European Community Directive
on the Conservation of Natural Habitats
and of Wild Fauna and Flora
(92/43/EEC)

Second Report by the United Kingdom under Article 17

on the implementation of the Directive from January 2001 to December 2006

Conservation status assessment for :

H2330: Inland dunes with open *Corynephorus* and *Agrostis* grasslands

Please note that this is a section of the report. For the complete report visit http://www.jncc.gov.uk/article17

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H2330 Inland dunes with open *Corynephorus* and *Agrostis* grasslands

Audit trail compiled and edited by JNCC and the UK Lowland Grasslands Lead Coordination Network

This paper and accompanying appendices contain background information and data used to complete the standard EC reporting form (Annex D), following the methodology outlined in the commission document "Assessment, monitoring and reporting under Article 17 of the Habitats Directive, Explanatory Notes and Guidelines, Final Draft 5; October 2006". The superscript numbers below cross-reference to the headings in the corresponding Annex D reporting form. This supporting information should be read in conjunction with the UK approach for habitats (see 'Assessing Conservation Status: UK Approach').

1. National-biogeographic level information

1.1 General description and correspondance with National Vegetation Classification (NVC) and other habitat types

Table 1.1.1 provides a summary description of H2330 and its relations with UK classifications. This habitat comprises inland dune grassland containing grey hair-grass *Corynephorus canescens*. In the UK the vegetation of this habitat falls within NVC types SD11 *Carex arenaria – Cornicularia aculeata* dune community, and SD12 *Carex arenaria – Festuca ovina – Agrostis capillaris* grassland, where the vegetation includes stands of grey hair-grass in inland situations. That is, inland stands of these communities without grey hair-grass, such as occur in Lincolnshire, are excluded. Coastal examples of these two NVC types are referable to Annex I type 2130 Fixed dunes with herbaceous vegetation ("grey dunes").

Rodwell *et al* 2007 state that among the Kolereio-Corynephoretea grasslands, the SD10b *Carex* and SD11 *Carex-Cornicularia* communities (together with SD12 *Carex-Festuca-Agrostis* grassland) are the British representatives of the Corynephorion alliance, which comprises colonising vegetation and open grasslands of more mobile acid sands on both inland and coastal dunes. Although, in Britain, the alliance character species *Corynephorus canescens* is a scarce plant and mostly coastal in its occurrence (Stewart *et al* 1994) and *Spergula morisonii* is an introduction that occurs only as a naturalised plant on open sandy ground in East Sussex (Stace 1997), these vegetation types can be seen as our equivalent of the Spergulo-Corynephoretum Libbert 1932. This association is characterised throughout its range by such companions as *Teesdalia nudicaulis, Jasione montana, Agrostis vinealis* (and sometimes *A. capillaris*), *Carex arenaria, Polytrichum piliferum, Cladonia spp.* and *Cornicularia* (=*Cetraria*) *aculeata,* many of these of frequent occurrence with us in the UK. The association is synonymous with the Corynephoretum canescentis R.Tx. 1935 and also includes the Teesdalio-Sperguletum (R.Tx. 1937) Passarge 1964 and part of the Agrostietum coarctatae (Kobendza 1930 em R.Tx) and has been described under one name or another from France (Julve 1993), Belgium (LeBrun *et al* 1948), The Netherlands (Schaminée *et al* 1996, Weeda *et al* 2002), Germany (Oberdorfer 1978, Ellenberg 1978, Dierßen 1996) and Poland (Matuszkiewicz 1984). Essentially similar vegetation also occurs in Latvia (Kabucis 2000) and Estonia (Paal 2004).

