

7.3 Comparison of representation of grassland on NNRs, NCR sites and SSSIs

The comparative representation of grassland types in sites with national status and protection is summarised in Table 14. Representation is a complex function of extent of the resource and evolving criteria for site selection and perceived threats, set against a changing pattern of land use. The development of the Natural Areas concept will allow representation relevant to the 1990s to be examined. Nevertheless some comments can be made on the national data gathered to date.

On a national scale, the NNR and NCR series have a greater preponderance of calcareous grassland (especially chalk grassland) compared to the SSSI series (Table 14). This may in part be due to the early recognition of the importance of calcareous grasslands, reflected in the acquisition of NNRs and choice of NCR sites. The SSSI series is more balanced in terms of calcareous/neutral grasslands, perhaps partly due to the more recent recognition of the scarcity of neutral grasslands and their rapid rate of loss. It should be remembered that even though the numbers of sites with neutral grassland approach those with calcareous grasslands, the actual area notified is much less as most neutral grasslands are only a few hectares in size. As a comparison, the 1995 national collation of chalk grassland information found that 75% of calcareous grassland on chalk is now SSSI, ie 19,000 ha. This is about double the entire national resource of botanically interesting neutral grassland (Table 2).

Lowland wet grassland is identified as a priority habitat for conservation in the English Nature's review of context and priorities for bird conservation (Brown and Grice 1993) and by the RSPB (Housden *et al* 1991). Examination of the under-representation of wet neutral grassland in the NNR and NCR series, when compared to SSSI, would appear to be timely (Table 14).

Knowledge of the extent and nature conservation interest of lowland acid grasslands is limited and this type may not be adequately represented on statutory sites. Acid grassland is usually present in a mosaic with other habitats, principally heathland. Table 13 shows that 80% occurs in sites with other habitats, and in two thirds of sites it is associated with other grassland types.

Table 14 Percentage representation of grassland types in NNRs, NCR sites and SSSIs

	% NNRs (n = 49)	% NCR (n = 128**)	% SSSI (n = 1322)
Acid grassland	12	11	18
Calcareous grassland	55 [39% chalk]	71 [47% chalk]	45
Neutral grassland	37	20	42
*Wet neutral grassland	12	12	37†

Note: Sites can contain more than one type of grassland
 *Note: Interpretation difficult, may include some mire types.
 †Wet neutral (28%) + wet neutral grassland/fen (9%)
 **Excludes Calaminarian (metallophyte) sites (3)

7.4 Representation of grassland on SSSIs in relation to the total resource

At present there is a lack of comprehensive national information about areas of grassland on SSSIs or in the wider countryside, but a few examples are listed below from individual counties where estimates have been made. An exception is for chalk grassland where the national assessment of current SSSI status indicated that 304 SSSIs include calcareous grassland, covering 75% of the resource.

The proportion of the resource that is scheduled is very variable across geographic areas and between grassland types. When the composition and characteristics of Natural Areas are worked out, these variations and the rationale for them, if any, needs to be examined in detail.

- Dorset, neutral grassland (Porley and Ulf-Hansen 1991) - 79% in SSSI.
- East Sussex, neutral grassland (Steven 1990) - 18.6% of known resource in SSSI and LNRs.
- Yorkshire Dales Area of Search, neutral grassland (Mercer 1992) - 0.4% of a relatively large resource (c.2800 ha) in SSSIs.
- Bedfordshire, neutral grassland (Soden 1989) - 38% in SSSIs.
- Worcestershire, neutral grassland (NVC type MG5) (Stephen 1993) - 12% in SSSIs.
- East Midlands (Beds, Cambs, Leics, Lincs, Northants), Jurassic (Oolitic) limestone grassland (Soden 1991) - 87% in SSSIs.

8. Non-statutory priorities

Apart from statutory and NCR designations, the relative priorities for the conservation of grassland habitats and species have been expressed in a number of ways.

8.1 Biodiversity report for the UK

The report of the UK Steering Group (1995) lists key habitats which merit costed action plans and are thus priorities for conservation action. Key habitats are defined as:

- those for which the UK has an international obligation;
- habitats at risk, eg with a high rate of decline, or which are rare;
- areas important for key speices;
- areas, particularly marine areas, which may be critical for organisms inhabiting wider ecosystems.

Grassland key habitats or those where grassland is an important element of the habitat are:

- Lowland hay meadows
- Upland hay meadows
- Lowland dry acid grassland
- *Purple moor grass and rush pastures
- Lowland calcareous grassland
- *Coastal and floodplain grazing marsh
- Lowland wood pastures and parklands

(* these habitats have costed action plans described in Volume 2 of the report. Other action plans will be produced over the next few years).

8 2 Habitat conservation priorities in England

A report produced by English Nature's Habitats Branch, before EN's reorganisation (Moffat 1994), identified conservation priorities for habitats based on several criteria such as international importance, area in England, loss since 1940, threat, and fragmentation. The study did not take account of individual species supported by the habitats and was intended to be used with species information to provide framework for setting targets for action. The relative priorities assigned to lowland grassland habitats are shown in Table 15.

Table 15 Priority for action for English habitats
(A = highest priority, E = lowest).

Habitat	Habitat priority
Brackish lagoons	A
Chalk cliffs	
Dystrophic standing waters	
Lowland neutral meadow and pasture	
Mesotrophic running waters	
Mesotrophic standing waters	
Shingle structures	
Ancient parkland and wood pasture	B
Eutrophic standing waters	
Lowland dry heath	
Lowland wet grassland (total)	
Lowland wet grassland (unimproved)	
Lowland wet heath	
Maritime heath	
Raised mire	
Soligenous base poor fen (lowland)	
Topogenous base rich fen	
Upland blanket mire	
Upland calcareous grasslands	
Upland dwarf shrub	
Beech/yew woods	C
Dune wetlands	
Eastern oakwoods	
Eutrophic running waters	
Fen meadow	
Intertidal sand and mudflats	
Limestone pavements	
Lowland calcareous grassland	
Lowland dry acid grassland	
Mixed deciduous	
Montane	
Oligotrophic standing waters	
Saltmarsh	
Soligenous base rich fen (lowland)	
Topogenous base poor fen	
Unprotected soft cliffs	
Western oakwoods	
Coastal dunes	D
Hard cliffs	
Hedges	
Maritime grasslands	
Oligotrophic running waters	
Wet woodland	
Arable	E
Coniferous plantations	
Gravel pits	
Improved/semi-improved grassland	
Other woods	
Reservoirs	
Running waters (degraded)	
Standing waters (degraded)	
Upland acidic grassland	

Priority ranking was scored according to the following criteria: International importance, percentage of GB total, area in England, loss since 1940, threat, naturalness, degree of fragmentation and patch size.

8.3 Natural Area profiles

Following the development of English Nature's Natural Area concept, the national significance of each Natural Area in terms of its botanically interesting semi-natural grassland has been assessed (Jefferson 1996). The ratings range from 'outstanding' with more than 40% of the England resource a grassland type or three or more types with 10-40%, to 'negligible' for Natural Areas where semi-natural lowland grassland is extremely scarce. Examples of outstanding Natural Areas are Breckland, Greater Cotswolds, and the North Pennines.

8.4 Priority habitats for birds

The report by Brown and Grice (1993) described the broad habitats of particular significance for birds, either for nesting, feeding, loafing and roosting. In addition the relative priorities among these habitats for bird conservation were defined and are shown in summary form in Table 16. Lowland wet grassland is a high priority while dry grassland is regarded as a medium priority.

Table 16 Prioritization of bird habitats in England

Bird habitat	Priority Rating
Montane	Low
Upland heaths	Medium
Upland mires	Medium
Uplands grasslands	Low
Broad leaved woods/scrub	Medium
Lowland heath	High
Dry grassland	Medium
Swamps/fen/carr	High
Lowland wet grassland	High
Marine	Low
Inshore waters	Low
Sea cliffs and rocks	Low
Intertidal flats	High
Saltmarsh	High
Shingle and sand	Medium
Coastal lagoons	Medium
Oligo/mesotrophic waters	Low
Eutrophic waters	Medium
Rivers and streams	Low
Plantations	Low
Extraction pits and reservoirs	Low
Arable	Medium
Improved pastures and leys	Medium
Built up areas	Low

Priority ranking was scored according to the following criteria: Area of habitat, past losses, predicted losses and number of priority bird species.

8.5 Lower plant assemblages

The UK Plant Conservation Strategy (Palmer 1994), lists several assemblages of lower plants (bryophytes, lichens, fungi and algae) that are internationally important. These assemblages are described in Table 17 and those that are related to grassland habitats in England are highlighted.

