range	Stable (loss and expansion in balance) or increasing AND not smaller than the 'favourable reference range'	Any other combination	Large decline: Equivalent to a loss of more than 1% per year within period specified by MS OR more than 10% below favourable reference range	*No or insufficient reliable information available*
Population	Population(s) not lower than 'favourable reference population' AND reproduction, mortality and age structure not deviating from normal (if data available)	Any other combination	Large decline: Equivalent to a loss of more than 1% per year (indicative value MS may deviate from if duly justified) within period specified by MS AND below 'favourable reference population' OR More than 25% below favourable reference population OR Reproduction, mortality and age structure strongly deviating from normal (if data available)	*No or insufficient reliable information available*
Habitat for the species	Area of habitat is sufficiently large (and stable or increasing) AND habitat quality is suitable for the long term survival of the species	Any other combination	Area of habitat is clearly not sufficiently large to ensure the long term survival of the species OR Habitat quality is bad, clearly not allowing long term survival of the species	*No or insufficient reliable information available*
Future prospects (as regards to population, range and habitat availability)	Main pressures and threats to the species not significant; species will remain viable on the long-term	Any other combination	Severe influence of pressures and threats to the species; very bad prospects for its future, long-term viability at risk.	*No or insufficient reliable information available*
Overall assessment of CS	All 'green' OR three 'green' and one 'unknown'	One or more 'amber' but no 'red'	One or more 'red'	Two or more 'unknown' combined with green or all "unknown"

Appendix 3: List of codes and short descriptions for the pressures and threats used for UK reporting – adapted from the list provided to EU Member States for the 2007-2012 Article 17 Reporting

A	Agriculture
A01	Cultivation, including increase of agricultural area
A02	Modification of cultivation practices, including agricultural intensification, crop change, grassland removal for arable land, installation of perennial non-timber crops
A03	Mowing / cutting of grassland, including intensive mowing or intensification, non intensive mowing, abandonment / lack of mowing
A04	Grazing, including all types of intensive livestock/mixed animal grazing, all types of non-intensive livestock/mixed animal grazing, abandonment of pastoral systems, and lack of grazing
A05	Livestock farming and animal breeding (without grazing), including animal breeding, stock feeding, lack of animal breeding
A06	Annual and perennial non-timber crops, including all types of crops for food production/intensification, biofuel-production, abandonment of crop production
A07	Use of biocides, hormones and chemicals
A08	Fertilisation
A09	Irrigation, including (temporary) transition from dry to mesic or wet conditions due to irrigation
A10	Restructuring agricultural land holding, including removal of hedges and copses or scrub, removal of stone walls and embankments
A11	Agriculture activities not referred to above
B	Forestry
B01	Forest planting on open ground, including planting (e.g. on grassland, heathland), with native trees or non-native trees, resulting in increase in forest area
B02	Forest and plantation management and use, including all types of forest replanting with native or non-native trees, forestry thinning, clearance, and clear-cutting, removal of all trees, forest undergrowth, dead and dying trees, and non-intensive timber production (leaving dead wood/ old trees),
B03	Forest exploitation without replanting or natural regrowth, resulting in decline of forest area
B04	Use of biocides, hormones and chemicals (forestry)
B05	Use of fertilizers (forestry)
B06	Grazing in forests/ woodland
B07	Forestry activities not referred to above (e.g. erosion due to forest clearing, fragmentation)
C	Mining, extraction of materials and energy production
C01	Mining and quarrying, including all types of sand, gravel, soil extraction/quarrying, peat extraction/cutting, all types of mining (open cast, underground), salt works, abandonment/conversion of saltpans, geotechnical survey, and any other mining and extraction activities
C02	Exploration and extraction of oil or gas, including all types of exploration, production and jack-up drilling, rig and shipping
C03	Renewable abiotic energy use, including all types of geothermal power, solar energy, wind energy and tidal energy production
D	Transportation and service corridors
D01	Roads, paths and railroads, including all types of paved, tarred and non-metalled surfaces, cycling tracks, car parks, railway lines, bridges, viaducts and tunnels
D02	Utility and service lines, including all types of electricity, phone lines, pipe lines, communication masts and antennas, and other forms of energy transport
D03	Shipping lanes, ports, marine constructions, including port areas, slipways, piers/tourist/fishing harbours, industrial ports, canals, cargo lanes (acoustic disturbance) and ferry lanes (vessel collisions), and marine constructions
D04	Airports, aerodromes, heliports, flight paths
D05	Improved access to site
D06	Other forms of transportation and communication
E	Urbanisation, residential and commercial development
E01	Urbanised areas, human habitation, including all patterns forms of urbanisation/habitation
E02	Industrial or commercial areas, including factories, storage areas, shopping centres, and other

	industrial / commercial areas
E03	Discharges, including disposal of household, industrial and inert waste, and other discharges including coastal sand supplementation and beach nourishment
E04	Structures and buildings in the landscape, including agricultural structures, military constructions, and other types of structure (but not related to transport, e.g. airports, see D)
E05	Storage of materials
E06	Other urbanisation, industrial and similar activities, including demolishment of buildings & human structures (e.g. bridges, walls), and renovation of buildings
F	Biological resource use other than agriculture & forestry
F01	Marine and freshwater aquaculture, including intensive fish farming, intensification, suspension culture (e.g. mussels, seaweed, fish), and bottom culture (e.g. shellfish)
F02	Fishing and harvesting aquatic resources (includes effects of bycatch/accidental catch), including professional passive fishing (e.g. potting, netting, longlining), professional active fishing (benthic or demersal trawling, pelagic trawling/drift-net fishing, demersal and purse seining), and leisure fishing (other than bait-fishing – including bait digging/collection, pole/spear-fishing, benthic dredging)
F03	Hunting and collection of wild animals (terrestrial), including damage caused by game (excessive density), and taking/removal of terrestrial animals (including collection of insects, reptiles, amphibians, birds of prey, etc., trapping, poisoning, poaching, predator control, accidental capture (e.g. due to fishing gear), etc.)
F04	Taking/removal/collection of terrestrial plants in general, including wildflowers , fungi, lichens, berries, etc.
F05	Illegal taking/ removal of marine fauna, including dynamiting (damage to rocky substrates like reefs, disturbance to marine mammals), date mussel-fishing (damage to rocky substrates and benthic communities), poisoning (damage to coastal fish-fauna), poaching (e.g. marine turtles), shooting (e.g. marine mammals), removal for collection purposes (e.g. marine invertebrates), and other methods (i.e. drift nets)
F06	Hunting, fishing or collecting activities not referred to above (e.g. harvesting of shellfish)
G	Human intrusions and disturbances
G01	Outdoor sports and leisure activities, recreational activities, including all nautical sports (e.g. jet-skiing, wind-surfing) walking, horse-riding and non-motorised vehicles, motorised vehicles, mountaineering, rock climbing, caving (terrestrial & marine), gliding, delta plane, paragliding, ballooning, skiing, off-piste, scuba-diving, snorkelling (e.g. disturbing seals and nesting birds), and other outdoor sports and leisure activities
G02	Sport and leisure structures, including golf course, skiing complex, stadium, attraction park, sports pitch, camping and caravans, wildlife watching (e.g. bird/whale watching), and other sport/leisure complexes
G03	Interpretative centres
G04	Military use and civil unrest, including military training and abandonment of military use
G05	Other human intrusions and disturbances, including trampling, overuse, shallow surface abrasion/mechanical damage to seabed surface (e.g. by scubadivers/ snorkelers), disturbance of the seabed (e.g. by anchoring/mooring on reefs), vandalism, intensive maintenance of public parks, cleaning of beaches, tree surgery, felling for public safety, removal of roadside trees, missing or wrongly directed conservation measures, closures of caves or galleries, fences, fencing, overflying with aircrafts (agricultural), death or injury by collision (e.g. marine mammals)
H	Pollution
H01	Pollution to surface waters (limnic & terrestrial, marine & brackish), including pollution by industrial plants, storm overflows, or other point sources, and diffuse pollution to surface waters via storm overflows or urban run-off, due to agricultural and forestry activities, transport and infrastructure, abandoned industrial sites, household sewage, waste waters or other sources
H02	Pollution to groundwater (point sources and diffuse sources), including from leakages from contaminated sites, waste disposal sites, oil industry infrastructure, mine water, disposal of contaminated water to soakaways, agricultural and forestry activities, septic tanks and urban land use
H03	Marine water pollution – specific to marine and brackish waters, including oil spills in the sea, toxic chemical discharge from material dumped at sea (harming e.g. marine mammals, birds, reptiles) including heavy metals, hydrocarbons, produced water, pesticides, antifoulants, pharmaceuticals, radioactive materials, other substances (e.g. liquid, gas), and marine macro-