Further south and east, the Corynephorion is represented in the Czech Republic, Slovakia and Hungary by the Thymo angustifolii-Corynephoretum Krippel 1954 and the Jurinea cyanoidis-Koelerietum Klika 1931 where species such as *Dianthus arenarius* ssp. *bohemicus*, *Artemisia campestris*, *Gypsophila fastigiata*, *Jurinea cyanoides*, *Koeleria glauca* and *Veronica dillenii* add a distinctive central European feel (Chytry *et al* 2001). With the shift to Hungary, the alliance gains a more distinctly Pannonian character in the Festuco dominii-Corynephoretum Borhidi (1958) 1996 and the Thymo serpylli-Festucetum pseudovinae Borhidi 1958 (Borhidi and Santa 1999), with species such as *Dianthus armeria, Spergula pentandra, Alyssum montanum* and *Peucedanum arenarium*. In Portugal, the Corynephorion acquires an Oceanic

South European character with the appearance of *Corrigiola telephiifolia* and *Jasione lusitanica* (Rivas-Martínez *et al* 2002, Plano Sectorial 2005).

The rather open, ephemeral-rich swards of the second Koelerio-Corynephoretea alliance, the Thero-Airion, certainly occur in this country and are the British equivalent of vegetation types of more stable but locally disturbed acid sands and siliceous rock outcrops across the European lowlands. Diagnostic species of the alliance include *Aira caryophyllea*, *A. praecox*, *Ornithopus perpusillus*, *Scleranthus annuus* ssp. *polycarpos*, *Teesdalia nudicalis*, *Trifolium striatum*, *Vulpia bromoides* and *V. myuros* with more rarely *Filago minima, F. lutescens* and *F. gallica.* In this country, we probably have vegetation like the Ornithopodo-Corynephoretum passarge 1960 (which is now thought synonymous with the Airo caryophylleae-Festucetum ovinae R.Tx. 1955 and the Airetum praecocis (Schwickerath 1944) Krausch 1967) and the Filagini-Vulpietum myuros Oberdorfer 1938, associations which have been variously recorded with a general consistency of composition from Ireland (White and Doyle 1982), The Netherlands (Schaminée *et al* 1996, Weeda *et al* 2002), Germany (Dierßen 1996), Poland (Matuszkiewicz (1984), the Czech Republic (Moravec 1995), Slovakia (Valachovič 1995) and Hungary (Borhidi 2003). Again, towards the south-east, a Pannonian element becomes more prominent with species such as *Aira elegans* and *A. elegantissima* (Borhidi 2003) while in Spain and Portugal, species such as *Veronica dillenii, Silene scabriflora* and *Apera interrupta* give an Oceanic West European feel (Rivas-Martínez *et al* 2002, Plano Sectorial 2005).

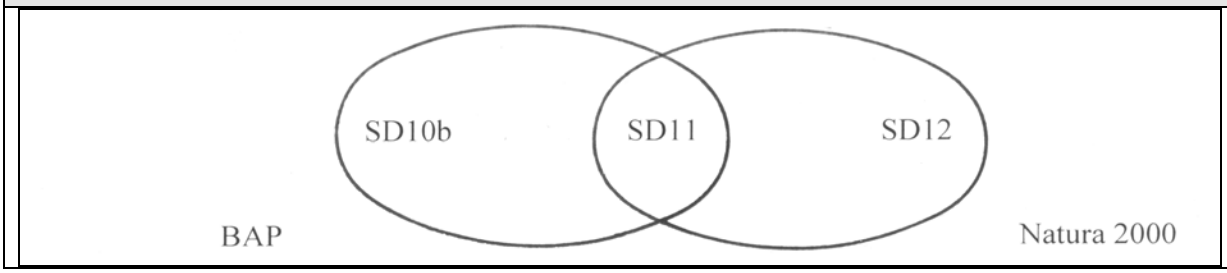
Table 1.1.1 Summary description of habitat H2330 and its relations with UK vegetation/habitat classifications

Classification	Correspondence with Annex I type	Comments
EU Interpretation Manual	64.1 X 35.2 Open grassland with *Corynephorus* and *Agrostis* of continental dunes PAL. CLASS: (64.11 or 64.12) X 35.2	
NVC	SD11 *Carex arenaria-Cornicularia aculeata* dune community. SD12 *Carex arenaria-Festuca ovina-Agrostis capillaries* dune grassland.	Occurs in both coastal and inland situations. Primarily eastern in its UK distribution Occurs around the UK coast and in eastern inland situations. Coastal examples of these two NVC types are referable to Annex I type 2130 Fixed dunes with herbaceous vegetation ("grey dunes"). Only inland stands of SD11 & SD12 supporting populations of grey hair-grass qualify for selection under H2330. In the UK, these are confined to Breckland.
BAP priority habitat type	SD11 forms part of the Lowland Dry acid grassland BAP priority habitat.	The Lowland Dry acid grassland priority habitat includes two dune communities SD 10 *Carex arenaria* dune community and SD11. SD12 however, is not covered (see Figure 1.1.1).