Table 17 Internationally important assemblages of lower plants

Bryophytes, lichens and fungi of Atlantic woodlands, especially those of western Scotland.
Atlantic-influenced arctic-alpine communities.
Bryophytes of raised and blanket mires.
The northern Atlantic hepatic mat, a liverwort community unique to Ireland and the west of Scotland.
Bryophytes and lichens of machair grassland (found only in western Ireland and Scotland) and dune communities.
Lichen and bryophyte assemblages of rocky sea coasts.
Bryophyte communities of sandstone formations in south-eastern England.
Bryophyte and lichen communities of chalk downland and chalk cliffs.
Lowland lichen-rich heath, including maritime cliff-top heath.
Lichen and fungus assemblages of Caledonian pine forest.
Epiphytic bryophytes and lichens of ancient parkland trees and pasture woodlands.
Pollution-sensitive epiphyte assemblages still frequent in the western UK but which have declined or disappeared elsewhere in Europe.
Metallophyte lichen communities (eg on old mine waste)
Algae of brackish lagoons and estuaries.
Marine algal communities, including maerl beds, <i>Ascophyllum nodosum</i> var. <i>mackaii</i> beds, communities of tide-swept narrows associated with sea lochs/loughs and communities of micro-algae on chalk cliffs.

8.6 Species Recovery Programme

English Nature has a programme to actively improve the survival prospects of rare and endangered species, through action such as species re-introduction and habitat management. Grassland species that are either being proposed, or that are in projects that are pre, full or post-recovery in type in 1995/96 are listed in Table 18.

Table 18 Species Recovery Programme projects that cover grassland species

Species	Grassland type
Lower Plants	
Breckland lichens, <i>Buellia asterella</i> , <i>Fulgensia fulgens</i> , <i>Squamaria lentigera</i>	Calcareous grassland
Vascular plants	
<i>Ajuga chamaepitys</i> (Ground pine)	Disturbed calcareous grassland
<i>Apium repens</i> (Creeping marshwort)	Wet grassland
<i>Cypripedium calceolus</i> (Lady's slipper orchid)	Calcareous grassland/woodland edge
<i>Scleranthus perennis prostratus</i> (Perennial knawel)	Breck acid grassland
Invertebrates	
<i>Bembecia chrysidiformis</i> (Fiery clearwing moth)	Disturbed calcareous grassland
<i>Decticus verrucivorus</i> (Wart-biter cricket)	Calcareous grassland
<i>Gryllotalpa gryllotalpa</i> (Mole cricket)	Wet grassland
<i>Gryllus campestris</i> (Field cricket)	Acid grassland
<i>Maculinea arion</i> (Large blue butterfly)	Calcareous grassland
<i>Siona lineata</i> (Black-veined moth)	Calcareous grassland
Birds	
<i>Burhinus oediconemus</i> (Stone curlew)	Calcareous grassland

9. Incentive schemes and agreements on lowland grassland

In response to the losses and fragmentation of the lowland grassland resource several incentive schemes have been developed and now cover several thousand hectares of grassland.

9.1 Targeting schemes: the County Grassland Inventories

In 1992, the grassland specialists in English Nature initiated a project to index and map all lowland grasslands which had known botanical interest. The project primarily utilises Phase 2 grassland survey records from the extensive surveys carried out in the 1980s and early 1990s by the NCC and English Nature. Inventories have now been produced for most counties and all counties will be completed by the end of 1996. A sample map and page from the spreadsheet index is shown in Appendix 2, together with the rationale behind the choice of sites for the inventories. The principal use of the inventories is to target incentive schemes, particularly Environmentally Sensitive Area schemes and the Countryside Stewardship Scheme.

9.2 SSSIs: Wildlife Enhancement Schemes

English Nature has developed a number of WES for suites of SSSIs in particular areas. The aim is to provide standardised positive payments to land managers to

maintain or restore the wildlife interest of these SSSIs. Grasslands rely heavily on continued management to conserve their characteristic species assemblages and figure prominently in the WES developed to date. A list of WES related to inland grassland habitats is given in Table 19.

Table 19 Wildlife Enhancement Schemes that include grassland habitats

Name of Scheme	Grassland type
North Yorks Moors Meadows and Pastures	Neutral and calcareous grasslands
Yorkshire Dales Meadows and Pastures	Neutral grasslands
Craven Limestone Grasslands, Yorkshire	Calcareous grassland
White Peak habitats	Calcareous and neutral grasslands
Magnesian Limestone Grasslands, North-East England	Calcareous grassland
Culm Grasslands, Devon & Cornwall	Wet and neutral grasslands, fen meadow
Hereford & Worcester Grasslands	Neutral grasslands
Vales of Yorkshire Lowland Wet Grasslands	Wet grassland including flood meadows
Avon Levels and Moors	Wet grassland

9.3 Environmentally Sensitive Areas

These areas are defined by MAFF and the first ones were designated in 1987-1988. To date 22 Areas have been designated and cover particular parts of the countryside where the landscape, wildlife and historic interest are of national importance. The scheme was set up to provide incentives to farmers to manage these features in a traditional, less-intensive way as compared to modern farming methods. English Nature contributed to the choice of Areas and a number of them have significant value for their lowland grassland, either botanically interesting grassland or grassland supporting important species interest. The ESAs and their grassland significance are listed in Table 20.

Table 20 Environmentally Sensitive Areas and their lowland grassland interest

ESA name	Grassland types
+* Breckland	Acid and calcareous grasslands including lichen grass-heath.
+ The Broads	Wet grassland.
North Peak	Primarily upland, very limited area of enclosed grassland, mostly improved.
* Pennine Dales	Northern neutral hay meadows.
Clun	Mix of upland and lowland including some neutral grassland.
+* Somerset Levels and Moors	Wet grasslands including fen meadows.
• South Downs	Calcareous grasslands.
Suffolk River Valleys	Mix of wet grassland, neutral meadows and reed bed.
Test Valley	River and wet grassland.

ESA name	Grassland types
West Penwith	Mix of heath, coastal and enclosed grassland, mostly improved.
+ Avon Valley	River and wet grassland including water meadows.
Exmoor	Primarily upland, some unimproved enclosed grassland.
* The Lake District	Upland and dales with northern neutral meadows, wet grassland and calcareous grassland.
+North Kent Marshes	Coastal grazing marsh.
* South Wessex Downs	Calcareous grassland.
South West Peak	Mainly upland, a little unimproved enclosed grassland.
The Blackdown Hills	Mix of woodland, grassland, heath and mire including unimproved wet acid grassland/fen meadow.
* The Cotswold Hills	Calcareous grassland.
Dartmoor	Principally upland but enclosed grassland includes wet acid grassland/fen meadow.
+ The Essex Coast	Coastal grazing marsh.
*The Shropshire Hills	Upland and woodland and some enclosed grassland, some unimproved neutral/acid grassland.
* The Upper Thames Tributaries	Rivers and wet grassland including flood meadows on neutral substrates.

* Significant for lowland grassland of botanical interest

+ Significant for species especially birds and/or ditch fauna and flora

9.4 Countryside Stewardship Scheme

The Countryside Stewardship Scheme is similar to the ESA scheme in that it offers management agreements to enhance and conserve important English landscapes, their wildlife habitats and history. Payments are made for changes in farming and land management practice which produce conservation benefits or improved access and enjoyment of the countryside. The scheme differs from the ESA scheme in that it is open to any land managers, including voluntary bodies and local authorities and applies anywhere in England where certain landscapes occur. Most of the qualifying landscapes have some lowland grassland component, in several cases it is the predominant feature. The landscapes are:

- Chalk and limestone grassland.
- Waterside land. This includes wet meadows, grazing marshes and wet pastures.
- Uplands. These include enclosed unimproved hay meadows.

- Historic landscapes. These include wood-pasture and parklands where grazing can be re-introduced and the restoration of historic irrigated water meadows.
- Old orchards. The grassland beneath the trees is included for payments and can be unimproved in character.
- Old meadows and pastures. All acid and neutral unimproved lowland grassland including wet acid grassland and fen meadows.

9.5 Monitoring of SSSIs, schemes and ageements

All the incentive schemes have monitoring requirements. English Nature has undertaken a sample survey of lowland grassland SSSIs (Sketch 1995) as part of the organisation's monitoring strategy for SSSIs. The survey was based on a stratified random sample of site management units so that wider conclusions could be drawn about the condition of the SSSI series as a whole. Approximately 50% of the units were managed with the help of incentive schemes.

The County Grassland Inventories have a useful role to play in the monitoring of the effectiveness of wider incentive schemes outside the SSSI series.

10. Bibliography of key references on grassland issues

The following brief lists are intended as guides to significant material on grassland issues in major topic areas.

10.1 Extent, distribution and condition/status of grassland communities and species

BATTEN, L.A., BIBBY, C.J., CLEMENT, P., ELLIOT, G.D. & PORTER, R.F., 1990. *Red Data Birds in Britain*. London: T. and A.D. Poyser.

BRATTON, J.H. ed., 1991. *British Red Data Books: 3. Invertebrates other than insects*. Peterborough: Joint Nature Conservation Committee.

BROWN, A.F. & GRICE, P.V. 1993. Birds in England: context and priorities. Peterborough: *English Nature Research Reports*, No. 62.