	pollution (i.e. plastic bags, Styrofoam) resulting in e.g. accidental ingestion by marine turtles, mammals, marine birds
H04	Air pollution/air-borne pollutants, including acid rain, nitrogen-input, and other air pollution
H05	Soil pollution and solid waste (excluding discharges), including garbage and solid waste
H06	Excess energy, noise nuisance/noise pollution, light pollution, thermal heating of water bodies (limnic, brackish or marine), electromagnetic changes (e.g. in marine environment), and seismic exploration/explosions/geophysical surveys
H07	Other forms of pollution
I	Invasive, other problematic species and genes
I01	invasive non-native species (plant & animal species)
I02	problematic native species
I03	introduced genetic material, GMO (animals and plants)
J	Natural system modifications
J01	Fire and fire suppression, including burning existing vegetation, supression of natural fires, lack of fires
J02	Human induced changes in hydraulic conditions, including: · landfill, land reclamation and drying out (polderisation, reclamation of land from sea, estuary or marsh, infilling of ditches, dykes, ponds, pools, marshes or pits, re-cultivation of mining areas) · removal of sediments (mud, etc.), including dredging/ removal of limnic sediments, and estuarine and coastal dredging · canalisation & water deviation · flooding modifications, including flooding and lack of flooding · modification of hydrographic functioning, including modification of water flow (tidal and marine currents), structures of inland water courses, standing water bodies (e.g. creation of fish ponds), reservoirs, small hydropower projects, weirs, and wave exposure changes · water abstractions from surface waters, including surface water abstractions for agriculture, public water supply, by manufacturing industry, for the production of electricity (cooling), by fish farms, hydro-energy, quarries/open cast sites, for navigation, water transfer, and · other major surface water abstractions · water abstractions from groundwater, including for agriculture, public water supply, by industry, quarries/open cast (coal)sites, and other major groundwater abstractions · raising the groundwater table /artificial recharge of groundwater, including discharges to groundwater for artificial recharge purposes, returns of groundwater, mine water rebound, and other major groundwater recharge · saltwater intrusion of groundwater · management of aquatic and bank vegetation for drainage purposes · siltation rate changes, dumping, depositing of dredged deposits · dykes, embankments, artificial beaches, including sea defence or coast protection works, tidal barrages, dykes and flooding defence in inland water systems · abandonment of management of water bodies · altered water quality due anthropogenic changes in salinity (marine and coastal waters, e.g. algal growth on reefs) · other human induced changes in hydraulic conditions
J03	Other ecosystem modifications, including reduction or loss of specific habitat features including prey availability, anthropogenic reduction of habitat connectivity (fragmentation) (including reduction in migration/migration barriers, dispersal and genetic exchange), reduction/lack or prevention of erosion , and applied (industrial) destructive research (e.g. marine scientific research in a broad sense)
K	Natural biotic and abiotic processes (without catastrophes)
K01	Abiotic natural processes – slow forms, including erosion, silting up, drying out, submersion, soil salinization
K02	Biocenotic evolution/succession, including scrub invasion, successional species change, accumulation of organic material, natural eutrophication and acidification
K03	Inter-specific animal relations, including animal competition (e.g. gulls), parasitism, disease/pathogens, predation, antagonism arising from introduction of species/domestic animals, and other forms of animal competition
K04	Inter-specific floral relations, including competition, parasitism, disease/pathogens, lack of

	pollinating agents, damage by herbivores (including game species)
K05	Reduced fecundity/genetic depression (e.g. due to low population size), both plants and animals
K06	Other forms or mixed forms of inter-specific floral competition
L	Geological events, natural catastrophes
L01	Volcanic activity
L02	Tidal wave, tsunamis
L03	Earthquake
L04	Avalanche
L05	Collapse of terrain, landslide
L06	Underground collapses
L07	Storm, cyclone
L08	Inundation (natural processes)
L09	Fire (natural)
L10	Other natural catastrophes
M	Climate change
M01	Changes in abiotic conditions, including temperature changes, droughts and reduced precipitation, flooding and increased precipitation, and changes in acidity, water flow (limnic, tidal and oceanic), wave exposure and sea-level
M02	Changes in biotic conditions, including change in habitat, de-synchronisation of processes, species decline or extinction, and species migration (natural newcomers)
X	No threats or pressures
XO	Threats and pressures from outside the Member State
XE	Threats and pressures from outside the EU territory
U	Unknown threat or pressure

Appendix 4: List of codes and descriptions for the conservation measures used for UK reporting – based on the list provided to EU Member States for the 2007-2012 Article 17 Reporting

Code	Measure	Examples
1. No measures		
1.1	No measures needed for the conservation of the habitat/species	
1.2	Measures needed, but not implemented	
1.3	No measure known/ impossible to carry out specific measures	Species migrations, habitat changes due to climate change, glacier retreat, monitoring changes without intervention
2. Measures related to agriculture and open habitats		
2.0	Other agriculture-related measures	
2.1	Maintaining grasslands and other open habitats	Mowing, burning, grazing, removal/control of shrubs and other woody plants
2.2	Adapting crop production	Adapting input of nutrients and pesticides/herbicides; adapting crop timing (advance/delay harvest dates)
3. Measures related to forests and wooded habitats		
3.0	Other forestry-related measures	
3.1	Restoring/improving forest habitats	Replanting with autochthonous species, enable/promote natural re-growth, removing non-natives species, change single species and even-aged stands into multi-species and uneven-aged stands, burning/maintaining a fire regime
3.2	Adapt forest management	Adapting harvesting cycles, adapting techniques and equipment
4. Measures related to wetland, freshwater and coastal habitats		
4.0	Other wetland-related measures	Restoring alluvial situations,
4.1	Restoring/improving water quality	Reducing pollutants in water
4.2	Restoring/improving the hydrological regime	Restoring river dynamics, removal of barriers and artificial margins, managing water levels (e.g. in bogs and mires)
4.3	Managing water abstraction	Managing periods and/or quantity of water abstracted for irrigation, energy production
4.4	Restoring coastal areas	Stabilisation of dunes, re-establishing dune dynamics, removing coastal infrastructures
5. Measures related to marine habitats		
5.0	Other marine-related measures	
5.1	Restoring marine habitats	Controlling invasive species, favouring re-establishment of natural communities
6. Measures related to spatial planning		
6.0	Other spatial measures	
6.1	Establish protected areas/sites	
6.2	Establishing wilderness areas/ allowing succession	No intervention after calamities, natural catastrophic events, succession where no management is necessary
6.3	Legal protection of habitats and species	Legal habitat type protection (regardless where they occur, also outside protected areas), strictly legally protected species including their habitats
6.4	Manage landscape features	Maintenance or creation of hedges, tree lines, corridors

