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 :

H6510: Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*)

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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H6510 Lowland hay meadows (*Alopecurus pratensis*, *Sanguisorba officinalis*)

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 correspondence with National Vegetaiotn Classification (NVC) and other habitat types

Table 1.1.1 provides a summary description of H6510 and its relations with UK classifications. This Annex I type comprises species-rich hay meadows on moderately fertile soils of river and tributary floodplains. Most examples are cut annually for hay, with light aftermath grazing. Seasonal flooding maintains an input of nutrients. In the UK, this habitat corresponds to NVC type MG4 *Alopecurus pratensis – Sanguisorba officinalis* grassland. This community is characterised by species-rich swards containing frequent red fescue *Festuca rubra*, crested dog's-tail *Cynosurus cristatus*, meadow foxtail *Alopecurus pratensis*, great burnet *Sanguisorba officinalis*, meadowsweet *Filipendula ulmaria* and meadow buttercup *Ranunculus acris*. It provides the main habitat in the UK for fritillary *Fritillaria meleagris*. The community occurs very locally in England and Wales, with important stands along the Thames and elsewhere in the Midlands and Welsh Borders and on the Yorkshire Derwent and Ouse.

Table 1.1.1 Summary description of habitat H6510 and its relations with UK vegetation/habitat classifications

Classification	Correspondence with Annex I type	Comments
EU Interpretation Manual	Lowland hay meadows *(Alopecurus pratensis, Sanguisorba officinalis)* PAL.CLASS:38.2	
NVC	MG4 *Alopecurus pratensis – Sanguisorba officinalis* grassland	
BAP priority habitat type	Falls within the Lowland Meadow Priority habitat type	Note that the Lowland Meadow Priority type includes vegetation referable to NVC types MG5 *Cynosurus cristatus – Centaurea nigra* and MG8 *Cynosurus cristatus – Caltha palustris* in addition to MG4.

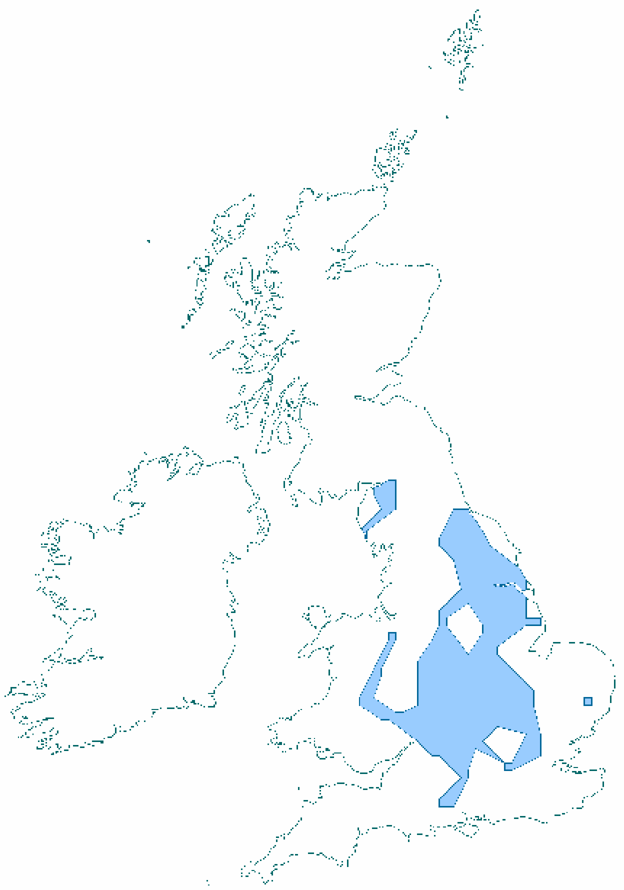
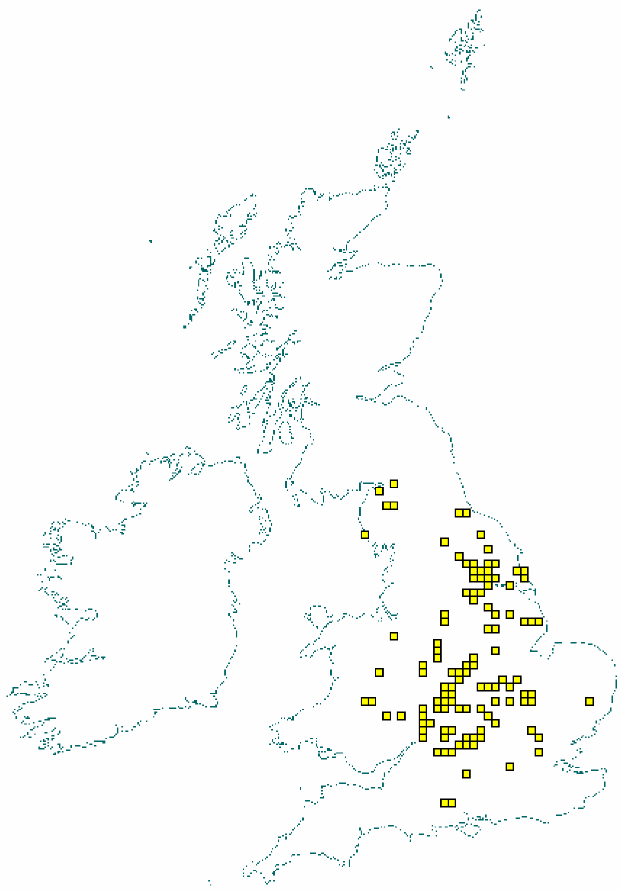
The community lies within the class Molinion – Arrehenatheretem of continental phytosociology. Within this Rodwell (1996) placed MG4 within the Cynosurion alliance while Page (1980) suggested it lies within the Molinion. It seems clear that periodically flooded grasslands do not fit existing European grassland classifications very well (Page 1980) and MG4 appears to have affinities with a number of alliances including the Junco conglomerati – Molinion, Cynousurion, Arrhenatherion, Calthion and Filipendulion. In continental Europe the most obviously similar vegetation to the UK MG4 Alopecurus – Sanguisorba type is the Fritillario – Alopecuretum (Westhoff and den Held ex Corporal *et al.* 1993) described from Dutch floodlains (Schaminee *et al.* 1996; Weeda *et al.*) Re-examination of data collected from a recent Defra research project on the hydrological control of flood meadow vegetation (Gowing *et al.* 2002) is likely to clarify the wider relationships of MG4 and related UK Lowland Meadows to their European relatives.