DALBY, G., 1991 Magnesian Limestone, the scientific interest and national importance. *English Nature report*, North East Region, Newcastle.

DARGIE, T., 1993. The distribution of lowland wet grassland in England. Peterborough: *English Nature Research Reports*, No. 49.

DEVON WILDLIFE TRUST, 1990. *Survey of Culm grasslands in Torridge District*. Devon Wildlife Trust, Nature Conservancy Council SW Region.

- DIJK, G. van, 1991. *The status of semi-natural grasslands in Europe*. In: Goriup, P.D., Batten, L.A. and Norton, J.A. (eds.) pp 15-36. The conservation of lowland dry grassland birds in Europe. Peterborough: Joint Nature Conservation Committee.
- DOLMAN, P., 1992. A review of lowland dry grassland birds in Britain: their status, ecological requirements and priorities for conservation. *JNCC Report 125*. Peterborough: Joint Nature Conservation Committee.
- FULLER, R.M., 1987. The changing extent and conservation interest of lowland grasslands in England and Wales: a review of grassland surveys 1930-1984. *Biological Conservation* 40: 281-300.
- HAGGER, R.J. & PEEL, S. (eds), 1994. Grassland management and nature conservation. *British Grassland Society Occasional Symposium No. 28*. Reading: British Grassland Society.
- HILLIER, S.H., WALTON, D.W.H. & WELLS, D.A. (eds.), 1990. *Calcareous Grasslands Ecology and Management*. Huntingdon: Bluntisham Books.
- HOPKINS, J.J., 1990. British meadows and pastures. *British Wildlife* 1: 202-215.
- JEFFERSON, R.G. 1996. Lowland grassland in Natural Areas: national assessment of significance. Peterborough: *English Nature Research Reports*, No. 171.
- KEYMER, R.J. & LEACH, S.J., 1990. *Calcareous grassland - a limited resource in Britain*. In: Hillier, S.H., Walton, D.W.H. and Wells, D.A. *Calcareous Grasslands Ecology and Management*, pp 11-17. Huntingdon: Bluntisham Books.
- KIRBY, P. 1994. Habitat fragmentation, species at risk. Invertebrate group information. Peterborough: *English Nature Research Reports*, No. 89.
- MOFFAT, A.M. (ed.) 1994. Priorities for habitat conservation in England. Peterborough: *English Nature Research Reports*, No. 97.
- NATURE CONSERVANCY COUNCIL, 1984. *Nature Conservation in Great Britain*. Peterborough: Nature Conservancy Council.
- NATURE CONSERVANCY COUNCIL, 1989. *Guidelines for selection of biological SSSIs*. Peterborough: Nature Conservancy Council.
- PALMER, M. & BLAKE, C., 1991. Review of the extent of grassland survey in England. *England Field Unit Report. Project No 101*. Peterborough: Nature Conservancy Council.
- PALMER, M. 1994. A UK plant conservation strategy: a strategic framework for the conservation of the native flora of Great Britain and Northern Ireland. Peterborough, Joint Nature Conservation Committee.
- PERRING, F.H. & FARRELL, L. 1983. *British Red Data Book 1: vascular plants*. 2nd edition. Lincoln, RSNC.

- PORLEY, R.D. & ULF-HANSEN, P.F., 1991. Unimproved neutral grassland in Dorset: survey and conservation. *Proceedings of the Dorset Natural History and Archaeological Society*, **113**: 161-165.
- RATCLIFFE, D.A. ed., 1977. *A Nature Conservation Review*. 2 vols. Cambridge: Cambridge University Press.
- RODWELL, J.S. (ed.), 1991. *British Plant Communities 2: Mires and Heaths*. Cambridge: Cambridge University Press.
- RODWELL, J.S. (ed.), 1992. *British Plant Communities 3: Grassland and Montane Communities*. Cambridge: Cambridge University Press.
- SHIRT, D.B. (ed.), 1987. *British Red Data Books: 2. Insects*. Peterborough: Nature Conservancy Council.
- SKETCH, C. 1995. National SSSI sample survey of lowland grasslands: pilot project. Peterborough: *English Nature Research Reports*, No. 130.
- STEWART, A., PEARMAN, D.A. & PRESTON, C.D. 1994. *Scarce plants in Britain*. Peterborough: Joint Nature Conservation Committee.
- UK STEERING GROUP. 1995. Biodiversity: the UK Steering Group Report. London: HMSO.
- WILLEMS, J.H., 1990. *Calcareous grasslands in continental Europe*. In: Hillier, S.H., Walton D.W.H. and Wells, D.A. (eds.). *Calcareous Grasslands Ecology and Management*, pp 3-10. Huntingdon: Bluntisham Books.

10.2 Understanding the impact of management practices/techniques/environmental factors/land uses/incentive schemes on grassland communities and species

- BUTTERFLIES UNDER THREAT TEAM (BUTT), 1986. *The management of chalk grassland for butterflies*. Peterborough: Nature Conservancy Council.
- CROFTS, A. & JEFFERSON, R.G. (eds), 1994. *The Lowland Grassland Management Handbook*. EN/RSNC. Peterborough: English Nature.
- DUFFEY, E., MORRIS, M.G., SHEAIL, J., WARD, L.K., WELLS, D.A. & WELLS, T.C.E., 1974. *Grassland ecology and wildlife management*. London: Chapman and Hall.
- GIBSON, C.W.D. 1996. The effects of horse grazing on species-rich grasslands. Peterborough: *English Nature Research Reports*, No. 164.
- JOSÉ, P. & SELF, M., 1994. *The management of lowland wet grassland for birds*. In: A. Crofts & R.G. Jefferson eds. *The Lowland Grassland Management Handbook*. EN/RSNC. Peterborough: English Nature.
- KIRBY, P., 1992. *Habitat Management for Invertebrates: a practical handbook*. Sandy: Royal Society for the Protection of Birds.

- HAGGER, R.J. & PEEL, S. (eds), 1994. Grassland management and nature conservation. *British Grassland Society Occasional Symposium No. 28*. Reading: British Grassland Society.
- HILLIER, S.H., WALTON, D.W.H. & WELLS, D.A. (eds.), 1990. *Calcareous Grasslands Ecology and Management*. Huntingdon: Bluntisham Books.
- NATURE CONSERVANCY COUNCIL, 1984. *Nature Conservation in Great Britain*. Peterborough: Nature Conservancy Council.
- SIMPSON, N.A. & JEFFERSON, R.G. 1996. Use of farmyard manure on semi-natural (meadow) grassland. Peterborough: *English Nature Research Reports*, No. 150.
- SKETCH, C. 1995. National SSSI sample survey of lowland grasslands: pilot project. Peterborough: *English Nature Research Reports*, No. 130.

10.3 Ecology of grassland communities and species

- BROWN, A.F. & GRICE, P.V. 1993. Birds in England: context and priorities. Peterborough: *English Nature Research Reports*, No. 62.
- DOLMAN, P., 1992. A review of lowland dry grassland birds in Britain: their status, ecological requirements and priorities for conservation. *JNCC Report 125*. Peterborough: Joint Nature Conservation Committee.
- DUFFEY, E., MORRIS, M.G., SHEAIL, J., WARD, L.K., WELLS, D.A. & WELLS, T.C.E., 1974. *Grassland ecology and wildlife management*. London: Chapman and Hall.
- ELLENBERG, H., 1988. *Vegetation Ecology of Central Europe*. Cambridge: Cambridge University Press.
- FULLER, R.J., 1982. *Bird Habitats in Britain*. Calton: Poyser.
- GIBSON, C.W.D. & BROWN, V.K., 1991. The nature and rate of development of calcareous grassland in southern Britain. *Biological Conservation* 58: 297-316.
- GILBERT, O.L. 1993. The lichens of chalk grassland. *Lichenologist*, 25(4): 379-414.
- GRIME, J.P. , HODGSON, J.G. & HUNT R. 1988. *Comparative plant ecology: a functional approach to common British species*. London: Unwin Hyman.
- HILLIER, S.H., WALTON, D.W.H. & WELLS, D.A. (eds.), 1990. *Calcareous Grasslands Ecology and Management*. Huntingdon: Bluntisham Books.
- HOPKINS, J.J., 1991b. *Vegetation structure and the conservation of wild plants and animals*. In: Curtis, D.J., Bignal, E.M. and Curtis, M.A. *Birds and Pastoral Agriculture in Europe*, pp 12-17. Peterborough: Joint Nature Conservation Committee/Scottish Cough Study Group.
- MARSHALL, J.A. & HAES, E.C.M., 1988. *Grasshoppers and allied insects of Great Britain and Ireland*. Colchester: Barley Books.

RODWELL, J.S. (ed.), 1991. *British Plant Communities 2: Mires and Heaths*. Cambridge: Cambridge University Press.

RODWELL, J.S. (ed.), 1992. *British Plant Communities 3: Grassland and Montane Communities*. Cambridge: Cambridge University Press.