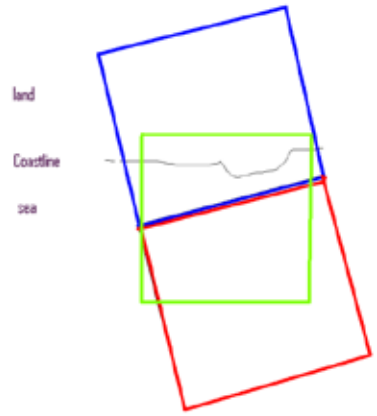
Code	Measure	Examples
6.5	Adaptation/ abolition of military land use	Nature management on military training grounds, abolition of military use
7. Measures related to hunting, taking and fishing and species management		
7.0	Other species management measures	
7.1	Regulation/ Management of hunting and taking	Regulation of hunting (periods, species), collection permits for plants, berries etc., regulation of game density
7.2	Regulation/ Management of fishery in limnic systems	Regulation of amount, fish species & catching methods allowed, removal of certain fish species, control of measures for enhancing fish production, maintenance of traditional fish pond systems
7.3	Regulation/ Management of fishery in marine and brackish systems	Adapting fishing techniques and equipment, including mussel fishery management
7.4	Specific single species or species group management measures	
8. Measures related to urban areas, industry, energy and transport		
8.0	Other measures	
8.1	Urban and industrial waste management	
8.2	Specific management of traffic and energy transport systems	Measures to reduce collision, maintenance of semi natural roadsides, protection of birds on high voltage systems, regulations to manage traffic density
8.3	Managing marine traffic	Managing routes, boat speed,
9. Measures related to special resource use		
9.0	Other resource use measures	
9.1	Regulating/Management exploitation of natural resources on land	Management of quarries with amphibians, wind exploitation
9.2	Regulating/Managing exploitation of natural resources on sea	Managing oil, gas, gravel/sand, wind exploitation on sea

Appendix 5: Method to convert distribution/range data from GB/Ireland grid to European standard ETRS grid

The EC Reporting Guidelines required that distribution and range maps were submitted using the European standard ETRS grid (LAEA 5210 projection). This involved converting the UK terrestrial habitats and species 10-km square distribution and range maps into the ETRS grid, as these had been compiled using the GB national grid for Great Britain and the Ireland national grid for Northern Ireland.

Distribution data

For the UK 10-km square distribution data, this conversion involved selecting which of the 10-km ETRS squares had the maximum overlap with the corresponding GB/Ireland grid square. This is illustrated by the figure below.

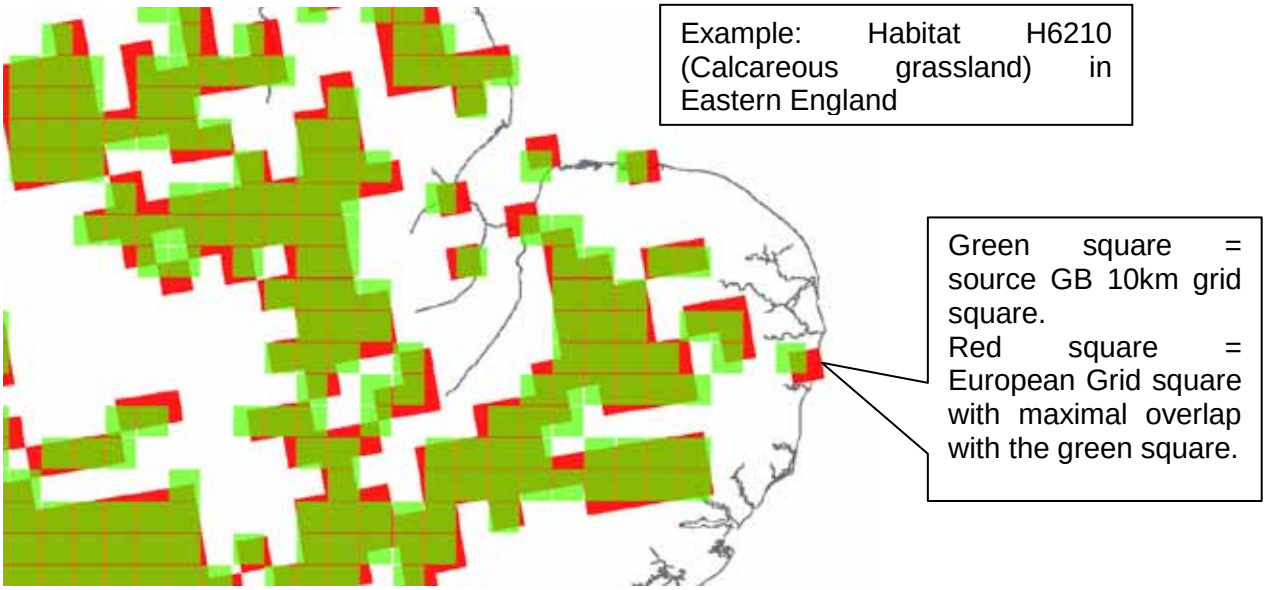


In this case, the source GB grid square is shown in green, and the potential ETRS squares to which it could match are shown in blue and red (note these are meant to be the same size as the green square). The green square overlaps with the red square to a greater extent than the blue square, so the green square was converted to the red ETRS square. For some coastal features that occurred above high water, this resulted in ETRS squares that were left isolated in the sea by a few km. This applied to a small percentage of coastal squares, mainly those where the coast only occupied a small proportion of the GB grid square as in the above example.

In some cases, two original adjacent GB/Ireland grid squares matched to the same ETRS square. This produced ETRS maps with a slightly lower number of squares compared with the GB/Ireland source maps (typically 1 or 2% less where the square count exceeded 100 source squares). This minor reduction in the square count was considered preferable to the alternative of reporting every 10-km ETRS square that overlapped with each source square (using this 'intersection' method would have resulted in one isolated 10-km GB/Ireland square generating four ETRS squares).

An example of the conversion from GB to ETRS distribution squares is illustrated below for H6210 in Eastern England.

Finally, it is important to note that any comparison between the 2013 and 2007 10-km distribution squares data should be based on the GB/Ireland national grid data, rather than the ETRS grid data.