2. Range [2.3]

2.1 Current range

Range surface area [2.3.1]: **41,631 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.

Map 2.1.1 Habitat range map [1.1] for H6510	**Map 2.1.2** Habitat distribution map [1.2] for H6510
	
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: 113

See Section 7.1 for map data sources

Maps 2.1.1 and 2.1.2 show the range and distribution of H6510 in the UK. They are based on the recorded distribution since around 1980 (Rodwell 2007). This grassland type is rare in the UK and occurs almost entirely in central and southern England. There are particularly important concentrations in the flood plains of the River Thames and its tributaries, and those associated with the Vale of York rivers, especially the Derwent. Only four putative locations for MG4 are known from Wales (D. Stevens, CCW, *pers. comm.*).

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 reported trend[2.3.7]: **Not applicable**
The broad range of this habitat has not changed since 1994.

2.3 Favourable reference range

Favourable reference range[2.5.1]: **41,631 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, 41,631 km^2, has been set as the favourable reference area. Reasons for this are discussed below.

H6510 occurs in lowland river flood plains or streamsides normally below 125 m above sea level, on moist but free-draining to moderately permeable, neutral to calcareous, clay rich or silty alluvial loams and occasionally peaty mineral soils ranging from pH 5.8 to 8.3 (Jefferson 1997). The hydrological regime necessary for the maintenance of this community is relatively precise, with characteristic periodic inundation by winter floodwaters. Sites are associated with a history of traditional low intensity management of hay cutting and grazing of the re-growth (aftermath) with no use of herbicides or inorganic fertilisers. Thus the potential range whilst greater than the current expression of the community is limited to suitable floodplain situations.

It is not known to what extent the distribution of this grassland community might have extended more widely in the past outside the current core areas in the Thames, Severn Trent, Yorkshire Ouse and Anglian catchments. However, the occurrence of suitable substrates, topography and hydrological and management regimes in the past, particularly in lowland England, suggest that it occurred in areas where it is now absent and was more abundant in areas where it is still extant (Jefferson 1997). Rackham (1986) reports that the records indicate that by the 13th Century most flood plains including those of small streams were under hay meadow management. Furthermore the pre. 1950 distribution of Fritillaria meleagris (Perring and Walters 1982), a characteristic species of MG4 in the Midlands and southern England, also indicates that the community was formerly more widespread. There was a 38% decrease in the number of 10 km squares from which this high-profile species was recorded, between the first BSBI Atlas (records from 1930 to 1962) and the second (1997 to 1999) (Preston *et al.* 2002; www.jncc.gov.uk/page-3711). To summarise there are likely to have been substantial but unquantified losses of this habitat, principally due to agricultural intensification in the last 60 years resulting in a concurrent contraction in range. The significance of this range contraction in terms of representation of ecological variation is not known.

Despite an historic contraction in range, the current range is taken as the favourable reference range because there has been no change in range since 1994 and the range at this time was considered sufficient to support a long-term viable distribution of this habitat.

2.4 Conclusions on range

Conclusion[2.6.i]: **Favourable**
The range is thought to have remained stable since 1994 and is equal to the favourable reference range. The conclusion is, therefore Favourable.

3. Area [2.4]

3.1 Current area

Total UK extent [2.4.1]: **15km²**
Date of estimation [2.4.2]: **May 2007**
Method [2.4.3]: **3 = ground based survey**
Quality of data [2.4.4]: **Moderate**

Table 3.1.1 provides information on the area of H6510 in the UK. The habitat survives only in scattered and mostly small sites. Ninety-two sites were identified in England by Jefferson (1997), covering a maximum area of 1,543.35 ha. Only four putative locations for MG4 are known from Wales, amounting to about 7 ha in total (D. Stevens, CCW, *pers. comm.*.). Given that the habitat has been declining, the current area is estimated to be about 1,500 ha.