SMITH, C.J., 1980. *Ecology of the English Chalk*. London: Academic Press.

STEWART, A., PEARMAN, D.A. & PRESTON, C.D. 1994. *Scarce plants in Britain*. Peterborough: Joint Nature Conservation Committee.

10.4 Methods of grassland restoration/creation/translocation

ASH, H.J., BENNETT, R.A. & SCOTT, R., 1992. *Flowers in the grass*. Peterborough: English Nature.

BYRNE, S., 1990. Habitat transplantation in England. A review of the extent and nature of the practice and the techniques employed. *England Field Unit Report 104*. Peterborough: Nature Conservancy Council.

GIBSON, C.W.D. 1995. *Chalk grasslands on former arable land: a review*. Oxford: Bioscan (UK) Ltd.

PARKER, D.M. 1995. *Habitat creation - a critical guide* Peterborough: English Nature Science No. 21

WELLS, T.C.E., 1991. *Restoring and re-creating species-rich lowland dry grassland*. In: Goriup, P.D., Batten, L.A. and Norton, J.A. (eds.). *The conservation of lowland dry grassland birds in Europe*, pp 125-132. Peterborough: Joint Nature Conservation Committee.

WELLS, T.C.E., FROST, A. & BELL, S., 1986. Wild flower grasslands from crop-grown seed and hay bales. *Focus on Nature Conservation No 15*. Peterborough: Nature Conservancy Council.

WELLS, T.C.E., COX, R. & FROST, A., 1989. The establishment and management of wildflower meadows. *Focus on Nature Conservation No 21*. Peterborough: Nature Conservancy Council.

10.5 Action plans and strategies relating to grassland conservation

BROWN, A.F. & GRICE, P.V. 1993. *Birds in England: context and priorities*. Peterborough: *English Nature Research Reports*, No. 62.

BUISSON, R. 1992. *RSPB lowland wet grassland habitat action plan*. Sandy: Royal Society for the Protection of Birds.

DOLMAN, P., 1992. A review of lowland dry grassland birds in Britain: their status, ecological requirements and priorities for conservation. *JNCC Report 125*. Peterborough: Joint Nature Conservation Committee.

- HOUSDEN, S., THOMAS, G., BIBBY, C., & PORTER, R., 1991. Towards a habitat conservation strategy for bird habitats in Britain. *RSPB Conservation Review* 5: 9-16.
- JEFFERSON, R.G. & ROBERTSON, H.J. 1996. Lowland grassland: a strategic review and action plan. Peterborough: *English Nature Research Reports*, No. 163.
- MERCER, B., 1992. A Mesotrophic Grassland Conservation Strategy for the Yorkshire Dales. English Nature, North East Region Report, Leyburn.
- MOFFAT, A.M. (ed.) 1994. Priorities for habitat conservation in England. Peterborough: *English Nature Research Reports*, No. 97.
- PALMER, M. 1994. A UK plant conservation strategy: a strategic framework for the conservation of the native flora of Great Britain and Northern Ireland. Peterborough, Joint Nature Conservation Committee
- PORTER, R.F., ELLIOTT, G.D. & WILLIAMS, G., 1991. *Action for dry grassland birds in Britain*. In: Goriup, P.D., Batten, L.A. and Norton, J.A. (eds.). The conservation of lowland dry grassland birds in Europe, pp 97-100. Peterborough: Joint Nature Conservation Committee.
- UK STEERING GROUP. 1995. Biodiversity: the UK Steering Group Report. London: HMSO.

11. Report references

- BATTEN, L.A., BIBBY, C.J., CLEMENT, P., ELLIOT, G.D. & PORTER, R.F., 1990. *Red Data Birds in Britain*. London: T. and A.D. Poyser.
- BRATTON, J.H. ed., 1991. *British Red Data Books: 3. Invertebrates other than insects*. Peterborough: Joint Nature Conservation Committee.
- BERKMÜLLER, K., 1992. *Environmental Education about the Rain Forest (Revised Edition)*. Cambridge: IUCN.
- BLAKE, C.P., 1990. Lincolnshire Chalk Grassland Survey 1988. *England Field Unit Project No 79*. Peterborough: Nature Conservancy Council.
- BROWN, A.F. & GRICE, P.V. 1993. Birds in England: context and priorities. Peterborough: *English Nature Research Reports*, No. 62.
- BRATTON, J.H. ed (1991). *British Red Data Books: 3. Invertebrates other than insects*. Peterborough: Joint Nature Conservation Committee.
- BUTTERFLIES UNDER THREAT TEAM (BUTT), 1986. *The management of chalk grassland for butterflies*. Peterborough: Nature Conservancy Council.
- DALBY, G., 1991 Magnesian Limestone, the scientific interest and national importance. *English Nature report*, North East Region, Newcastle.

- DARGIE, T., 1993. The distribution of lowland wet grassland in England. Peterborough: *English Nature Research Reports*, No. 49.
- DEVON WILDLIFE TRUST, 1990. *Survey of Culm grasslands in Torridge District*. Devon Wildlife Trust, Nature Conservancy Council SW Region.
- DIJK, G. van, 1991. *The status of semi-natural grasslands in Europe*. In: Goriup, P.D., Batten, L.A. and Norton, J.A. (eds.) pp 15-36. The conservation of lowland dry grassland birds in Europe. Peterborough: Joint Nature Conservation Committee.
- DOLMAN, P., 1992. A review of lowland dry grassland birds in Britain: their status, ecological requirements and priorities for conservation. *JNCC Report 125*. Peterborough: Joint Nature Conservation Committee.
- DUFFEY, E., MORRIS, M.G., SHEAIL, J., WARD, L.K., WELLS, D.A. & WELLS, T.C.E., 1974. *Grassland ecology and wildlife management*. London: Chapman and Hall.
- FULLER, R.J., 1982. *Bird Habitats in Britain*. Calton: Poyser.
- FULLER, R.M., 1987. The changing extent and conservation interest of lowland grasslands in England and Wales: a review of grassland surveys 1930-1984. *Biological Conservation* 40: 281-300.
- GILBERT, O.L. 1993. The lichens of chalk grassland. *Lichenologist*, 25(4): 379-414.
- HOPKINS, J.J., 1991a. Proposed development of site west of Millhouse Lane, Moreton, Wirral. Proof of Evidence for Public Enquiry. July 1991. On behalf of English Nature.
- HOUSDEN, S., THOMAS, G., BIBBY, C., & PORTER, R., 1991. Towards a habitat conservation strategy for bird habitats in Britain. *RSPB Conservation Review* 5: 9-16.
- JEFFERSON, R.G. 1996. Lowland grassland in Natural Areas: national assessment of significance. Peterborough: *English Nature Research Reports*, No. 171.
- JOSÉ, P. & SELF, M., 1994. *The management of lowland wet grassland for birds*. In: A. Crofts & R.G. Jefferson eds. *The Lowland Grassland Management Handbook*. EN/RSNC. Peterborough: English Nature.
- KENT COUNTY COUNCIL, KENT TRUST FOR NATURE CONSERVATION, ENGLISH NATURE, NATIONAL RIVERS AUTHORITY, KENT DISTRICT COUNCIL, UNION RAILWAYS. 1995. *Kent Wildlife Habitat Survey County Report*. Maidstone, Kent County Council.
- KIRBY, 1992. *Habitat Management for Invertebrates: a practical handbook*. Sandy: Royal Society for the Protection of Birds.
- KIRBY, P. 1994. Habitat fragmentation, species at risk. Invertebrate group information. Peterborough: *English Nature Research Reports*, No. 89.
- MERCER, B., 1992. A Mesotrophic Grassland Conservation Strategy for the Yorkshire Dales. English Nature, North East Region Report, Leyburn.