Range data

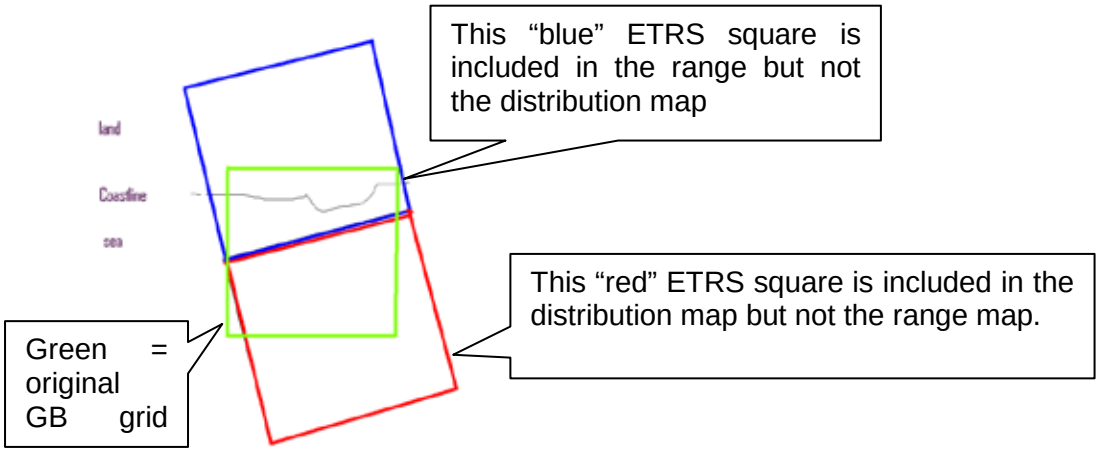
The UK terrestrial habitat and species range maps mostly took the form of a set of irregularly shaped polygons, clipped to the coastline. This is illustrated below.

Example UK Range Map – the range area is covered by the blue shading (note how the range is clipped to the coastline)

These maps were converted to the European standard grid by simply intersecting the UK range map area with the ETRS 10-km grid. This resulted in a 10-km square blocked map, which often had a calculated range area considerably in excess of the UK range map area (the latter was the value reported to the EC). This was particularly the case with habitat/species with range areas in:

a) the Scottish Hebrides;
b) thin strips around the coast (e.g. sand dune habitats) – in each case the whole of the ETRS 10-km square was included, whereas the UK Range Tool clipped the range to the coastline;
c) habitat/species that had a significant proportion of isolated GB/Ireland grid squares – one isolated source square generated four ETRS squares.

In a few cases, the range map conversion resulted in ETRS distribution squares being left outside the series of ETRS range squares. This is illustrated by the figure below.



In this case, the ETRS distribution square that corresponded best to the green GB grid square is shown in red. However, the starting point for calculating the ETRS range map was the polygon that had been clipped to the coast – note that this is on the landward side of the coast and intersected with the blue ETRS square. As a result, the red ETRS distribution square was left outside the series of ETRS range squares. This anomaly affected a small proportion of coastal 10-km grid squares.

As with the distribution maps, it is important to note that any comparison between the 2013 and 2007 range maps, as well as the range surface area, should be based on the GB/Ireland national range data rather than the ETRS data.

Appendix 6: Method for the assessment of air pollution impacts in the UK's conservation status assessments for Article 17 reporting

1. Introduction

1.1. Air pollution, and in particular nitrogen deposition, has caused has caused widespread negative effects on UK terrestrial biodiversity (Emmett *et al*, 2011, ROTAP, 2012). The impacts include reduced occurrence of a range of plant species and changes in ecosystem structure and function (Emmett *et al*, 2011).

1.2. Air pollution (code H04) is included in the list of "Pressures' to current Structure and Function and "Threats" to Future Prospects in Article 17 guidance.

1.3. This paper explains the methodology which was used by the UK for air pollution assessment for Article 17 reporting for Annex I habitats.

1.4. An overview of the approach is given in Section 2. The full method for terrestrial habitats for which critical loads are available is described in section 3. Annex 1 provides background to, and a rationale for, the method and the sources of data. Annex 2 provides details of the country submissions and methods.

2. Summary of approach

2.1. The air pollution assessment was primarily based on the use of national assessments of extent of critical load exceedance.

2.2. The potential sensitivity of all Annex I habitats to atmospheric deposition has been considered. For sensitive habitats, a 'relevant' critical load for nutrient nitrogen and acidity has been assigned where there is adequate correspondence between the Annex I habitat and a EUNIS class or broad habitat respectively, for which critical loads have been established. Exceedance of nutrient nitrogen critical loads was then used as the basis for identification of "air pollution" (H04) as a pressure or threat and scored High, Medium or Low depending on the per cent area of habitat exceeding the nutrient nitrogen critical load. Data on exceedance of acidity critical loads was used to identify whether acidification should be recorded as a pollution qualifier. The nitrogen critical loads exceedance data were used together with site-condition data to inform the conclusion of the assessment for Structure and Function and Future Prospects, according to the approach detailed in section 3.

2.3. Habitats which are not sensitive to atmospheric deposition or which do not have a 'relevant' critical load were omitted from the critical load-based assessments for Article 17. Annex 1 (table A2) provides details of which habitats are excluded because a) they are not sensitive or b) they are potentially sensitive but no 'relevant' critical load is available. For the latter, where available, other evidence was used to identify air pollution as a pressure or threat.

2.4. This assessment has been carried out for terrestrial Annex I habitats only. It is considered that the critical loads approach is not appropriate for Annex II species in this context. For sensitive species, where available, other evidence was used to identify air pollution as a pressure or threat.

2.5. For freshwater habitats (and freshwater species) acidification impacts are considered explicitly in site-level condition monitoring and an additional critical loads based assessment, as for terrestrial habitats, is not required. Nitrogen deposition is recognised as a risk to some softwater oligotrophic lake types in remote areas and nutrient nitrogen

critical loads are available for some Annex I types. Site specific consideration is required concerning their application in order to consider N/P limitation, other sources of nitrogen input and altitude, which all influence choice of critical load. They are therefore excluded from this national critical loads based assessment (see Annex I), but other evidence from condition assessment may be drawn upon to identify air pollution as a pressure/threat.

2.6. It is not possible at this stage to undertake a full risk assessment of ozone impacts on individual habitats. However, the pollutant is recognised as risk to many sensitive habitats across the UK (Morrissey *et al*, 2007).

3. Method in Detail

Structure and Function parameter

3.1. Relevant critical loads for nutrient nitrogen and acidity were assigned to sensitive Annex I habitats (see Annex 1 for details of methods). Some habitats were excluded (see table A2) because a) they are not sensitive or b) they are potentially sensitive but no 'relevant' critical load is available. For the latter, where available, other evidence was used to identify air pollution as a pressure or threat and this is recorded in the country-level reporting information.

3.2. The statutory country nature conservation agencies submitted data on exceedance of nutrient nitrogen critical loads for "current" day (see Annex 2 for details of methods). These were aggregated on an area weighted basis to provide an estimate of the per cent area exceeded of the Annex I habitat resource in the UK.

3.3. Critical load exceedance for acidity was based on the Site Relevant Critical Loads database (see Annex 1). This provided an estimate of the per cent area exceeded in 2005 of the Annex I habitat resource in Special Areas of Conservation (SACs) in the UK.

3.4. Nutrient nitrogen critical load exceedance data for "current deposition" was used to identify "H04 Air Pollution" as a pressure and it was scored as High, Medium or Low based on:
- >25% area of habitat exceeds nutrient N critical loads – High;
- 5-25%, area of habitat exceeds nutrient N critical loads – Medium;
- <5%, area of habitat exceeds nutrient N critical loads – Low.

3.5. Where this resulted in the pressure H04 Air Pollution being recorded, "N" was recorded as a pollution qualifier. In this case, "A" was also recorded as a pollution qualifier if the per cent habitat area exceeding acid critical load >5%. Apart from the pollution qualifier, acidity critical load exceedance was not used to inform the outcome of the assessment. In some cases nitrogen impacts are considered to consequently cause another listed pressure (e.g. species change), in this case "N" was recorded as a pollution qualifier with that pressure too.

3.6. Critical load exceedance was not used to influence the outcome of the structure and function assessment.

3.7. The resulting assessment matrix for structure and function is summarised below. The pressure "Air Pollution" does not affect the outcome.