Table 3.1.1 Area of H6510 in the UK

	Area (ha)	Method [2.4.3]	Quality of data [2.4.4]
England	c.1,500	3	Moderate
Scotland	Not present		
Wales	7	3	Good
Northern Ireland	Not present		
Total UK extent [2.4.1]	c.1,500	3	Moderate

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.

3.2 Trend in area since c.1994

Trend in area[2.4.5]: **Decreasing**
Trend magnitude[2.4.6]: **Unknown**
Trend period[2.4.7]: **1994 -2006**
Reasons for reported trend[2.4.8]: **3 – Direct human influence**

It is thought that the extent of this habitat has declined during 1994-2006. Although precise figures are not available, the decline has almost certainly been less than 10% by area. Dramatic losses occurred over the past century due to sand and gravel extraction, urban and industrial development, and agricultural intensification of such stretches as remain farmed (Gowing *et al.* 2002). These factors continue to affect the few localities of this vegetation which lie outside the protected area series. Existing legislation (EIA regulations) remains insufficient to adequately protect remaining species rich grassland from agricultural improvement. Estimates of the proportion of the English resource which remains in undesignated sites range from 8% of area (according to Homes *et al.* 2005) to *circa* 28% of sites and 12% of the area (Jefferson 1997).

3.3 Favourable reference area

Favourable reference area[2.5.2]: **Approx. 16.5km²**

Section 3.2.2.3 of 'Assessing Conservation Status: UK Approach' sets out how favourable reference area estimates have been determined in the UK. Based on this approach, the favourable reference area has been identified as greater than the current extent, but not by a factor of more than 10%. Reasons for this are discussed below.

The habitat area has declined since 1994, but almost certainly by not more than 10%. It is not entirely clear what area the habitat needs to be considered favourable. Dramatic losses of this grassland type have occurred over the past century and the majority of MG4 grassland is now confined to small remnants isolated within a matrix of hostile agricultural or urban land use and a good many sites supporting this habitat may be too small to be considered viable. For example, only about one third of sites contain more than 10 hectares of the priority habitat (Jefferson 1997). Smaller sites are at greater risk from catastrophic events, such as drought and fire and from losses due to draining of surrounding land.

At a landscape scale, it is not entirely clear what area, configuration and connectivity the habitat needs to be considered viable. Theoretical models of habitat loss suggest that the processes of loss and fragmentation may have produced an “extinction debt” (Tilman 1994): habitat specialists will eventually go extinct unless semi-natural habitats and appropriate management are reinstated. Furthermore, for long-lived or clonal species fragmentation effects may be obscured and delayed. However, the importance of good management in off-setting population extinction over the short to medium term should not be underestimated. Research by Cooper *et al.* (1994) and Pacha (2005) has shown that the most important factor influencing the diversity of grassland fragments was the continuation of good management rather than parcel size. Similarly, long-term monitoring of isolated populations of Orchis morio on very small grassland Sites of Special Scientific Interest (SSSIs) in Cambridgeshire has shown that populations have remained remarkably stable for over 30 years under stable management (Wells 1998).

Although it is not entirely clear what area is needed to ensure viability, an overall increase of 10% is judged to be sufficient.

3.4 Conclusions on area covered by habitat

Conclusion[2.6.ii]: **Unfavourable – Inadequate and deteriorating**

The area of habitat has declined since 1994, but probably by not more than 10%. Further small-scale losses outside of protected sites are probably continuing. The favourable reference area has been set at 10% above the current area estimate. Although it is not entirely clear what area is needed to ensure viability, an overall increase of 10% is judged to be sufficient.

4. Specific structures and functions (including typical species)

4.1 Main pressures [2.4.10]

701 water pollution
954 invasion by a species
120 Fertilisation
110 Use of pesticides
420 Discharges
840 Flooding
853 management of water levels
950 Biocenotic evolution
141 Abandonment of pastoral systems
101 Modification of cultivation practices
120 Fertilisation
702 air pollution
162 Artificial planting

On stands both within and outside protected areas conservation of the community relies on a balance between water regime, nutrient regime and vegetation management, and changes to any of these three factors are likely to result in shifts in the botanical composition of the community.

- Water and nutrient regime

Studies of floodplains (Gowing *et al.* 2002) have shown how the sequence of vegetation types found there (including MG4, 5 and 8 and variants of them) depends upon an annual cycle of inundation that results in a gradient of flooding and drying; each vegetation type having it's particular range of tolerance to hydrological conditions. Gowing *et al.* (2002) stress that the MG4 community has two basic requirements: an aerated root zone during the growing season and adequate water supply so as not to limit plant growth in early summer. The community is more threatened by the prospect of anoxia from prolonged flooding and inadequate surface drainage, than by any direct effects of changes in water management that enhance drainage. Consequently prolonged duration of water logging will cause a change in community composition from grassland towards a mire or swamp. Conversely draw down of the water table and consistently deeper water tables in summer will result in a gradual loss of the community's characteristic, moisture demanding species such as *Sanguisorba officinalis* and *Thalictrum flavum*.