- MOFFAT, A.M. (ed.) 1994. Priorities for habitat conservation in England. Peterborough: *English Nature Research Reports*, No. 97.
- NATURE CONSERVANCY COUNCIL, 1984. *Nature Conservation in Great Britain*. Peterborough: Nature Conservancy Council.
- NATURE CONSERVANCY COUNCIL, 1987. Dorset Chalk Grassland Survey 1983/4. *England Field Unit Project No 27*. Peterborough: Nature Conservancy Council.
- NATURE CONSERVANCY COUNCIL, 1989. *Guidelines for selection of biological SSSIs*. Peterborough: Nature Conservancy Council.
- PALMER, M. & BLAKE, C., 1991. Review of the extent of grassland survey in England. *England Field Unit Report. Project No 101*. Peterborough: Nature Conservancy Council.
- PALMER, M. 1994. A UK plant conservation strategy: a strategic framework for the conservation of the native flora of Great Britain and Northern Ireland. Peterborough, Joint Nature Conservation Committee
- PERRING, F.H. & FARRELL, L. 1983. *British Red Data Book 1: vascular plants*. 2nd edition. Lincoln, RSNL.
- PORLEY, R.D. & ULF-HANSEN, P.F., 1991. Unimproved neutral grassland in Dorset: survey and conservation. *Proceedings of the Dorset Natural History and Archaeological Society*, 113: 161-165.
- PORTER, R.F., ELLIOTT, G.D. & WILLIAMS, G., 1991. *Action for dry grassland birds in Britain*. In: Goriup, P.D., Batten, L.A. and Norton, J.A. (eds.). The conservation of lowland dry grassland birds in Europe, pp 97-100. Peterborough: Joint Nature Conservation Committee.
- RATCLIFFE, D.A. ed., 1977. *A Nature Conservation Review*. 2 vols. Cambridge: Cambridge University Press.
- REDGRAVE, L.J. 1995. *Berkshire unimproved neutral grassland survey*. Newbury: English Nature.
- ROBERTS, N. & SMYTH, W., 1990. Norfolk Grassland Survey. Nature Conservancy Council, East Anglia Region.
- ROBERTS, N. (NCC) & SUFFOLK WILDLIFE TRUST, 1990. Suffolk Grassland Survey. Nature Conservancy Council, East Anglia Region.
- RODWELL, J.S. (ed.), 1991. *British Plant Communities 2: Mires and Heaths*. Cambridge: Cambridge University Press.
- RODWELL, J.S. (ed.), 1992. *British Plant Communities 3: Grassland and Montane Communities*. Cambridge: Cambridge University Press.
- ROSE, F., STERN, R.C., MATCHAM, H.W. & COPPINS, B.J. 1991. *Atlas of Sussex mosses, liverworts and lichens*. Brighton: Booth Museum of Natural History.

- ROWELL, T.A. & ROBERTSON, H.J. 1994. The Grassland Database: VEGAN Version 4.0. Supplement to the Version 3.0 Manual. Peterborough: *English Nature Research Reports*, No. 113.
- SHIRT, D.B. (ed.), 1987. *British Red Data Books: 2. Insects*. Peterborough: Nature Conservancy Council.
- SKETCH, C. 1995. National SSSI sample survey of lowland grasslands: pilot project. Peterborough: *English Nature Research Reports*, No. 130.
- SODEN, D., 1989. Bedfordshire Neutral Grassland Survey 1988. Nature Conservancy Council, East Midlands Region Report, Peterborough.
- SODEN, D., 1991. A Botanical Survey of Oolitic Limestone Grassland in the East Midlands 1989/90. Peterborough: Nature Conservancy Council East Midlands Region Report.
- STEPHEN, K., 1993. Worcestershire Grasslands 1992: Report of a Botanical Survey for English Nature. Worcestershire Nature Conservation Trust. English Nature West Midlands Region.
- STEVEN, G., 1990. A Botanical Survey of Unimproved Neutral Grassland in East Sussex. NCC South East Region Report, Lewes.
- STEWART, A., PEARMAN, D.A. & PRESTON, C.D. 1994. *Scarce plants in Britain*. Peterborough: Joint Nature Conservation Committee.
- UK STEERING GROUP. 1995. Biodiversity: the UK Steering Group Report. London: HMSO.
- WIGGINGTON, M.J., 1985. Berkshire Chalk Grassland Survey 1985. *England Field Unit Project No 39*. Peterborough: Nature Conservancy Council.
- WILLEMS, J.H., 1990. *Calcareous grasslands in continental Europe*. In: Hillier, S.H., Walton D.W.H. and Wells, D.A. (eds.). *Calcareous Grasslands Ecology and Management*, pp 3-10. Huntingdon: Bluntisham Books.

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Appendix 1 Nature Conservation Review Sites which have lowland grassland as a principal interest

Note: The list includes metallophyte (Calaminarian) sites and fen meadow/wet acid grassland sites.

NCR SITES WITH GRASSLAND AS A PRINCIPAL INTEREST

NCR SITE	AREA	SSSI NAME	COUNTY	AREA=SSSI. IF NO, SSSI AREA = ()	TYPE
L3 Wye Downs	348.5	Wye + Crundale Downs	Kent	Yes	Chalk grassland
L4 Castle Hill	53.2	Castle Hill	E. Sussex	No (113.5)	Chalk grassland
L5 Lewes Downs	149.8	Lewes Downs	E. Sussex	Yes	Chalk grassland
L6 Lullington Heath and Deep Dean	198.1	a) Lullington Heath SSSI b) Wilmington Downs SSSI	E. Sussex E. Sussex	Yes No (208.2)	Chalk grassland and Chalk heath
L7 Mole Gap to Reigate Escarpment (used to be Box Hill-Headley)	999.4	Mole Gap to Reigate Escarpment	Surrey	Yes	Chalk grassland and Chalk heath
L8 Harting Downs	200.0	Harting Downs	W. Sussex	No (331.1)	Chalk grassland + Chalk heath + Juniper
L9 Kingley Vale	209.4	Kingley Vale	W. Sussex	Yes	Chalk grassland + Chalk heath + Juniper
L10 Wouldam-Detling Escarpment	326.4	Wouldam-Detling Escarpment	Kent	Yes	Chalk grassland (small amount) + Chalk scrub
L11 Halling-Trottiscliffe	684.4	Halling-Trottiscliffe Escarpment	Kent	Yes	Chalk grassland (small amount) + Chalk scrub
L12 White Downs	185.0	Hackhurst and White Downs	Surrey	Yes (185.2)	Chalk scrub + Juniper + limited Chalk grassland
L15 Folkestone-Etchinghall Escarpment	269.5	Folkestone-Etchinghall Escarpment	Kent	Yes	Chalk grassland
L16 Heyshott Down	42.2	Heyshott Down	W. Sussex	Yes	Chalk grassland
L17 Purple Hill and Queendown Warren	15.1	a) Purple Hill (15.1) and b) Queendown Warren (22.2)	Kent	Yes	Chalk grassland
L18 Therfield Heath	85.0	Therfield Heath	Herts	No (143.3) in 1992 Coredata list	Chalk grassland
L19 Fulking Escarpment/Newtimber Hill	272.9	Beeding-Newtimber Hill	W. Sussex	No (305.0)	Chalk grassland + Chalk heath + Juniper
L20/W26/P3 New Forest	27734.4	The New Forest	Hampshire	Yes	Neutral grassland
L21 Aston Rowant	128.5	Aston Rowant Bucks	Oxon	Yes	Chalk grassland + Juniper + Chalk scrub

NCR SITE	AREA	SSSI NAME	COUNTY	AREA=SSSI. IF NO, SSSI AREA = ()	TYPE
L22 Aston Upthorpe Down	37.6	Aston Upthorpe Downs	Oxon	No (38.7) in 1992 Coredata list	Chalk grassland + Juniper (main interest) + Chalk scrub
L23 Compton Down	196.2	Compton Down	Isle of Wight	Yes	Chalk grassland (influenced by maritime conditions)
L24 Martin and Tidpit Downs	195.3	Martin and Tidpit Downs	Hants	No (379.5)	Chalk grassland + Chalk heath
L25 Old Winchester Hill	109.3	a) Beacon Hill b) Old Winchester Hill	Hants	Yes a) 44.8 b) 64.6	Chalk grassland + Chalk heath
L26 Pewsey Downs	305.3	Pewsey Downs	Wilts	Yes	Chalk grassland
L27 Wylde Down	80.9	Wylde & Church Dean Downs	Wilts	Yes	Chalk grassland
L28 Prescombe Down	83.2	Prescombe Down	Wilts	Yes	Chalk grassland
L29 Knighton Down	203.7	Knighton Downs & Woods	Wilts	Yes	Chalk grassland
L30 Steeple Langford, Cow Down & Clifford Bottom	21.8 (21.75)	Steeple Langford Down	Wilts	Yes (21.7)	Chalk grassland
L31 Bowerchalke Downs (was called Woodminton Down-Knowle Hill)	120.9	Bowerchalke Downs	Wilts	No (128.6) in 1992 Coredata	Chalk grassland
L34 Parsonage Down	188.6	Parsonage Down	Wilts	Yes	Chalk grassland
L35 Scratchbury & Cotley Hills	53.5	Scratchbury & Cotley Hills	Wilts	Yes	Chalk grassland
L36 Porton Down	1209.6	Porton Down	Wilts (+ Hants in SSSI list)	No (1227.4) in 1992 Coredata	Chalk grassland + Chalk heath + Juniper
L37 Tennyson Down	276.3	Headon Warren & West High Down	Isle of Wight	Yes	Chalk grassland + Chalk heath + Chalk scrub (maritime influence)
L38 Ellesborough & Kimble Warrens	94.4	a) Ellesborough & Kimble Warrens b) Grangelands & Pulpit Hill	Bucks	Yes a) 68.9 b) 25.5	Chalk grassland + Box scrub
L39 Burghclere Beacon	83.1	Burghclere Beacon	Hants	Yes (83.2) in 1992 Coredata	Chalk grassland + Juniper
L40 Rushmere Down	113.2	Rushmere & Conholt Downs	Hants	Yes	Chalk scrub (primary interest) + Juniper + Chalk grassland