The U1 *Festuca-Agrostis-Rumex* grassland is the inland British representative of the third alliance of calcifuge swards within the Koelerio-Corynephoretea, the Plantagini-Festucion (Rodwell 2000), not part of the Thero-Airion (as originally suggested by Rodwell 1992). This alliance (which now includes parts of the Koelerion albescentis and Armerion elongatae) comprises more mature, closed swards on drought-prone soils of less strikingly acidic character found on fixed inland dunes and heaths. Floristically, the vegetation is defined rather loosely by the high frequency of species generally characteristic of the class such as *Koeleria macrantha, Galium verum, Hieracium pilosella* and *Rumex acetosella* but it provides a major locus for Continental plants that are scarce or rare with us, such as *Thymus serpyllum, Dianthus deltoides, Silene otites, S. conica, Crassula tillaea, Lychnis viscaria* and *Armeria elongata.* Very similar

to the British U1 grassland is the Festuco-Thymetum serpylli R.Tx.(1928) 1937, an association which has been described from The Netherlands (Schaminee *et al* 1996, Weeda *et al* 2002), north-west Germany (Tüxen 1937) and the Czech Republic (Chytry *et al* 2001). With a somewhat more Continental character are the Diantho-Armerietum elongatae Pötsch 1962 described from Germany (Dierßen 1996), Poland (Matuszkiewucz 1984) and Czechia (Moravec 1995), the Sileno otitis-Festucetum from Poland (Matuszkiewicz 1984) and the Jasiono-Dianthetum deltoidis Oberdorfer ex Mucina in Mucina & Kolbec 1993 from Austria (Mucina *et al* 1993). The more decisive shift towards the Pannonian zone is marked for some authors by the replacement of the Plantigini-Festucion by another alliance, the Hyperico perforati-Scleranthion (Mucina *et al* 1993, Borhidi 2003). Towards the south-west of Europe, in Spain and Portugal, Koelerio-Corynephoretea grasslands of this more closed type have been classified in the Koelerion arenariae, with the Oceanic West European *Asparagus prostratus* becoming a characteristic plant (Rivas-Martínez *et al* 2002).

Figure 1.1.1 Schematic showing relationship between H2330 (Natura 2000) and BAP inland dune habitats, which are part of the Lowland Dry acid grassland priority BAP habitat