Whilst the community is relatively productive in comparison to other semi-natural vegetation types, due to nutrient inputs from flood water sediments and manuring from stock, increasing nutrient input from a variety of sources may threaten the distinctive richness of the vegetation with its strong representation of dicotyledons. Such sources include deposition of phosphorous enriched silt, atmospheric deposition of nitrogen and dressings of chemical fertilisers or slurry. Eutrophication from these various sources is known to favour the development of more species poor MG7c *Lolium- Festuca – Alopecurus* swards or MG6 *Lolium – Cynosurus* grassland. Gowing *et al.* (2002) suggest that indirect effects of changes in nutrient supply and surface pH that come from alterations in sediment deposition with disruption of flooding or shifts in load could pose more of a risk for maintenance of the MG4 community.

Although there have been various active initiatives underway in England and Wales to reduce the nutrient loading of various lowland rivers through tackling point sources of pollution (e.g. AMP4) there remains substantial concern that the supply of nutrients loaded onto MG4 meadows via sediment deposition in floodwaters is high due to the typically eutrophic nature of many lowland rivers. Diffuse source-derived phosphorus is the major problem. High agricultural losses of phosphorus and silt to freshwaters are generated by the heavy usage of inorganic fertilisers and animal feeds and the increased soil erosion caused by a range of intensive farming practices, particularly the cultivation of erosion-sensitive soils. For diffuse sources, the most important pieces of legislation are the EU Nitrates Directive and EU Water Frameworks Directive. Although aimed primarily at preventing export of nitrates from diffuse sources, by reducing the load of nitrogen which can be applied to land, the Nitrates Directive also reduces the load of phosphorus which can be applied in organic fertilisers.

However, at present there are no obligatory mechanisms in place to ensure that farmers act to control phosphorus and sediment losses from their land. Consequently for stands of MG4 in eutrophic catchments input of phosphorous from floodwater remains a major problem. It is vital that farming activity in high risk areas matches the environmental capability of the land to support agriculture without releasing excessive phosphorus and silt to receiving waters. Strategic assessments of pollution risk need to be made at a catchment scale, but best practice has to be delivered through individual farm plans. There is a clear need for a coherent policy package and delivery strategy for controlling diffuse water pollution from agriculture, being progressed by Defra. This package needs to include compulsory mechanisms for securing necessary management change where these cannot be secured by voluntary means. It is essential that such an approach is adopted in order to ensure favourable condition on H6510 Special Areas of Conservation (SACs) within the required timescales.

- Management neglect

Disrupting the combination of mowing and grazing which forms the traditional regime for the community is also likely to pose a threat. The community is usually the product of several hundred years of consistent management involving the taking of a summer hay cut followed by grazing of the re-growth in autumn.

Hay cut and removal is important to balance the nutrient budget for the community (Gowing *et al.* 2002). Management neglect characterised by a failure to remove the crop or reduction in grazing intensity will typically result in taller species becoming increasingly dominant and reduction in the community's diversity. However some changes to the management of these sites may be required to mitigate the impacts of increased nutrient inputs. For example, taking a second hay cut might help to counteract high nutrient inputs or earlier cuts to help control aggressive and rank eutrophic plants.

- Agricultural intensification

Particularly in undesignated sites, the habitat is vulnerable to conversion to arable or a reseeded sward of 'improved' grassland as well as the application of fertilisers and/or herbicides which result in a 'semi-improved' sward of *Lolio-Cynosuretum*.

- Air pollution

Based on an assessment of the exceedence of relevant critical loads (see Technical note III), air pollution is not considered to be a potentially significant pressure to the structure and function of this habitat.

4.2 Current condition

4.2.1 Common Standards Monitoring (CSM) condition assessments

Condition assessments based on CSM (see http://www.jncc.gov.uk/page-2199) provide a means to assess the structure and functioning of H6510 in the UK. The following attributes were examined for all CSM assessments relevant to the habitat:

- Extent
- Grass:herb ratio
- Positive indicator species
- Negative indicator species
- Indicators of local distinctiveness
- Height
- Litter
- Bare ground

SAC condition assessments

Table 4.2.1 and Map 4.2.1 summarise the CSM condition assessments for UK SACs supporting habitat H6510. These data were collated in January 2007. The maps give an impression of the overall spread of where unfavourable and favourable sites exist (summary statistics for the map are given in Section 7.2). The combined assessments show that of the SACs assessed:

- 68% of the area and 40% of the number of assessments was unfavourable;
- at least 30% of the total UK habitat area was in unfavourable condition; and
- none of the unfavourable habitat was classed as recovering in condition.

Table 4.2.1 CSM condition assessment results for UK SACs supporting H6510. See notes below table for details. Information on the coverage of these results is given in Section 7.2

Condition	Condition sub-categories	Area (ha)	Number of site features
Unfavourable	Declining		
	No change	458	2
	Unclassified		
	Recovering		
	Total	458	2
	% of all assessments	***68%***	***40%***
	% of total UK resource	***30%***	***unknown***
Favourable	Maintained		
	Recovered		
	Unclassified	214	3
	Total	214	3
	% of all assessments	***32%***	***60%***
	% of total UK resource	***14%***	***unknown***

Notes
1. Data on features that have been partly-destroyed have been excluded from this table because they are not relevant to the consideration of present condition.
2. The data included are from CSM assessments carried out between April 1998 and December 2006. NB: these include additional and some up-date data form those used in the six year report produced by JNCC. (Williams, J.M., ed. 2006. *Common Standards Monitoring for Designated Sites: First Six Year Report*. Peterborough, JNCC).
3. Only assessments made for qualifying interest features on SAC have been included in this analysis.
4. Area figures for CSM assessments have been calculated using the data presented on the standard Natura 2000 data forms submitted to the EU.