Assessment matrix showing conclusions used for Structures & Function parameter in relation to CSM results and air pollution pressure

	% of area in unfavourable condition as assessed by CSM site condition data		
	<5%	**5-25%**	**> 25%**
Pressure from Air Pollution = L or none	Favourable	Unfavourable-Inadequate	Unfavourable-bad
Pressure from Air Pollution = M			
Pressure from Air Pollution = H			

3.8. Where structure and function is judged as unfavourable (- bad or -inadequate) there is a requirement to add a "status qualifier" as to whether this is improving, stable, declining or unknown. Site condition data were used to determine whether the relative balance between the amount of habitat recorded as unfavourable recovering and unfavourable declining were:

- § improving (more recovering);
- § declining (more declining);
- § stable (about equal);
- § unknown.

3.9. However, site condition assessment has not adequately reflected the impacts of nitrogen deposition. Consequently, to take specific account of the impacts of nitrogen deposition, the amount of habitat that was recorded as '*unfavourable recovering'* and '*unfavourable no change/unclassified'* was reduced proportionally by the percentage area of habitat where the nutrient nitrogen critical load is exceeded (based on 'current' deposition). This proportion of the habitat will instead be treated as '*unfavourable no change'* or '*unfavourable declining'* respectively.

3.10. Some habitats are potentially sensitive to impacts from nitrogen deposition but there is not a relevant critical load to apply to them. In such cases, in their assessment the country agencies may have identified air pollution (H04) as a pressure based on other evidence, or using expert judgement to apply a suitable critical load. These are excluded from the approach set out above and are considered in the same way as other pressures.

Future Prospects parameter

3.11. The statutory nature conservation agencies submitted data on exceedance of nutrient nitrogen critical loads for a "2020" forecast (see Annex 2 for details of methods). These were aggregated on an area weighted basis to provide an estimate of the per cent area exceeded of the Annex I habitat resource in the UK.

3.12. Critical load exceedance for acidity was based on the Site Relevant Critical Loads database (see Annex 1). This provided an estimate of the per cent area exceeded in 2020 of the Annex I habitat resource in Special Areas of Conservation (SACs) in the UK.

3.13. Nutrient nitrogen critical load exceedance data for 2020 deposition was used to identify "H04 Air Pollution" as a threat and scored High, Medium or Low based on:

- § >25% area of habitat exceeds nutrient N critical loads – High;
- § 5-25%, area of habitat exceeds nutrient N critical loads – Medium;
- § <5%, area of habitat exceeds nutrient N critical loads – Low.

3.14. Where this resulted in the threat H04 Air Pollution being recorded, “N” was recorded as a pollution qualifier. In this case, “A” was also recorded as a pollution qualifier if the per cent habitat area exceeding acid critical load >5%. Apart from the pollution qualifier, acidity critical load exceedance was not used to inform the assessment outcome.

3.15. The future prospects conclusion is based on the percentage of habitat that is expected to be in favourable condition in c.2025, i.e. the habitat area that is currently assessed as favourable and the habitat area that is currently assessed as unfavourable-recovering.
- <75% likely to be in favourable condition in 2025 = unfavourable-bad prospects.
- 75-95% likely to be in favourable condition in 2025 = unfavourable-inadequate prospects
- >95%, likely to be in favourable condition in 2025 = favourable prospects

3.16. However, as site condition assessment does not adequately attribute the impacts of nitrogen deposition on future condition, nitrogen critical load exceedance was used to inform the outcome for the Future Prospects (of structure and function). The area of habitat which is unfavourable recovering was proportionally reduced by the predicted level of nitrogen critical load exceedance in 2020, and this area was then added to the future-unfavourable category.

3.17. In addition, a rule is included to treat all habitats with a HIGH threat from air pollution as having at least 25% in the future-unfavourable category. So this results in all habitats with a HIGH threat from N deposition having a conclusion of unfavourable bad future prospects, i.e. implying that at least 25% will be future-unfavourable.

3.18. In addition, the outcome of the air pollution assessment was used to inform the ‘status qualifier’ when Structure and Function is judged as unfavourable (bad or inadequate); i.e. improving, declining, stable or unknown. The Future Prospects status qualifier is based on the difference between the percentage of habitat that is currently assessed as favourable and that in c.2025 (after accounting for air pollution impacts by proportionally reducing the areas in future favourable as above). If the overall amount of favourable habitat looked set to:
- increase, then it was concluded to be improving;
- decrease, then it was concluded to be declining;
- remain about equal, then it was concluded to be stable;
- is unknown, it was concluded to be unknown.

3.19. However, an additional rule is included to specifically take account of the predicted change in the impacts of nitrogen deposition by 2020: the condition status qualifier will always be assessed as declining when the area of nutrient nitrogen critical load exceedance is predicted to increase by at least 5%. (This affects two habitats only).

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Annex 1 to the method for the assessment of air pollution impacts in the UK's conservation status assessments for Article 17 reporting

Detailed description of the method, data sources and technical justification

This section provides information on the critical loads and deposition data used for the assessment and a rationale and justification for the method proposed, including how acid deposition is taken into account.

1. Context of the approach

1.1. There is widespread exceedance of critical loads across the UK. There is also an increasing evidence base showing nitrogen deposition impacts on vegetation in the UK. Emmett *et al* (2011) reviewed the evidence of impacts on vegetation and concluded that nitrogen deposition is a major threat to biodiversity in the UK. For example, there is UK field evidence of nitrogen impacts (e.g. from targeted survey or broad-scale survey) for acid and calcareous grassland, bogs, heathland, montane, woodland and sand dunes (Emmett *et al*, 2011; Stevens *et al*, 2011, RoTAP, 2012). It is recognised that for some habitats there is limited UK evidence. However, the evidence supports the use of nitrogen critical loads exceedance as an indication of where effects are likely.

1.2. Despite this evidence, air pollution is rarely reported as an adverse factor contributing to unfavourable condition of individual SACs. In many cases, it is possible that air pollution could be a contributory cause of unfavourable condition, but other factors have been recorded as the cause. Therefore, the reporting of condition of SAC sites, based on Common Standards Monitoring (CSM), underplays the importance and threat from air pollution.

1.3. Noting the evidence of nitrogen impacts (Emmett *et al*, 2011, ROTAP, 2012) and that current site-level monitoring often fails to attribute impacts to air pollution, it is proposed, that in future, for site-level condition assessment, nitrogen critical loads exceedance will be used to help attribute air pollution as a cause of unfavourable condition where a habitat is failing attributes which are sensitive to nitrogen deposition. The statutory nature conservation bodies are establishing an implementation plan for this work.

1.4. In respect of Article 17 reporting, typical air pollution loads in the UK are mostly likely to affect the parameters "Structure and Function" and "Future Prospects". The assessment of these parameters is based on habitat condition data (principally CSM). However, the approach for incorporating nitrogen deposition in site-level monitoring as outlined above has not yet been implemented. Therefore, for the current Article 17 report, it is necessary to use critical loads exceedance for the habitat resource in an additional assessment, noting this is not yet integrated with individual site assessments.

1.4.1. Critical load exceedance for "current" deposition will be used to inform whether air pollution is recorded as pressure to current structure and function. It will not affect the conclusion of the assessment which is based on the proportion of habitat in favourable condition. However, nitrogen critical load exceedance will inform the 'status qualifier' which indicates if unfavourable status is improving or declining.