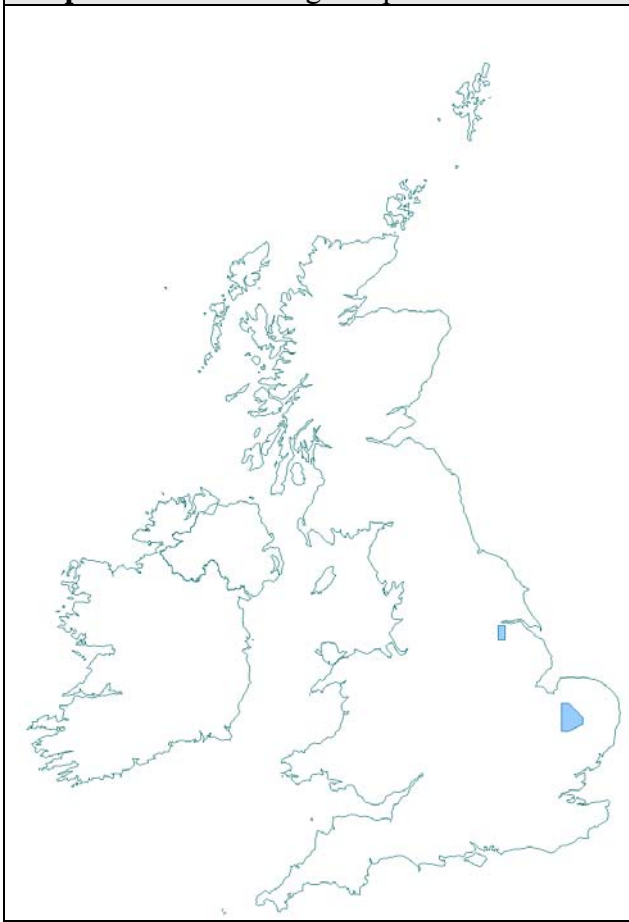
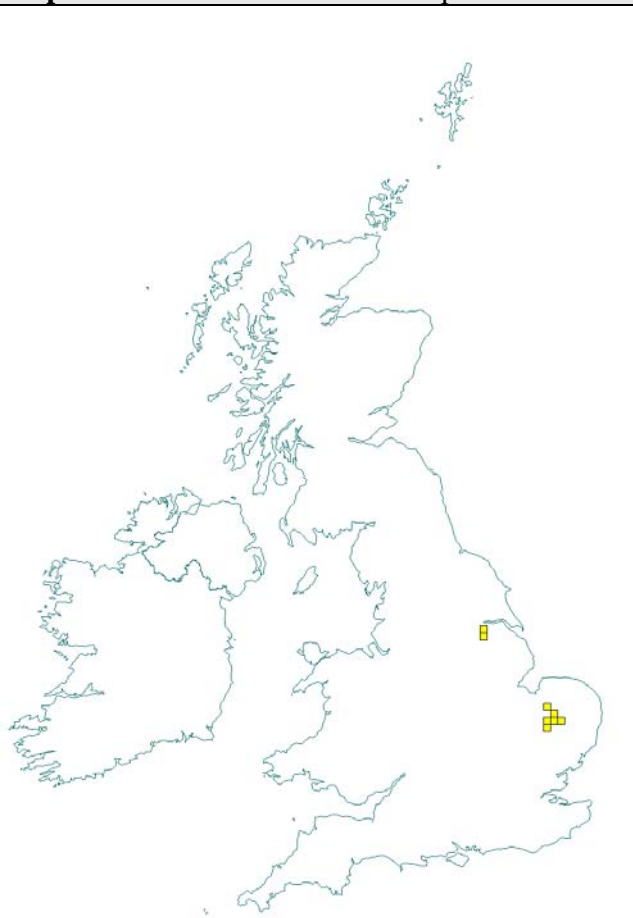
2. Range [2.3]

2.1 Current range

Range surface area [2.3.1]: **1,100 km²**
Date calculated [2.3.2.]: **May 2007**
Quality of data [2.3.3.]: **Good**

The surface area estimate was calculated within alpha hull software, using extent of occurrence as a proxy measure for range (see Map 2.1.1). The value of alpha was set at 25 km; the alpha was clipped to include inland areas only.

Maps 2.1.1 and 2.1.2 show the range and distribution of H2330 in the UK. Inland dunes with open *Corynephorus* and *Agrostis* grasslands are an extremely rare habitat in the UK, found in one small part of the Breckland area of East Anglia, eastern England. It occurs at two locations in Suffolk, both Sites of Special Scientific Interest (SSSIs) but comprising a single Special Area of Conservation (SAC).

Map 2.1.1 Habitat range map [1.1] for H2330	**Map 2.1.2** Habitat distribution map [1.2] for H2330
	
Range envelope shown in blue/grey shade in above map is a minimum convex polygon constructed using JNCC Alpha Shapes tool (see Technical note I for details of methodology).	Each yellow square represents a 10x10km square of the National Grid and shows the known and/or predicted occurrence of this habitat. 10-km square count: 8

See section 7.1 for map data sources

2.2 Trend in range since c.1994

Trend in range[2.3.4]: **Stable**
Trend magnitude[2.3.5]: **Not applicable**
Trend period[2.3.6]: **1994-2006**
Reasons for trend[2.3.7]: **Not applicable**

The range of this habitat has probably been relatively stable over the last 10-15 years.