SSSI/Area of Special Scientific Interest (ASSI) condition assessments

Table 4.2.2 and Maps 4.2.2 and 4.2.3 summarise the CSM condition assessments that were judged to be either strongly or weakly indicative of the condition of the Annex I habitat on SSSI/ASSIs (see Technical note II for details of methodology behind this). These data were collated in January 2007. The maps give an impression of the overall spread of where unfavourable and favourable sites exist (summary statistics for the maps are given in Section 7.2). The combined condition assessments show that of the SSSI/ASSI assessments considered:

- 56% of strongly indicative assessments were unfavourable, most of which were recovering in condition.

A snapshot estimate of the condition of MG4 grassland was provided in Holmes *et al.* (2005) who conducted a refined report on condition of MG4 sites alone during 2005. This report indicated that 68% of SSSIs within England were in favourable condition at the time of assessment, with a further 15% recorded as being unfavourable recovering. Approximately 1,388 ha or 92% of this grassland type is under statutory notification in England (Holmes *et al.* 2005).

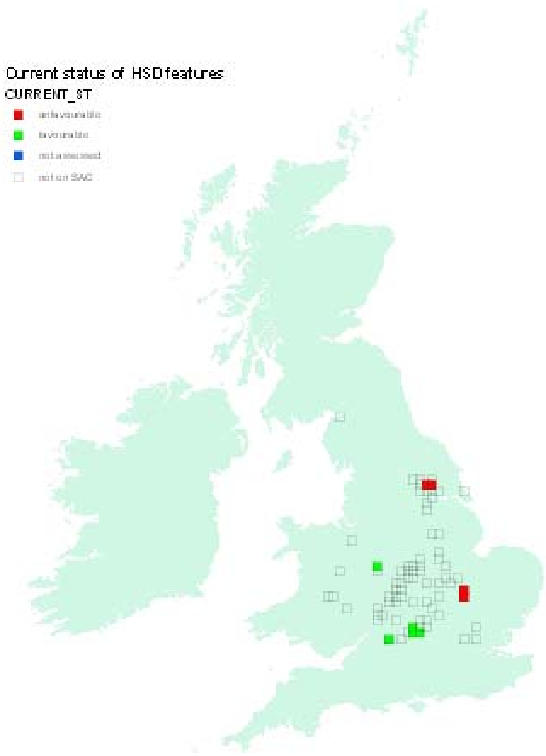
Table 4.2.2 CSM condition assessment results for UK SSSI/ASSIs that were judged to be either strongly or weakly indicative of the condition of H6510 on SSSI/ASSIs. See notes below table and Technical note II for further details

Condition	**Condition sub-categories**	**Number of assessments**	
		Strongly indicative assessments (Category 1)	**Weakly indicative assessments (Category 2)**
Unfavourable	Declining	4	
	No change	16	
	Unclassified		
	Recovering	37	
	Total	57	
	% of all assessments	***56%***	***%***
Favourable	Maintained		
	Recovered		
	Unclassified	44	
	Total	44	
	% of all assessments	***44%***	***%***

Notes
1. Data on features that have been partly-destroyed have been excluded from this table because they are not relevant to the consideration of present condition.
2. The data included are from CSM assessments carried out between April 1998 and December 2006.

Condition of other sites

The results of a recent survey of 500 non-statutory good quality grassland sites outside the series of designated sites (Hewins *et al*. 2005) indicate that only 22% of the 100 or so lowland meadows surveyed were in favourable condition. Sites failed most frequently because they lacked positive indicator species in sufficient number and at frequency levels characteristic of good quality semi-natural grasslands, and because the ration of forbs to grasses was too low. Analysis also revealed that 38% of lowland meadow sites now show greatest botanical similarity to agriculturally improved grassland types indicating actual loss. However, it is important to note that the vast majority of meadow sites sampled for this survey were MG5 as opposed to MG4. Indeed there are very few remaining stands of this vegetation type outside the designated sites (Holmes *et al.* 2005).

<table>
<tr><td colspan="3">Current Condition of H6510 based on CSM condition assessments (See Sections 4.2 and 7.2 for further information)</td></tr>
<tr><td>Map 4.2.1 SAC assessments</td><td>Map 4.2.2 Assessments strongly indicative of the condition on SSSI/ASSIs</td><td>Map 4.2.3 Assessments weakly indicative of the condition on SSSI/ASSIs</td></tr>
<tr><td>
</td><td>
</td><td>Not applicable</td></tr>
<tr><td>Key
<u>Red = unfavourable</u>, i.e. the square contains at least one SAC where this habitat feature is present and has been judged to be unfavourable
<u>Green = favourable</u>, i.e. the square contains at least one SAC where this habitat feature is present and has been assessed as favourable but there are no unfavourable SAC features
<u>Blue = SAC not assessed</u>, i.e. the square contains at least one SAC supporting this habitat feature but no assessment has been reported
<u>Transparent = SAC feature not present</u>, i.e. the square does not contain any SAC features of this habitat type</td><td colspan="2">Key*
<u>Green</u> – 80 – 100% of assessed features on 10km square are favourable
<u>Yellow</u> - 50 – 80% of assessed features on 10km square are favourable
<u>Orange</u> - 20 – 50% of assessed features on 10km square are favourable
<u>Red</u> - 0 – 20% of assessed features on 10km square are favourable
*This is the same key as was used for JNCC CSM Report 2006</td></tr>
</table>