1.4.2. Critical load exceedance predicted for 2020 will be used to inform whether air pollution is recorded as a threat to future prospects. It will inform the conclusion of the assessment, in accordance with principles for site level assessment. Therefore, for a habitat where nitrogen critical load exceedance in 2020 is predicted to be widespread, future prospects will be reported as unfavourable, even where based on CSM alone it is deemed to have future favourable.

2. Ozone

2.1. Ozone is recognised as an important gaseous air pollutant in terms of regional scale impacts on vegetation. In a study commissioned by JNCC, Morrissey *et al*., 2007 reviewed the impacts of ozone, focussing on BAP Priority Habitats. The study showed there is a significant threat to sensitive habitats and plant species in the UK. However, the implications of current and future ozone exposure on Annex I habitats has not been assessed and at present, it is not possible to undertake an assessment of the threat specifically for individual Annex I habitats.

3. Species

3.1. A specific air pollution assessment, based on critical loads, will not be included for species because critical loads are only established for habitats, not individual species. Where air pollution is known to be having current impacts on species these will have been highlighted in CSM. However, it is acknowledged that relating cause and effect is extremely challenging and air pollution impacts may be under-reported.

4. Freshwaters and freshwater species

4.1. Acidification remains an issue for some freshwater habitats in some areas of the UK. The lakes CSM guidance includes an attribute for ANC and pH is included for rivers. Therefore, current acidification impacts on the structure and function of lake and river habitats should be picked up through use of condition data and air pollution will be recorded as a factor causing unfavourable condition where sites are failing for this attribute. This information was used to inform the inclusion of air pollution as a pressure/threat in Article 17 reporting, and treated in the same way that other pressures/threats were considered.

4.2. Nitrogen deposition is increasingly recognised as a threat to some remote upland softwater oligotrophic lakes. Critical loads for nutrient nitrogen are available for some lake types within Annex I types H3110, H3130, H3160.

4.3. There are no attributes in CSM guidance directly relevant to nitrogen impacts. Critical load exceedance data is available for features within SACs and will be made available for use by countries collating data on condition and pressures/threats for these freshwater habitats. However, site specific consideration will be necessary for the application of the critical loads and so generic application of the criteria used for terrestrial habitats is not directly transferable to freshwaters.

5. Data on Critical loads and exceedance

5.1. Methodologies for calculating critical loads are established under the auspices of the Convention on Long Range Transboundary Air Pollution (CLRTAP). The UK critical loads National Focal Centre (NFC) maps critical loads and exceedance for broad habitats in the UK.

5.2. Critical loads for nutrient nitrogen are based on experimental and field evidence of impacts. They have been assigned to sensitive habitats (for which empirical evidence is available) as defined under the EUNIS habitat classification.

5.3. An exercise has been carried out in the UK to assign 'relevant' nitrogen critical loads and acidity critical loads to Annex I habitats based on correspondence between habitat types according to JNCC habitat correspondence tables (see SNIFFER 2007 and Bealey *et al* 2011 for details). This information is contained in the Site Relevant Critical Loads Database (www.apis.ac.uk; Bealey *et al*, 2011). This has considered the potential

sensitivity of all Annex I habitats to nutrient nitrogen deposition and acid deposition and where possible assigned a "relevant' critical load. This is where there is adequate equivalence of the Annex I habitat type with a EUNIS class/or BAP Broad Habitat for which critical loads are assigned, for nutrient nitrogen and acidity respectively. These critical loads form the basis of the air pollution assessment Article 17 reporting.

5.4. Nutrient nitrogen critical loads are expressed as a range (e.g. 10-20 kgN/ha/yr) reflecting variation in response across Europe, and also sometimes the nitrogen deposition treatment doses for which data are available. The UK NFC sets a single value within the range, known as the 'mapping value', for the purposes of national mapping and calculating exceedance. The mapping values are based on UK evidence (and use of 'modifying factors' in the case of bogs). Where there is no evidence to suggest otherwise, the NFC uses the mid-point of the range as a default value for mapping. However, for purposes of this assessment and following the approach adopted by the country statutory nature conservation bodies for site impact assessments, and that recommended by the CLRTAP Co-ordination Centre for Effects, the minimum point of the range is used, unless a mapping value is established based on UK evidence. Critical loads for nutrient nitrogen recommended for each Annex I habitat are provided in table A1.

5.5. Nutrient nitrogen critical loads were revised in 2010, hence values differ from those used in the critical loads assessment undertaken for the 2007 Article 17 reporting round.

5.6. Habitats which are not sensitive to atmospheric deposition or which do not have a 'relevant' critical load are omitted from the critical load based assessments for Article 17. Table A2 provides details of which habitats are excluded because a) they are not sensitive or b) they are potentially sensitive but no 'relevant' critical load is available[23].

5.7. For remaining habitats, data are available in the UK Site Relevant Critical Loads (SRCL) database (see www.apis.ac.uk/srcl) from which exceedance statistics have been generated for each Annex I habitat based on the proportion (per cent area) of SACs containing the habitat which exceed the critical load in 2005 (taken as "current" deposition) and a scenario (UEP30) for 2020 (see Bealey *et al*, 2011 for details of the deposition model and scenario).

5.8. There are two limitations with respect to applying this dataset for Article 17 reporting.

5.8.1. Firstly, the exceedance estimates are based on SACs only. The proportion of habitat resource occurring within the SAC series varies for Annex I habitats and in some cases may represent less than half the habitat resource. However, the SACs are likely to be sufficiently representative of the wider habitat resource situation.

5.8.2. Secondly, the calculations assume the Annex I habitats are distributed across each SAC for which they are designated. In practice, in some cases, the habitat may only cover a small proportion of an SAC for which it designated. However, habitat distribution maps were not available for the SRCL database. These assumptions about the distribution of habitats within SACs could distort the %area based results (potentially leading to an over or underestimate of exceedance).

[23] It was recommended that only those habitats with a reasonable equivalence with a EUNIS class for which critical loads have been set should be included in the assessment. This is habitats where the Annex I type is equal to a EUNIS class for which a CL is set, or where the Annex I type overlaps with/is contained within/contains a EUNIS class for which a CL is set. Some habitats are sensitive but have no correspondence with EUNIS classes for which critical loads are set. For casework, expert judgement is used to apply a critical load where possible for a site specific assessment. For the purposes of Article 17, such a site specific approach is not possible so those with weak equivalence were excluded. However, the country agencies may have evidence or may be able to make recommendations regarding impacts which they used to inform their assessment of pressure/threat.

Table A1. Annex I habitats with CL data available and which were included in the assessment. The relevant critical load is provided.