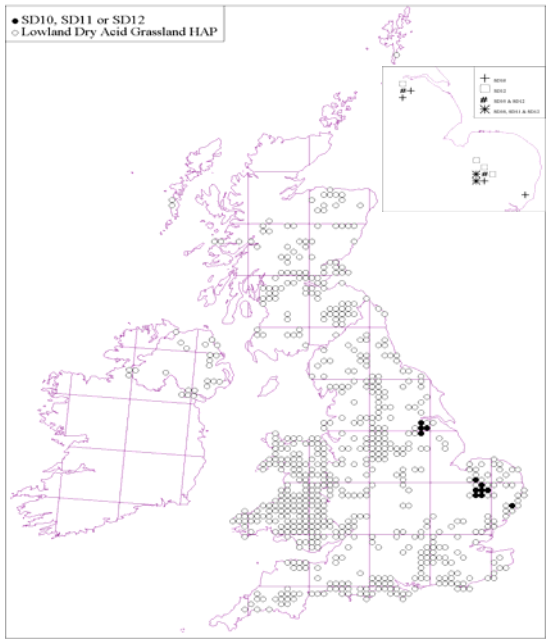
2.3 Favourable reference range

Favourable reference range[2.5.1]: 1,100 km^2

Section 3.2.1.3 of 'Assessing Conservation Status: UK Approach' sets out how favourable reference range estimates for habitats have been determined in the UK. Based on this approach, the current surface area, 1,100 km^2, has been set as the favourable reference area. Reasons for this are discussed below.

The natural range of the inland dune habitat in the UK is determined by drift geology which gives rise to mobile sands. The range of the habitat was once larger than present but a combination of agricultural reclamation and afforestation have resulted in range contraction within the last hundred years. The potential for range expansion is very limited due to the specialised environmental conditions necessary for this habitat. It is conceivable, but unlikely, that there are extant sites which are not known about. Map 2.1.3 shows the location of related inland dune vegetation and may indicate potential range.

Map 2.2.1 Distribution of vegetation related to H2330 Inland dunes in the UK



This habitat was probably always rather rare depending as it does on the occurrence of inland acidic sands. These are restricted to areas of Devensian Aeolian drift deposits such as in the North Lincolnshire Coversands and the East Anglian Breckland. There have been losses of inland dune habitat in the 20th Century due to reclamation for intensive agriculture, afforestation, amenity and successional change due to a lack of grazing. Preston *et al* (2002) indicate that sites supporting populations of *Corynephorus canescens* were lost prior to 1930 and this appears to have involved two inland 10 km square records. Taken together, these losses have resulted in some contraction in range. The extent and significance of this contraction in range over the last hundred years, in terms of representation of ecological variation, is not known. Even so, the potential for expansion of the range of this habitat is likely to be very limited, requiring the formation of new dune systems.

The range of this habitat has however probably been relatively stable over the last 10-15 years. The 1994 range, calculated at a resolution of 10-km squares, covers 1,100 km^2 even though the habitat covers a tiny proportion (<0.01%) of that range. Even though the range of the actual fragments of habitat, mapped at a larger scale, could be considered borderline for viability, 1,100 km^2 is considered ample to ensure viability. The current range is, therefore, set as the favourable reference range. The habitat's requirement for active dune conditions is exacting, and any new opportunities for these conditions are most likely to be created in the squares of the existing range.

2.4 Conclusions on range

Conclusion[2.6.i]: Favourable

Trend in range is stable and the current range is equal to the favourable reference range.

3. Area [2.4]

3.1 Current area

Total UK extent [2.4.1]: 1.2 km^2
Date of estimation [2.4.2]: May 2007
Method [2.4.3]: 3 = ground based survey
Quality of data [2.4.4]: Good

Table 3.1.1 provides information on the area of H2330 in the UK. The estimated total UK extent of inland dunes is 120 ha which occur within a single SAC (Breckland) and two SSSIs (RAF Lakenheath and Wangford Warren) in Suffolk, England, UK.