4.3 Typical species

Typical species[2.5.3]: **None**

Typical species assessment[2.5.4]: **Not applicable**

No species are confined to this habitat. Although *Sansguisorba officinalis* probably has a reasonable affinity, other species are typical of other habitats, including the related MG5 grassland types (see section 1). It has tentatively been concluded that no typical species can be identified.

Candidate typical species are provided in the table below; these are species listed in EU Interpretation Manual and which are known to occur in British MG4 vegetation.

Table 4.3.1 Candidate typical species

	Trend based on BSBI Atlas (Preston *et al.* 2002):	**Trend, based on Braithwaite *et al.* 2006:**
Knautia arvensis	Declining	Declining
Leucanthemum vulgare	Declining	Stable
Sansguisorba officinalis	Declining slowing	Declining
Trisetum flavescens	Stable	Stable
Arrhenatherum elatius	Stable	Stable
Tragopogon pratensis	Stable	Stable
Alopecurus pratensis	Stable	Stable

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

Conclusion[2.6.iii]: **Unfavourable – Bad but improving**

The EC Guidance states that where "more than 25% of the area of the habitat is unfavourable as regards its specific structures and functions", the conclusion should be Unfavourable – Bad. In the UK this was generally taken to mean that more than 25% of the habitat area in unfavourable condition.

CSM site condition assessments show that 68% of the area and 40% of the number of SAC assessed were in unfavourable condition, representing at least 30% of the total UK habitat area for H6510. For SSSIs, 56% of strongly indicative assessments were found to be unfavourable. Although none of the unfavourable assessments on SACs showed signs of recovery, most of those on SSSIs did. Thus, much more than 25% of the habitat is in unfavourable condition, albeit that there are some signs of recovery.

5. Future prospects

5.1 Main factors affecting the habitat

5.1.1 Conservation measures

This habitat forms part of a national action plan under the UK BAP (see http://www.ukbap.org.uk/UKPlans.aspx?ID=10), with targets to maintain, improve, restore and expand the resource.

It is also covered by agri-environment schemes in England and Wales, which can contract landowners to maintain, restore and create this type of grassland. The latest agri-environment schemes should help to reduce the continuing losses of this habitat and so in the absence of other evidence, the situation has been judged to be stable.

Restoration or re-creation may be hampered by a lack of suitable sites with relatively low fertile soils. Available evidence suggests that if a stand of MG4 has been recently lost but is still under non-intensive grassland management, then corrective management may rehabilitate the community in the short to medium term (5-20 years). However if the soil has been disturbed or the P (Phosphorous) status increased, restoration may require a far longer timescale (several decades plus).

Since the vast majority of stands of this grassland type fall under statutory designation, site specific factors relating to agricultural management can theoretically be addressed using incentive and regulatory measures as appropriate. In England there was an intention by Natural England to notify remaining stands of the requisite quality.

Remedial actions associated with implementation of the Water Framework Directive (WFD) can be expected to benefit some sites for this habitat.

5.1.2 Main future threats[2.4.11]
701 water pollution
954 invasion by a species
120 Fertilisation
110 Use of pesticides
420 Discharges
840 Flooding
853 management of water levels
950 Biocenotic evolution
141 Abandonment of pastoral systems
101 Modification of cultivation practices
120 Fertilisation
702 air pollution
162 Artificial planting

- Water and nutrient regime

The habitat's dependence upon a suitable annual cycle of inundation means that it remains vulnerable to problems in controlling the timing, magnitude and water quality of inundation (see section 4.1). In particular, the supply of nutrients loaded onto MG4 meadows via sediment deposition in floodwaters is high and is not effectively controlled.

- Management neglect

Sites need a minimal level of grazing and hay-cropping, and may need higher levels if the water which inundates them is subject to nutrient enrichment. Underlying causes of under-grazing are thought to be largely due to current agricultural economics and policies, leading to a reluctance to keep stock.

- Agricultural intensification

Particularly in undesignated sites, the habitat is still vulnerable to conversion to arable or to a reseeded sward of 'improved' grassland as well as to the application of fertilisers and/or herbicides to otherwise undisturbed sites.

- Climate change

Based on the literature review (see Technical note IV) climate change is considered a major threat to the future condition of this habitat, especially in the long term. However, there is a high degree of uncertainty in defining future climate threats on habitats and species due to uncertainty in: future greenhouse gas emissions; the consequential changes in climatic features (for instance temperature, precipitation CO_2 concentrations); the responses of habitats and species to these changes (for instance location, phenology, community structure) and the role of other socio-economic drivers of environmental change. The scale of change in habitats and species as a result of climate change will vary across ecosystems. Small changes in the climate are more likely to have a substantial impact on habitats and species which exist within a narrow range of environmental conditions. The future impacts of climate change on UK biodiversity will be exacerbated when coupled with other drivers of environmental change.