NCR SITE	AREA	SSSI NAME	COUNTY	AREA=SSSI. IF NO, SSSI AREA = ()	TYPE
L41 Bulford Down	542.1	Bulford Downs & Beacon Hill	Wilts	No (552.3) in 1992 Coredata	Chalk grassland + Juniper + Chalk scrub
L42 Calstone & Cherhill Downs (was called Oldbury Castle & Cherhill Downs)	128.6	Calstone & Cherhill Downs	Wilts	Yes	Chalk grassland
L43 North Meadow, Cricklade	44.4	North Meadow, Cricklade	Wilts	Yes	Wet neutral grassland
L44 Clattinger Farm, Oaksey	60.3	Clattinger Farm	Wilts	No (57.5) in 1992 Coredata	Wet neutral grassland
L45 Bransbury Common	155.6	Bransbury Common	Hants	Yes	Neutral grassland (wet) + old water meadow + fen meadow
L46 Lower Woodford Water Meadows	23.9	Lower Woodford Water Meadows	Wilts	Yes	Neutral grassland (Water Meadow)
L47 Pixey & Yarnton Meads, Port Meadow	252.8	a) Pixey & Yarnton Meads b) Port Meadow with Wolvercote Common & Meadows	Oxon	Yes a) 85.6 b) 167.2	Neutral grassland
[L48 Fyfield Down]	325.3	Fyfield Down	Wilts	Yes	1977 Grade 2 Chalk grassland Now not of national importance for grassland.
L49 Homington, Odstock & Clearbury Downs	68.4	a) Homington & Coombe Bissett Downs b) Odstock Down c) Clearbury Down	Wilts	Yes a) 25.0 b) 12.1 c) 31.3	Chalk grassland (not described in detail in 1977)
L50 Noar Hill	70.1	Noar Hill	Hants	No (63.7) in 1992 Coredata	Chalk grassland + Chalk quarry.
L51 Throope Down	39.4	Throope Down	Wilts	Yes	Not described in detail in 1977. Chalk grassland
L52 Pincombe Down (was called Throw Down)	23.8	Pincombe Down	Wilts	Yes	Not described in 1977 in detail. Chalk grassland
L54 Stockbridge Down	69.5	Stockbridge Down	Hants	Yes	Chalk scrub + Juniper + Chalk grassland
L55 Ivinghoe Hills, Steps Hill and Pitstone Hill	259.50	a) Ivinghoe Hills b) Pitstone Hill	Bucks	Yes a) 212.3 No b) (21.3) in 1992 Coredata	Chalk grassland

NCR SITE	AREA	SSSI NAME	COUNTY	AREA=SSSI. IF NO, SSSI AREA = ()	TYPE
L56 Coombe Hill (Wendover)	51.2	Coombe Hill	Bucks	Yes	Juniper (chalk) scrub + chalk grassland + acid grassland
L58 Minsmere/Westleton Heaths & Marshes	2003.7	Minsmere/Westleton Heaths & Marshes	Suffolk	Yes	Acid grassland Fen meadow
L60 Stanford-Wretham Heaths	5204.1	a) Stanford Training Area (4740) b) East Wretham Heath (150) c) Bridgeham - Brettenham Heaths (460)	Norfolk	No (4597) No (141.1) No (446.0)	Calcareous (chalk) grassland + Acid grassland + Juniper Acid grassland Acid and chalk grassland
L61 Icklingham Heaths	511.3	a) Cavenham/Icklingham Heaths (175+160) b) Deadman's Grave, Icklingham (105)	Suffolk	No (385.0) No (126.3)	Calc. (Chalk) grassland Chalk grassland + Acid grassland
L62 Lakenheath - Elveden Heaths	964.9	a) Lakenheath Warren (537) b) Wangford Warren & Carr (60+18) c) Weather & Horn Heath + d) Berner's Heath, Icklingham (331) e) Maidcross Hill (Heath) Lakenheath (26) f) Lordswell Field, Eriswell (8)	Suffolk	No (570.6) No (65.6) No (130.8) No (149.6) No (45.2) No (3.1)	Chalk grassland + Acid grassland Acid grassland + Grass heath Acid grassland Heath Acid grassland + Chalk grassland Calc (Chalk) Grassland + Acid grassland
L63 Foxhole Heath	84.5	Foxhole Heath	Suffolk	Yes	Calcareous (chalk) grassland + Acid grass heath
L64 Weeting Heath	140.8	Weeting Heath	Norfolk	Yes	Chalk grassland + acid grassland
L65 Thetford Heaths	357.0	a) Thetford Heath b) Barnhamcross Common c) Little Heath, Barnham	Norfolk & Suffolk (35)	?(262.0) No (27.7)	Calcareous (Chalk) grassland + Acid grassland Chalk grassland
L66 Risby Warren	150.8	Risby Warren	Humberside (was Lincs)	Yes	Acid grassland + Grass heath + Calcareous grassland (Jurassic limst.)
L67 Knocking Hoe	7.7	Knocking Hoe	Beds	Yes	Chalk grassland but for uncommon spp assemblage (plants)
L68 Barton Hills	47.5	Barton Hills	Beds	Yes	Chalk grassland + Chalk scrub

NCR SITE	AREA	SSSI NAME	COUNTY	AREA=SSSI. IF NO, SSSI AREA = ()	TYPE
L69 Barnack Hills & Holes	23.0	Barnack Hills & Holes	Cambs	Yes (22.9)	Jurassic limst. grassland
L70 Ouse Washes	2424.6	Ouse Washes	Cambs/ Norfolk	No (2478.7)	Neutral wet grassland + swamp
L71 Thompson Common	156.0	Thompson Water, Carr and Common	Norfolk	Yes	Wet neutral grassland + Calcareous (Chalk) grassland + fen meadow
L72 Upwood Meadows	6.2	Upwood Meadows	Cambs	Yes	Neutral grassland
L74 Monewden Meadows	3.3	Monewden Meadows	Suffolk	Yes	Neutral grassland
L77 Barnham Heath	76.5	Barnham Heath	Suffolk	Yes	Acid grassland
L78 Thetford Warren	119.6	Thetford Golf Course & Marsh	Norfolk	Yes	Acid grassland + Calc. grassland.
L81 Castor Hanglands	90.4	Castor Hanglands	Cambs	Yes	Calc. (Jurassic limst.) grassland + Grass heath
L82 Foulden Common	131.5	Foulden Common	Norfolk	Yes	Calc (Chalk) grassland and fen meadow
L83 Calceby Marsh	4	Calceby Marsh	Lincolnshire	No 10.8	Fen meadow/Rush pasture
L85 Portholme	104.0	Portholme	Cambs	Yes	Wet neutral grassland (MG4)
L86 Bratoft Meadows	2.2	Bratoft Meadows	Lincs	No (2.5)	Neutral grassland (MG5)
L87 Moor Closes, Ancaster	7.0	Moor Closes	Lincs	Yes	Neutral grassland
L96 Eggardon Hill, Haydon & Askerwell Downs	146.2	a) Eggardon Hill & Lucas Farm b) Haydon & Askerwell Downs	Dorset	No a) 144.1 b) 108.0	Chalk grassland
L97 Hod and Hambledon Hills	103.9	Hod & Hambledon Hills	Dorset	Yes	Chalk grassland
L99 Barnsley Warren	67.6	Barnsley Warren	Glos	No (70.0)	Jurassic limst. grassland
L100 Rodborough Common	116.0	Rodborough Common	Glos	Yes	Jurassic limst. grassland
L101 Cleeve Common (was called Cleeve Hill)	455.0	Cleeve Common	Glos	Yes	Jurassic limst. grassland + Scree + Limst. heath
L104 Brean Down & Uphill Cliff	84.9	a) Brean Down Somerset b) Uphill Cliff Avon	Somerset Avon	Yes a) 65.1 b) 19.8	Carb. limst. grassland (+ maritime influence areas)