Table 3.1.1 Area of H2330 in the UK.

	Area (ha)	Method [2.4.3]	Quality of data [2.4.4]
England	120	3	Good
Scotland	not present	1	Good
Wales	not present	1	Good
Northern Ireland	not present	1	Good
Total UK extent [2.4.1]	120	3	Good

Method used to estimate the habitat surface area: 1 = only or mostly based on expert opinion; 2 = based on remote sensing data; 3 = ground based survey. Only the most relevant class is given if more than one applies.
Quality of habitat surface area data: 'Good' e.g. based on extensive surveys; 'Moderate' e.g. based on partial data with some extrapolation; 'Poor' e.g. based on very incomplete data or on expert judgement

Source: Natural England's designated site files.

3.2 Trend in area since c.1994

Trend in area[2.4.5]: **Stable**
Trend magnitude[2.4.6]: **Not applicable**
Trend period[2.4.7]: **1994-2006**
Reasons for reported trend[2.4.8]: **Not applicable**

The area of this habitat has probably been relatively stable over the last 10-15 years. There have been losses of inland dune habitat in the 20th Century due to reclamation for intensive agriculture, afforestation, amenity and successional change due to a lack of grazing. Inland dune areas with populations of *Corynephorus canescens* were also lost prior to 1930 (Preston *et al* 2002) but the species distribution is now stable.

3.3 Favourable reference area

Favourable reference area[2.5.2]: **Unknown**

3.4 Conclusions on area covered by habitat

Conclusion[2.6.ii]: **Unknown**

The current extent of the inland dune habitat, although stable, is small and of unknown viability and so may be less than a favourable reference area. Due to the lack of or very restricted occurrence of suitable habitat conditions and the difficulty of creating new active dune systems, it is suggested that any expansion targets should be modest and subject to review following further investigations. This would include a field audit of potential areas of the appropriate habitat conditions, which might include a survey of Coversand areas of Lincolnshire; any expansion will necessarily be modest. It is concluded that the favourability of area now covered is 'Unknown'.

4. Specific structures and functions **(including typical species)**

4.1 Main pressures [2.4.10]

702 air pollution
140 Grazing

- Air pollution: Based on an assessment of the exceedence of relevant critical loads (see Technical note III), air pollution is considered to be a potentially significant pressure to the structure and function of this habitat.

- Grazing: Lack of, or inappropriate grazing.

4.2 Current condition

SAC condition assessments

The Common Standards Monitoring (CSM) condition assessments for the UK SAC which supports habitat H2330 were collated in January 2007. These assessment for the SAC as a whole was unfavourable. However, the individual units within the SAC which support areas of H2330 were in favourable condition.

4.3 Typical species

Typical species[2.5.3]: None

Typical species assessment[2.5.4]: Not applicable

The characteristic species listed below are all more commonly found in other, less rare, habitats. Therefore, information about typical species has not contributed to the judgement.

The characteristic plants listed in EU Interpretation Manual are: *Agrostis* spp., *Corynephorus canescens*, *Carex arenaria*, *Spergularia morisonii* (not UK), *Teesdalia nudicaulis*, *Cladonia* spp., and *Cetraria* spp. Published analyses of plant change were consulted and the results shown in Table 4.3.1. Three of the four species are stable and one is in decline. The assessment of the status of *Teesdalia nudicaulis* by Preston *et al* 2002 is based on its occurrence across all habitats which in addition to H2330 (SD11 *Carex arenaria-Cornicularia* dune community) include U1 *Festuca ovina –Agrostis capillaris-Rumex acetosella* acid grassland and CG7 *Festuca ovina-Hieracium pilosella-Thymus praecox/pulegioides* calcareous grassland. Thus, it is not possible to state with confidence that it has declined in the open dune community.