Code	Name	Nutrient N critical load range (kgN/ha/yr)	Recommended Nutrient N CL for assessment (kgN/ha/yr)
H1130	Estuaries[1]	20-30[1]	30[2]
H1150	Coastal lagoons	20-30[1]	30[2]
H1310	Salicornia and other annuals colonising mud and sand	20-30	30
H1320	Spartina swards (Spartinion maritimae)	20-30	30
H1330	Atlantic salt meadows (Glauco-Puccinellietalia maritimae)	20-30	30
H1420	Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi)	20-30	30
H2110	Embryonic shifting dunes	10-20	10
H2120	Shifting dunes along the shoreline with Ammophila arenaria (white dunes)	10-20	10
H2130	Fixed dunes with herbaceous vegetation (grey dunes)	8-15	8[3]
H2140	Decalcified fixed dunes with Empetrum nigrum	10-20	10
H2150	Atlantic decalcified fixed dunes (Calluno-Ulicetea)	10-20	10
H2190	Humid dune slacks	10-20	10[4]
H2330	Inland dunes with open Corynephorus and Agrostis grasslands	8-15	8
H4010	Northern Atlantic wet heaths with Erica tetralix	10-20	10
H4020	Temperate Atlantic wet heaths with Erica ciliaris and Erica tetralix	10-20	10
H4030	European dry heaths	10-20	10
H4040	Dry Atlantic coastal heaths with Erica vagans	10-20	10
H4060	Alpine and Boreal heaths	5-15	5
H4080	Sub-Arctic Salix spp. scrub	5-15	5
H6150	Siliceous alpine and boreal grasslands	5-10	5
H6170	Alpine and subalpine calcareous grasslands	5-10	5
H6210	Semi-natural dry grasslands and scrubland facies: on calcareous substrates (Festuco-Brometalia)	15-25	15
H6230	Species-rich Nardus grassland, on siliceous substrates in mountain areas (and submountain areas in continental Europe)	10-15	10
H6410	Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)	15-25	15
H6510	Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)	20-30	20
H6520	Mountain hay meadows	10-20	10
H7110	Active raised bogs	5-10	5[5]
H7120	Degraded raised bogs still capable of natural regeneration	5-10	5[5]
H7130	Blanket bogs	5-10	5[5]
H7140	Transition mires and quaking bogs	10-15	10
H7150	Depressions on peat substrates of the Rhynchosporion	10-15	10
H7230	Alkaline fens	15-30	15
H7240	Alpine pioneer formations of the Caricion bicoloris-atrofuscae	15-25	15
H9120	Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer (Quercion robori-petraeae or Ilici-Fagenion)	10-20	15
H9130	Asperulo-Fagetum beech forests	10-20	15
H9160	Sub-Atlantic and medio-European oak or oak-hornbeam forests of the Carpinion betuli	15-20	15
H9180	Tilio-Acerion forests of slopes, screes and ravines	15-20	15
H9190	Old acidophilous oak woods with Quercus robur on sandy plains	10-15	10

H91A0	Old sessile oak woods with Ilex and Blechnum in the British Isles	10-15	10
H91C0	Caledonian forest	5-15	12
H91J0	Taxus baccata woods of the British Isles	5-15	5[6]

Notes
[1] Critical load applies to the saltmarsh element of this habitat only.
[2] 30 kgN/ha/yr is used. It is recommended that this is the relevant critical load for most of saltmarsh but the lower level of 20 kgN/ha/yr should be applied to the more densely vegetated upper marsh and to areas of marsh subjected to direct run-off from adjacent catchments (CCW recommendation)
[3] Use 8 kgN/ha/yr for acid types and 10 kgN/ha/yr for calcareous types. If unknown use 8 kgN/ha/yr as precaution.
[4] Use 10 kgN/ha/yr for acid types and 15 kgN/ha/yr for calcareous types. If unknown use 10 kgN/ha/yr as precaution.
[5] Mapping value is based on rainfall. Water table modifying factor also used for local impact assessments. Use 5 kgN/ha/yr as precaution.
[6] No UK evidence to set mapping value. Default to minimum, but appears more sensitive than other woodland types which might not be the case. Unlikely to affect CL exceedance.

Table A2. Annex I habitats excluded from air pollution assessment based on critical loads (excluding freshwater habitats) because a) they are not sensitive to atmospheric N inputs or b) they are sensitive but there is not a critical load with sufficient equivalence. Habitat names are given in table A1. Note that H1160 may have saltmarsh elements which are potentially sensitive to nitrogen deposition.

Reason	Habitat codes
a	H1110, H1160, H1170, H1180, H1210, H8310, H8330, H91E0
b	H1140, H1220, H1230, H1340, H2160, H1270, H21A0, H2250, H5110, H5130, H6130, H6430, H7210, H7220, H8110, H8120, H8210, H8220, H8240, H91D0

5.9. Data on Annex I habitat nutrient nitrogen critical load exceedance was provided by the country statutory nature conservation bodies and subsequently aggregated to form a UK assessment.

5.10. The country statutory nature conservation bodies were able to use exceedance data from the SRCL database (as described above), or, if they had habitat mapping available and chose to do so, they were able to generate exceedance data for a habitat using the critical load values from the SRCL database. In this case, more recent deposition data was used (2009/12) and a more recent scenario for 2020 (UEP43). Annex 2 records the data submitted by the country statutory nature conservation bodies and the methods they used to derive the exceedance.

5.11. When available, the nutrient nitrogen critical loads exceedance was used as the basis for identification of “H04 Air Pollution” as a pressure or threat, and used to inform the outcome of the assessment as detailed in Section 3 of the main paper.

5.12. The category H04 Air Pollution could also encompass other air pollutant impacts including acidification.

5.13. Acidification is also recognised as an ongoing threat to sensitive habitats in some areas of the UK, with widespread critical load exceedance. However, there are important differences in the evidence base and in the derivation of the critical loads compared to nutrient nitrogen. There is more uncertainty in the use of the acidity critical loads and the temporal timescales for impact.

5.14. Acidity critical loads are:
   i. based on the dominant soil type with a 1km grid square which may not be coincident with the habitat type; causing greater uncertainty in their application;
   ii. are “steady-state”, giving no temporal indication of when impacts will occur (timescales could be decadal; *cf* nutrient nitrogen critical loads are set on the basis that impacts would occur over about 30 years and studies show vegetation change);
   iii. the evidence base for semi-natural habitats is less than for nutrient nitrogen impacts;
   iv. some increase in pH of soils and Ellenberg R (Countryside Survey) has been shown despite ongoing exceedance of acidity critical loads.

5.15. These points do not negate the use of acidity critical loads in casework because they can be considered specifically in the site specific assessment. However, they throw more uncertainty onto broad scale application changing the assessment conclusions for either current structure and function, or future prospects.

5.16. As a result, acidification is reported as a pollution qualifier where there is widespread exceedance (>5% of habitat area) but it is not used to influence the conclusion of assessments.

5.17. All data for acidity critical loads exceedance was based on the SRCL database. From this exceedance statistics were generated for each Annex I habitat based on the proportion (per cent area) of SACs containing the habitat which exceed the relevant critical load for the Annex I type, in 2005 (taken as “current” deposition) and a scenario (UEP30) for 2020.

5.18. The assessment is based on national modelling of deposition (5x5km resolution) and provides a national overview. Some Annex I habitats which are not identified as ‘at risk’ at a national level may still be under threat on a local/site specific basis.

Annex 2 to the method for the assessment of air pollution impacts in the UK's conservation status assessments for Article 17 reporting

Country-level submissions and summary of methods used

Table A3 presents the nutrient nitrogen critical loads exceedance data for each country. A brief description is then given of the method used by each country to derive the exceedance data. Table A4 presents the UK critical loads exceedance data, the ranking for H04 Air Pollution as a pressure and threat and the pollution qualifiers. For nutrient nitrogen, the UK exceedance data is derived from an area weighted average of the country data (Table A3). For acidification, the UK exceedance data is based on the per cent area of SACs designated for each Annex I habitat in the UK, derived directly from the SRCL database.

England
Data for England were derived directly from the SRCL database. Data were generated for each Annex I habitat based on the proportion (per cent area) of SACs designated for the habitat which exceed the relevant critical load for the Annex I type, in 2005 (taken as "current" deposition) and a scenario (UEP30) for 2020.