NCR SITE	AREA	SSSI NAME	COUNTY	AREA=SSSI. IF NO, SSSI AREA = ()	TYPE
L105 Berry Head	52.5	Berry Head to Sharkham Point	Devon	No (67.9)	Devonian limst. grassland (NCR says Maritime influence limited, not on our 1992 grassland SSSI list though)
L108 Park Bottom, Higher Houghton	74.3	Higher Houghton	Dorset	No (139.0)	Chalk grassland.
L109 Brassey	14.5	Brassey Reserve & Windrush Valley	Glos	Yes	Jurassic limst. grassland + Scree + Fen meadow/Rush pasture
L110 Hornsleasow Roughs	28.2	Hornsleasow Roughs	Glos	Yes	Jurassic limst. grassland (quarry) + plant spp assemblage
L111 Minchinhampton Common	182.7	Minchinhampton Common	Glos	Yes	Jurassic limst. grassland.
L112 Crook Peak	327.8	Crook Peak to Shute Shelve Hill	Somerset	Yes	Carbonif. limst. grassland + Limst. heath
L113 Dolebury Warren	90.6	Dolebury Warren	Avon	Yes	Carb. limst. grassland + Acid grassland + Heath (main interest)
L124 Derbyshire Dales Grasslands a) - e) Grade 1 site in NCR f) - h) Grade 2 alternative in NCR	1485.6	a) Dove Valley & Biggin Dale b) Lathill Dale c) Cressbrook Dale d) Monks Dale e) Long Dale & Gratton Dale f) Wye Dale & Monsal Dale (was called Millers Dale) g) Coombs Dale h) Topley Pike & Deep Dale	Derbyshire	No (669.6) (272.1) (117.7) (69.5) (82.2) (257.3) (93.2) (50.6)	Carbonif. limst. grassland + retrogressive calc. scrub + neutral grassland + scree + grass heath
L125 Motte Meadows (was called Marston Meadows)	39.0	Motte Meadows	Staffs	No (44.6)	Wet neutral (MG4) + neutral grassland (MG5)
L126 Foster's Green Meadows	12.3	Foster's Green Meadows	Hereford & Worcs.	Yes	Neutral grassland
L127 Bredon Hill	119.4	Bredon Hill	Hereford & Worcs.	Yes	Jurassic limst. grassland + Calc. scrub (main interest)
L128 Cribbs Lodge Meadow	4.4	Cribbs Lodge Meadows	Leics	Yes	Neutral grassland
L130 Waterdale	36.3	Waterdale	N. Yorks	Yes	Chalk grassland
L131 Nine Spring Dale (was called Duggleby High Barn Wold =55ha)	4.5	Nine Spring Dale	N. Yorks	Yes	Chalk grassland

NCR SITE	AREA	SSSI NAME	COUNTY	AREA=SSSI. IF NO, SSSI AREA = ()	TYPE
L132 East Dale	15.6	Fordon Chalk Grasslands	Humberside/N. Yorks	No (56.1)	Chalk grassland
L133 Humphrey Head	12.4	Humphrey Head	Cumbria	No (29.5)	Plant assemblage (main interest) + Carb. limst. grassland.
L134 Gait Barrows	68.6	Gait Barrows	Lancs	Yes	Limestone pavement (main interest) + limestone grassland + Limestone scrub
L135 Hutton Roof Crag & Farleton Knott	675.8	a) Hutton Roof Crag b) Farleton Knott	Cumbria	Yes a) 391.7 b) 284.1	Limestone pavement (main interest) Carbon. limst. grassland + limst. heath
L136 Whitbarrow Scar	918.2	Whitbarrow	Cumbria	No (1156.8)	Carb. limst. grassland + limst. heath + limst. scree + Calc. scrub
L137 Scout & Cunswick Scars	364.3	Scout & Cunswick Scars	Cumbria	No (370.3) +	Carb. limst. grassland + limst. heath + limst. scree + Calc. scrub
L138 Thrislington Plantation	8.8	Thrislington	Durham	No (25.9)	Magnesian limst. grassland
L139 Orton Meadows	11.9	Orton Pastures	Cumbria	Yes	Wet neutral grassland (meadow + pasture) + carb. limestone grassland + fen meadow
L140 Crosby Gill	120.0	Crosby Gill	Cumbria	Yes	Carb. limestone grassland
L142 Derwent Ings	1027.8	a) Brighton Meadows b) Derwent Ings c) Melbourne Ings & Thornton Ings d) Newton Mask)Humber/)N Yorks Humber Humber	No a) 28.0 b) 662.5 c) 200.3 d) 16.5 in 1992 Coredata list	Neutral + wet neutral grassland + Fen meadow/Rush pasture
L143 Gowk Bank	14.7	Gowk Bank	Cumbria	Yes	Northern meadow neutral grassland.
L144 Upper Teesdale Meadows	47.5	Upper Teesdale	Durham	No (14035.6)	Northern neutral grassland (pasture + hay) + wet flushes
L147 Arnside Knott & Warton Crag	147.7	a) Arnside Knott b) Warton Crag	Cumbria Lancs	No a) 166.1 b) 73.0	Carb. limst. grassland + scree
L148 Cassop Vale	40.9	Cassop Vale	Durham	Yes	Magnesian limst. grassland

NCR SITE	AREA	SSSI NAME	COUNTY	AREA=SSSI. IF NO, SSSI AREA = ()	TYPE
L159 Draycote Meadows (NCR Appendix)	5.9	Draycote Meadows	Warwicks	No (4.1 but must be wrong acc. to NCR info.)	Neutral grassland
OUTSIDE PUBLISHED NCR					
L161 Wendlebury Meads	54.0	Wendlebury Meads and Mansmoor Closes	Oxon	No (73.2)	Neutral grassland
L162 Oxclose	140.1	Oxclose	N. Yorks	Yes	Carb. limst. grassland + Metallophyte assemblage (main interest)
L166 Tyne/Allen River Gravels	13.3	a) Bumfoot River Shingles & Wydon Nab b) Ninebanks River Shingle c) Wharmley Riverside d) Williamston River Shingle e) Lambley River Shingles	Northumb.	No a) 20.3 b) 5.6 c) 6.3 d) 1.5 e) 4.2	Metallophyte assemblage (main interest)
L167 Nene Washes	1310.0	Nene Washes	Cambs	Yes	Neutral wet grassland; ornithological interest (main interest)
L170 Aubert Ings	10.6	Aubert Ings	N. Yorks	Yes	Neutral grassland
L179 Ancaster Valley	11.0	Ancaster Valley	Lincs	No (10.5)	Calcareous grassland in 1992 grass SSSI list (Jurassic limst.)
L182 Sudborough Green Lodge Meadows	13.5	Green Lodge Meadows, Sudborough	Northants	Yes	Neutral grassland
L187 Olchon Meadows	2.4	Ochlon Farm Meadows	Hereford & Worcs	Yes	Neutral grassland (Sounds similar to northern hay meadow)
L188 North Somerset Levels	2767.5	a) Tealham & Tadham Moors b) Westhay Moor c) Catcott Edginton & Chilton Moors d) Shapwick Heath	Somerset	No a) 917.6 b) 513.7 c) 1083.0 d) 335.3	No NCR description Neutral grassland + Fen meadow/Rush pasture, Wet neutral grassland in 1992 grass SSSI list
L189 Kings Sedgemoor & Moorlinch	1064.0	a) Kings Sedgemoor b) Moorlinch	Somerset	No a) 822.0 b) 226.0	Wet neutral grassland + Ornithology (main interest)

NCR SITE	AREA	SSSI NAME	COUNTY	AREA=SSSI. IF NO, SSSI AREA = ()	TYPE
L192 The Flits	21.1	The Flits	Hereford & Worcs	No (35.5)	Neutral grassland + Fen meadow. Inverts nationally important.
L195 High Leys	8.8	High Leys	Cumbria	Yes	Dry neutral grassland & wet neutral grassland/fen meadow
L196 Pike Corner	15.2	Pike Corner	Wilts	Yes	Wet neutral grassland (+ sedge marsh)
L197 Dunsdon Farm	39.2	Dunsdon Farm	Devon	Yes	Fen meadow. Not on 1992 grassland SSSI list
L203 Gang Mine	8.2	Gang Mire	Derbys	Yes	Metallophytes (main interest)
L206 Conistone Old Pasture (not on NCR printout)	297.2	Conistone Old Pasture	N. Yorks	Yes	Carb. limst. grassland + pavement + spp assemblage
L210 New House Meadows	8.8	New House Meadows	North Yorkshire	Yes	Neutral grassland
GRASSLAND SITES IN OTHER FORMATIONS					
C1 Cuckmere Haven - Beachy Head	840	Seaford to Beachy Head	East Sussex	No 1090.8	Chalk grassland
C24 South Dorset Coast	1760.9	South Dorset Coast	Dorset	Yes	Chalk & Jurassic limestone grassland
M1 Sutton Park	866.1	Sutton Park	West Midlands	Yes	Acid grassland
OW112 Aqualate Mere	447	Aqualate Mere	Staffordshire	No 230.5	Fen meadow/Rush pasture
OW109 Northmoor & Southlake Moor	858.7	Northmoor South lake Moor	Somerset	Yes	Wet neutral grassland/neutral grassland
P4 Cothill Fen and Parsonage Moor	19	Cothill Fen & Parsonage Moor	Oxfordshire	Yes	Fen meadow
P6 Hickling Broad & Marshes	1159.2	Upper Thorne Broads & Marshes	Norfolk	Yes	Fen meadow
P13 Chippenham Fen	114.78	Chippenham Fen & Snailwell Poor's Fen	Cambs	Yes	Fen meadow