Table 4.3.1 Trends of a selection of characteristic plant species

	BSBI Atlas change (Preston *et al.* 2002)	**Braithwaite *et al.* 2006**
Agrostis capillaris	Stable	Stable
Corynephorus canescens	Stable	-
Carex arenaria	Stable	Stable
Teesdalia nudicaulis	Decline	-

4.4 Conclusions on specific structures and functions (including typical species)

Conclusion[2.6.iii]: Favourable

The EC Guidance states that where "structures and functions are in good condition and no significant pressures exist", the conclusion should be Favourable. In the UK, this was generally taken to mean that less than 5% the habitat area was in unfavourable condition.

CSM site condition assessment for relevant units within the single SAC supporting this habitat type are in favourable condition. Trends in possible typical species do show any certain declines. The conservation status of the habitat for structure and function has therefore been classified as Favourable.

5. Future prospects

5.1 Main factors affecting the habitat

5.1.1 Conservation measures

This habitat is covered in part by a national action plan under the UK BAP (see http://www.ukbap.org.uk; also Figure 1.1.1), with targets to maintain, improve, restore and expand the resource. All known examples are protected in an SAC.

5.1.2 Main future threats[2.4.11]

702 air pollution

140 Grazing

The most obvious major future threats to H2330 over the next 10-15 years are listed below, several of which are referred to in Section 4.1. Based on the literature review (see Technical note IV) climate change is not considered a potentially significant threat to the future condition of this habitat.

- Air pollution: Based on an assessment of the exceedence of relevant critical loads (see Technical note III), air pollution is considered to be a potentially significant threat to the future condition of this habitat.
- Grazing: Lack of, or inappropriate grazing remains potential a threat for the future.

5.2 Future condition **(as regards range, area covered and specific structures and functions)**

5.2.1 CSM condition assessments

The CSM condition assessments for the UK SAC which supports habitat H2330, as discussed in Section 4.2, provides a basis to predict the potential future condition of the habitat. Given that the individual units within the SAC that support areas of H2330 are currently in favourable condition, it is excepted these remain as such over the next 10-15 years.

5.3 Conclusions on future prospects **(as regards range, area covered and specific structures and functions)**

Conclusion[2.6.iv]: Unknown

The condition of the existing habitat is currently unknown. The opinion of the experts that there is uncertainty as to whether the existing area is viable, and some risk from nitrogen deposition. In the absence of clear information, the conclusion is Unknown.

6. Overall conclusions and judgements on conservation status

Conclusion[2.6]: Unknown

Range and structure and function have been assessed as Favourable; extent and future prospects are unknown. Based on EU Commission guidance, two unknown judgments combined with two Favourable judgments indicate an overall conclusion of Unknown.

Table 6.1 Summary of overall conclusions and judgements

Parameter	Judgement	Grounds for Judgement	Confidence in judgement*
Range	Favourable	Current range is stable and not les than the favourable reference range.	2
Area covered by habitat type within range	Unknown	Insufficient information to make a judgement.	N/A
Specific structures and functions (including typical species)	Favourable	Structures and functions considered to be in good condition with no significant pressures.	3
Future prospects (as regards range, area covered and specific structures and functions)	Unknown	Insufficient information to make a judgement.	N/A
Overall assessment of conservation status	Unknown	Two Favourable judgments with two Unknowns.	N/A

Key to confidence in judgement: 1 = High; 2 = Medium; 3 = Low; N/A = Not applicable

7. Annexed material **(including information sources used 2.2.)**

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Map data sources

Data used to compile J.S. RODWELL, V. MORGAN, R.G. JEFFERSON & D. MOSS. 2007. The European context of British Lowland Grasslands. JNCC Report No. 394. Joint Nature Conservation Committee.

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7.2 Further information on CSM data

Table 7.2.1 Summary of the coverage of the data shown in Tables 4.2.1 and 5.2.1

Data	Value
Number of SACs supporting feature (a)	1
Number of SACs with CSM assessments (b)	1
% of SACs assessed (b/a)	100
Extent of feature in the UK – hectares (c)	121
Extent of feature on SACs – hectares (d)	121
Extent of features assessed – hectares (e)	121
% of total UK hectarage on SACs (d/c)	100
% of SAC total hectarage that has been assessed	100
% of total UK hectarage that has been assessed (e/c)	100