Northern Ireland
Data for NIEA were derived from a site specific look up using the site relevant critical loads database on the Air Pollution Information System (www.apis.ac.uk). The total area of each Annex 1 habitat present within SACs in NI was calculated. Using the APIS website the critical load was determined for each site and if this was/will be exceeded in 2005 & 2020. Area of hectares exceeded is then converted to a %, thus giving a % of the Annex 1 habitat that is exceeded. NIEA included additional submissions for Annex I types without good equivalence with a EUNIS class for which critical loads are established. This was based on the applying a critical load for a habitat with similar species, soils or other functioning. (see 3.1.10 for how this data were used).

Scotland
Two approaches were taken for generating nutrient nitrogen exceedance data for Scotland. For 13 habitats for which distribution maps were available (with in SACs), a GIS analysis was undertaken to estimate exceedance. These habitats were H4010, H4030, H4060, H4080, H6150, H6170, H6210, H6230, H7130, H7140, H7150, H7230, H7240.

For these the distribution of each Annex I habitat was mapped and the relevant critical load applied (based on Table A1). Deposition data for "current day" and for 2020 were then use to calculate the proportion of the habitat area exceeding the critical load. Habitat distribution maps were not available outside of SACS. The deposition data used was 2009-11 CBED and a 2020 scenario based on UEP43 using the FRAME model. In each case data were provided by CEH.

For the remaining Annex I habitats in Scotland, for which relevant critical loads are available, data for Scotland were derived directly from the SRCL database. Data were generated for each Annex I habitat based on the proportion (per cent area) of SACs designated for the habitat which exceed the relevant critical load for the Annex I type, in 2005 (taken as "current" deposition) and a scenario (UEP30) for 2020.

Wales
In Wales, CCW used digital maps of the Annex I habitats' resource across Wales and a GIS analysis was undertaken to estimate exceedance and the relevant critical load applied (based on Table A1). Deposition data for "current day" and for 2020 were then use to calculate the proportion of the habitat area exceeding the critical load. The deposition data used was 2009-11 CBED and a 2020 scenario based on UEP43 using the FRAME model. In both cases deposition data were provided by CEH.

CCW included additional submissions for Annex I types without good equivalence with a EUNIS class for which critical loads are established. This was based on the applying a critical load for a habitat with similar species, soils or other functioning. (see 3.1.10 for how this data were used).

Table A3. Per cent area of Annex I habitat exceeding the relevant critical load for nutrient nitrogen in each country. Blanks are where there is no (or very small extent) habitat present in the country. Data are presented for habitats with good equivalence with a EUNIS class for which a critical load is established. Habitat names are given in table A1.

Habitat code	England	England	NI	NI	Scotland	Scotland	Wales	Wales
	% area exceeding N CL, 2005	% area exceeding N CL, 2020	% area exceeding N CL, 2005	% area of exceeding N CL, 2020	% area exceeding N CL, 2005	% area exceeding N CL, 2020	% area exceeding N CL, 2005	% area exceeding N CL, 2020
H1130	0	0			0	0		
H1150	0	0	0	0	0	0		
H1310	0	0	0	0	0	0	0	0
H1320	0	0						
H1330	0	0	0	0	0	0	0	0
H1420	0	0					0	0
H2110	69	56	63	63	29	11	58	33
H2120	72	52	60	60	25	10	46	36
H2130	72	65	24	24	36	26	93	95
H2140					7	0		
H2150	58	43	100	100	30	12	54	41
H2190	62	45	0	0	3	0	32	31
H2330	100	100						
H4010	100	94	88	63	15	21	99	98
H4020	100	42						
H4030	100	95	98	94	51	28	99	97
H4040	82	66						
H4060	100	100	100	100	99	99	100	100
H4080					100	100		
H6150	100	100	100	100	99	99	100	100
H6170					100	100	100	100
H6210	99	63	0	0	0	0	51	47
H6230	100	100	100	100	47	44	97	97
H6410	76	35	0	0			73	64
H6510	57	25					60	58
H6520	100	100						
H7110	100	100	100	100	100	100	100	100
H7120	100	100	100	100	100	100	100	100
H7130	100	100	100	100	83	92	100	100
H7140	100	87	100	100	17	17	92	91
H7150	100	60			11	11	90	90
H7230	90	57	59	32	44	3	91	88
H7240	100	40			48	8	100	100
H9120	100	100					100	100
H9130	100	100					100	100
H9160	100	100						
H9180	100	99	100	11	16	3	100	100
H9190	100	100						
H91A0	100	100	97	97	78	33	100	100
H91C0					91	56		
H91J0	100	100					100	100

Table A4. UK exceedance data for nutrient nitrogen (area weighted average of data presented in Table A3) and acidity (SRCL Database). For each habitat listed, the ranking of "H04 – Air Pollution" pressure and threat is given (H = high, M = medium, L = low, - = H04 is not a pressure or threat). Pollution qualifiers for pressure and threat are provided (N = nitrogen deposition; A = acid deposition). Habitat names are given in table A1.

Code	% UK area exceeding N CL in 2005	% UK area exceeding N CL in 2020	% SAC area exceeding acid CL in 2005	% SAC area exceeding acid CL in 2020	Code H04 - Air Pollution, pressure ranking for nutrient nitrogen	Code H04 - Air Pollution, pressure pollution qualifiers	Code H04 - Air Pollution, threat ranking for nutrient nitrogen	Code H04 - Air Pollution, threat pollution qualifiers
H1130	0	0	0	0	-	-	-	-
H1150	0	0	0	0	-	-	-	-
H1310	0	0	0	0	-	-	-	-
H1320	0	0	0	0	-	-	-	-
H1330	0	0	0	0	-	-	-	-
H1420	0	0	0	0	-	-	-	-
H2110	53	35	0	0	H	N	H	N
H2120	47	31	0	0	H	N	H	N
H2130	49	41	6	4	H	NA	H	N
H2140	7	0	21	7	M	NA	-	-
H2150	46	32	6	5	H	NA	H	N
H2190	16	12	10	7	M	NA	M	NA
H2330	100	100	67	67	H	NA	H	NA
H4010	31	33	87	67	H	NA	H	NA
H4020	100	42	80	80	H	NA	H	NA
H4030	74	59	89	77	H	NA	H	NA
H4040	82	66	1	1	H	N	H	N
H4060	99	99	89	68	H	NA	H	NA
H4080	98	98	95	77	H	NA	H	NA
H6150	99	99	91	75	H	NA	H	NA
H6170	100	100	0	0	H	N	H	N
H6210	96	61	0	0	H	N	H	N
H6230	52	50	90	74	H	NA	H	NA
H6410	53	29	79	64	H	NA	H	NA
H6510	57	25	24	23	H	NA	H	NA
H6520	95	95	91	90	H	NA	H	NA
H7110	100	100	99	99	H	NA	H	NA
H7120	100	100	98	98	H	NA	H	NA
H7130	86	94	82	63	H	NA	H	NA
H7140	73	79	90	67	H	NA	H	NA
H7150	48	12	65	37	H	NA	M	NA
H7230	85	52	0	0	H	N	H	N
H7240	57	17	0	0	H	N	M	N
H9120	100	100	83	40	H	NA	H	NA
H9130	100	100	79	40	H	NA	H	NA
H9160	100	100	41	6	H	NA	H	NA
H9180	87	82	20	14	H	NA	H	NA
H9190	100	100	86	52	H	NA	H	NA
H91A0	91	74	75	59	H	NA	H	NA
H91C0	91	56	43	5	H	NA	H	N
H91J0	100	100	30	22	H	NA	H	NA