There is particular concern that the higher frequency of warm springs in the past decade, which may also be a feature of climate change in future, will favour grass dominance through encouraging an early burst of nitrogen mineralization. The impact of climate change on flood regime could also affect the habitat. These factors are difficult to quantify and can only be tackled at the broad scale by national policy changes.

- 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.

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

5.2.1 CSM condition assessments

The CSM condition assessments reported in Sections 4.2.1-2 provide a basis to predict the potential future condition of H6510 in the UK. This involved treating all assessments currently identified as either favourable or unfavourable recovering as future-favourable: remaining categories were treated as future-unfavourable – see Table 5.2.1. There are a number of caveats to this approach, which are set out beneath this table.

SAC condition assessments

Table 5.2.1 and Map 5.2.1 summarise the predicted potential future condition of H6510 on UK SACs. This is based on the approach described above. The maps give an impression of the overall spread of where future-unfavourable and future-favourable sites are predicted to occur (summary statistics for the map are given in Section 7.2). The combined assessments show that of the SACs assessed:

- 32% of the area and 60% of the number of assessments fall within the future-favourable category; and
- at least 14% of the total UK habitat area falls within the future-favourable category.

Table 5.2.1 Predicted future condition of UK SACs supporting H6510 based on current CSM condition assessments. See notes below table for details. Information on the coverage of these results is given in Section 7.2

Future condition	Present condition	Area (ha)	Number of site features
Future-unfavourable	Unfavourable declining		
	Unfavourable no change	458	2
	Unfavourable unclassified		
	Total	458	2
	% of assessments	***68%***	***40%***
	% of total UK extent	***30%***	***Unknown***
Future-favourable	Favourable maintained		
	Favourable recovered		
	Unfavourable recovering		
	Favourable unclassified	214	3
	Total	214	3
	% of assessments	***32%***	***60%***
	% of total extent	***14%***	***Unknown***

Note that the scenario presented above is based on the same information as used to construct the Table 4.2.1. It is based on the following premises:
(i) the unfavourable-recovering condition assessments will at some point in the future become favourable;
(ii) all unfavourable-unclassified sites will remain unfavourable, which is probably overly pessimistic;
(iii) sympathetic management will be sustained on sites already classified as favourable and these will not be seriously damaged by any unforeseen events.
IMPORTANT NOTE: We do not have information on the timescale of the predicted recovery, which may be influenced by many past, natural and human related factors. A sustained, sympathetic management regime is more likely to result in 'favourable' condition being attained.

Table 5.2.2 Predicted future condition of H6510 on SSSI/ASSIs based on CSM assessments that were judged to be either strongly or weakly indicative of the condition. See notes below table and Technical note II for further details

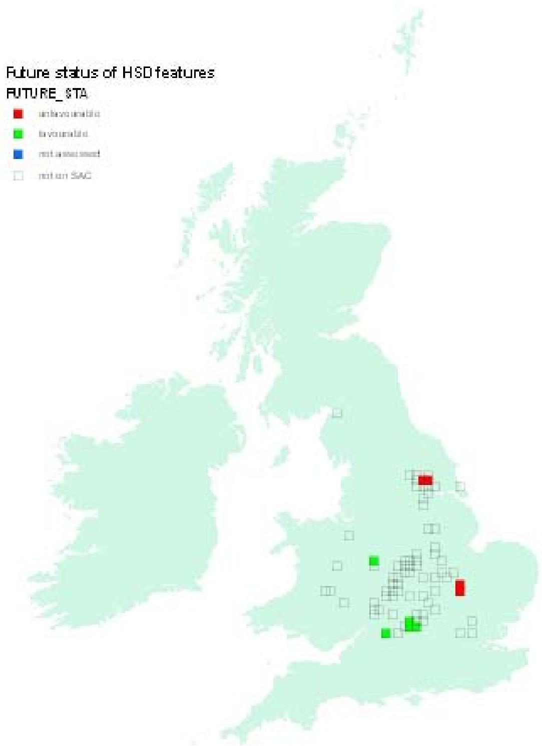
Future condition	**Present condition**	**Number of assessments**	
		Strongly indicative assessments (Category 1)	**Weakly indicative assessments (Category 2)**
Future-unfavourable	Unfavourable declining	4	
	Unfavourable no change	16	
	Unfavourable unclassified		
	Total	***20***	
	% of assessments	***20%***	***%***
Future-favourable	Favourable maintained		
	Favourable recovered		
	Unfavourable recovering	37	
	Favourable unclassified	44	
	Total	81	
	% of assessments	***80%***	***%***

Note that the scenario presented above is based on the same information as used to construct the Table 4.2.2. It is based on the following premises:
(i) the unfavourable-recovering condition assessments will at some point in the future become favourable;
(ii) all unfavourable-unclassified sites will remain unfavourable, which is probably overly pessimistic;
(iii) sympathetic management will be sustained on sites already classified as favourable and these will not be seriously damaged by any unforeseen events.
IMPORTANT NOTE: We do not have information on the timescale of the predicted recovery, which may be influenced by many past, natural and human related factors. A sustained, sympathetic management regime is more likely to result in 'favourable' condition being attained.

SSSI/ASSI condition assessments

Table 5.2.2 and Maps 5.2.2 and 5.2.3 summarise the predicted potential future condition of H6510 on UK SSSI/ASSIs. This is based on the approach described above and utilises condition assessments that were judged to be either strongly or weakly indicative of the condition of the Annex I habitat on SSSI/ASSIs (see Technical note II for details of methodology behind this). The maps give an impression of the overall spread of where unfavourable and favourable sites exist (summary statistics for the maps are given in Section 7.2). The combined condition assessments show that of the SSSI/ASSI assessments considered:

- 80% of strongly indicative assessments fall within the future-favourable category.

Predicted Future Condition of H6510 based on CSM condition assessments (See Sections 5.2 and 7.2 for further information on these maps)		
Map 5.2.1 SAC assessments	**Map 5.2.2** Assessments strongly indicative of the condition on SSSI/ASSIs	**Map 5.2.3** Assessments weakly indicative of the condition on SSSI/ASSIs
		Not applicable
Key <u>Red = future-unfavourable</u>, i.e. the square contains one or more SACs where this habitat feature is present and has been predicted to be future-unfavourable <u>Green = future-favourable</u>, i.e. the square contains at least one SAC where this habitat feature is present and has been predicted to be future-favourable <u>Blue = SAC not assessed</u>, i.e. the square contains at least one SAC supporting this habitat feature but no assessment has been reported <u>Transparent = SAC feature not present</u>, i.e. the square does not contain any SAC features of this habitat type	Key* <u>Green</u> – 80 – 100% of assessed features on 10km square are favourable <u>Yellow</u> - 50 – 80% of assessed features on 10km square are favourable <u>Orange</u> - 20 – 50% of assessed features on 10km square are favourable <u>Red</u> - 0 – 20% of assessed features on 10km square are favourable *This is the same key as was used for JNCC CSM Report 2006	

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

Conclusion[2.6.iv]: Unfavourable – Bad but improving

The EC Guidance states that where "habitat prospects are bad, with severe impacts from threats expected and long-term viability not assured", the judgement should be Unfavourable – Bad. In the UK, this was generally taken to mean that habitat range and/or area are in decline, and/or less than 75% of the habitat area is likely to be in favourable condition in 12-15 years.

The range of the habitat is stable. Although it has declined in area since 1994, such losses should be stemmed over the next 10-15 years aided by the latest improvements in agri-environment schemes. CSM assessments on SACs indicate that only 32% of the habitat area therein is in favourable condition with no obvious signs of recovery at present. For relevant SSSIs the situation is better because the majority of sites currently in unfavourable condition are recovering: the indication is that 80% of SSSIs could therefore become favourable. However, even making allowance for some additional recovery (as further conservation measures are put into place), it still appears that SACs for H6510 will largely remain unfavourable and that more than 25% of the overall resource will be unfavourable in 12-15 years time.

6. Overall conclusions and judgements on conservation status [2.6]

Conclusion[2.6]: Unfavourable – Bad but improving

On the basis of the Structure and Function and Future Prospects assessments, the overall conclusion for this habitat feature is Unfavourable – Bad but improving.

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 less than the favourable reference range.	2
Area covered by habitat type within range	Unfavourable – Inadequate and deteriorating	Current extent is below the favourable reference area, but not by more than 10%. Further measures are required to address threats to future range for the overall UK resource.	2
Specific structures and functions (including typical species)	Unfavourable – Bad but improving	More than 25% of the habitat area is considered to be unfavourable as regards its specific structures and functions. Significantly more of the resource in unfavourable condition is improving than declining.	1
Future prospects (as regards range, area covered and specific structures and functions)	Unfavourable – Bad but improving	Habitat prospects over next 12-15 years are considered to be bad, with severe impact from threats expected, and long term viability not assured. However, measures are in place/ planned to address threats to future range, extent and structure and function, for the overall UK resource.	3
Overall assessment of conservation status	Unfavourable – Bad but improving	At least one Unfavourable – Bad.	1

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. Peterborough: Joint Nature Conservation Committee.

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7.2 Further information on CSM data as presented in Sections 4.2 and 5.2

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)	5
Number of SACs with CSM assessments (b)	5
% of SACs assessed (b/a)	100
Extent of feature in the UK – hectares (c)	1,510
Extent of feature on SACs – hectares (d)	672
Extent of features assessed – hectares (e)	672
% of total UK hectarage on SACs (d/c)	45
% of SAC total hectarage that has been assessed (e/d)	100
% of total UK hectarage that has been assessed (e/c)	45

Table 7.2.2 Summary of grid square map data shown in Maps 4.2.1-3 and 5.2.1-3

Status	Number of squares	Proportion of all squares
Current – Unfavourable (red)	4	5%
Current – Favourable (green)	5	7%
On SAC but not assessed (blue)		%
Not on SAC (transparent)	67	88%
Total Number of 10km squares (any colour)	76	
Future – Unfavourable (red)	4	5%
Future – Favourable (green)	5	7%