NCR SITE	AREA	SSSI NAME	COUNTY	AREA=SSSI. IF NO, SSSI AREA = ()	TYPE
P18 Redgrave - South Lopham Fen	124.9	Redgrave & Lopham Fens	Norfolk & Suffolk	Yes	Fen meadow
P148 Gordano Valley	136	Gordano Valley	Avon	Yes	Fen Meadow/Rush pasture
W72 Cotswolds Commons & Beechwoods	665.5	Cotswolds Commons & Beechwoods	Gloucestershire	Yes	Jurassic limestone grassland
W121 Wyre Forest	897.5	Wyre Forest	Hereford & Worcester	Yes	Neutral grassland
W123 Hamps & Manifold Valleys	285.2	Hamps & Manifold Valleys	Staffs	No 507.3	Carboniferous limestone grassland
W132 Chaddesley-Randon Woods	170	Feckenham Forest	Hereford & Worcester	No 223.5	Neutral grassland
W156 Skoska Wood	68.9	Skoska Wood	North Yorkshire	Yes	Carboniferous limestone grassland

Appendix 2 County Grassland Inventories

1. Rationale and criteria
2. Sample page from spreadsheet index
3. Sample 10 km map showing grassland sites

THE ENGLISH NATURE GRASSLAND INVENTORY

Rationale

This inventory has been produced by English Nature (EN) with the aim of making lowland grassland data available for conservation management schemes in the wider countryside. English Nature, its predecessor body, the Nature Conservancy Council (NCC) and other organisations, have over the last 15 years built up a large body of site-specific information through Phase 2 survey (see Note 1). This level of information allows an assessment to be made of the botanical conservation value of a site. With the introduction of management schemes such as Countryside Stewardship and larger initiatives such as Environmentally Sensitive Areas (ESAs), there is now an opportunity for this information to be used in targeting resources and identifying sites of particular value. This inventory is designed to aid that process. However it is a PROVISIONAL document and should be used as a guide and not as a definitive resource statement.

Criteria for inclusion

The inventory highlights sites for which EN or other organisations hold detailed information. Lowland grassland is broadly defined as enclosed grassland occurring at, or below, 300 m above sea level. Sites include fen meadows and selected swamp communities and those unimproved lowland grasslands defined as of high-botanical interest in *Guidelines for the selection of biological SSSIs*¹ (NCC, 1989), but exclude maritime and sea cliff vegetation. The fen meadow and swamp communities have been included because they are often part of the farmland landscape and frequently occur in mosaics with grassland communities (see Note 2). Sites were included according to the following criteria:

- high botanical interest
- post-1980 survey data
- minimum size of 0.5 ha (100m length for linear features)
- information which is easily located and held as a readily accessible record.

The majority of site information which met these criteria derived from systematic surveys. These sites include SSSIs and non-SSSIs. In special circumstances, due to local considerations, sites which do not meet all the criteria have been included.

How to use this inventory

The sites are mapped on 10 x 10 km grid squares at a 1:50,000 scale, using reduced 1:25,000 maps. Each site has a unique site code, to avoid possible confusion, for examples where sites have multiple names. The code is made up of an abbreviation of the county name, e.g. BK for Berkshire, the grid square the site is located in and an alphabetical/numerical code identifying the individual site, for example BK/SU36/A01 for Any Hill, Berkshire. Where sites occur on more than one map, the site code may not be shown on each map. In these cases, the code can be found on adjacent maps. The site listing overleaf is ordered according to this code. Basic information, e.g. grid reference, grassland type, site area and conservation status, is presented and indicates that more detailed site information is held by EN or other organisations. Grid squares which do not contain any known sites have been included for a fuller picture of the spread of sites and data held for the county.

Limitations of this approach

On many sites, habitats other than grassland may occur. Clear delineations of habitat types are frequently not practical at the scale used and consequently the complete site has been mapped without habitat divisions. The area shown therefore may include habitats other than grasslands of high botanical interest. All SSSIs with a significant grassland component have been included but a number of these will include

¹ Sites of Special Scientific Interest

other habitats within the site boundary shown. Data for disjunct yet related areas of grassland, such as along the line of a chalk escarpment, may have been collected as one site and consequently the grassland will be mapped as one site. The area surveyed and the site mapped may not always coincide with either the SSSI boundary as notified, or field boundaries.

This inventory is provisional and is designed to be used as a guide. Some of the figures presented are estimates and the quality of data may vary site to site. There may be little or no data for the years following the main survey date. Consequently, given the rate of grassland change and loss, the data are likely to contain some inaccuracies or differences when compared with the present day situation. The inventory should therefore not be seen as a complete resource statement: rather, as a guide to identified sites for which information is held.

Inventory distribution

Whilst the document is intended for positive use in the planning and targeting of countryside management schemes, the potentially sensitive nature of the information is appreciated and consequently distribution is being limited to a restricted number of organisations concerned with conservation and countryside management.

Distribution to national headquarters or organisations is being undertaken by EN headquarters at Peterborough whilst local distribution is being undertaken by Local Area Teams based at local EN offices.

Further information

If you require further data on any of the sites listed, reference should be made to your local English Nature office. Quoting the site code will enable the staff to identify the site data and advise you accordingly. It would be helpful if you could pass new information on the loss of known sites or the discovery of new sites to your local English Nature office.

Notes

1. Phase 1 survey is a standardised system that was devised by the NCC for classifying and mapping habitats, in which land is allocated to one of ninety specified habitat types.

Phase 2 is the more detailed level of survey, at which vegetation is defined according to its plant communities as categorised, for example, in the National Vegetation Classification. (British Plant Communities Volume 2 - Mires and Heaths, Volume 3 - Grassland and Montane Communities and Volume 4 - Swamps and Aquatic Communities. J. Rodwell (ed), Cambridge University Press 1991, 1992 and in press respectively).

2. Communities covered by the inventory, in addition to those unimproved lowland grassland communities defined as being of high botanical interest in *Guidelines for the selection of biological SSSIs* (NCC, 1989), are NVC communities M13, M16, M22-M28 (mires, fen meadows and rush pastures), S5 (*Glyceria maxima* swamp), S22 (*Glyceria fluitans* water-margin vegetation) and S28 (*Phalaris arundinacea* tall-herb fen).

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NORTH YORKSHIRE GRASSLAND INVENTORY

SITE CODE	SUR. CODE	SITE NAME	GRID REF	SSSI NAME(if known)	DATE OF SURVEY	COUNTY	STATUTORY CONSERVATION STATUS	SITE AREA (ha)	GRASS AREA (ha)	GRASSLAND TYPE
NY/NY80/C01	SE-29	CLOSE HILLS	NY865028		1985	NY	YDNP	c4		MG
NY/NY80/C02	SE-79	CARR HOUSE	NY889026		1985	NY	YDNP	c5		MG
NY/NY80/E01	SE-150,151	EAST STONESDALE (2 target notes)	NY893013		1985	NY	YDNP	c5		MG
NY/NY80/H01	NY80-2	HILL TOP, field 3	NY860019	Harkers House Meadows	1980	NY	YDNP, SSSI (part of)	2.4	2.4	MG
NY/NY80/H02	NY80-9	HILL TOP, field 1	NY860017	Harkers House Meadows	1980	NY	YDNP, SSSI (part of)	3.1	3.1	MG
NY/NY80/H03	NY80-10	HILL TOP, field 2	NY862018	Harkers House Meadows	1980	NY	YDNP, SSSI (part of)	2.0	2.0	MG
NY/NY80/H04	NY80-11	HOGGARTHS, field 1	NY871014		1980	NY	YDNP	2.2	2.2	MG
NY/NY80/H05	NY80-12	HOGGARTHS, field 2	NY870014		1980	NY	YDNP	1.9	1.9	MG
NY/NY80/H06	NY80-13	HARKERS HOUSE, bottom field	NY865019		1980	NY	YDNP	3.1		MG
NY/NY80/H07	NY80-14	HARKERS HOUSE, west field	NY862020	Harkers House Meadows	1980	NY	YDNP, SSSI (part of)	3.8	3.8	MG
NY/NY80/H08	NY80-15	HARKERS HOUSE, east field	NY864022	Harkers House Meadows	1980	NY	YDNP, SSSI (part of)	2.8	2.8	MG
NY/NY80/K01	NY80-1	KELD	NY887015		1980	NY	YDNP	0.6	0.6	MG
NY/NY80/K02	NY80-8	KELD	NY891012		1980	NY	YDNP	0.7	0.7	MG
NY/NY80/K03	SE-146	KELD	NY889015		1985	NY	YDNP	c2		MG
NY/NY80/K04	SE-83	KELD	NY891016		1985	NY	YDNP	c5		CG
NY/NY80/K05	SE-99	KELD	NY891014		1986	NY	YDNP	c1		MG
NY/NY80/R01	SE-126	RAVEN SEAT	NY858034		1985	NY	YDNP	c3		MG
NY/NY80/S01	SE-41	SMITHY HOLME	NY870017		1985	NY	YDNP	c3		MG
NY/NY80/S02	SE-47	SMITHY HOLME	NY875016		1985	NY	YDNP	c0.5		CG
NY/NY80/S03		SCAR CLOSES, KISDON SIDE	NY893000	Scar Closes, Kisdon Side	1988	NY	YDNP, SSSI	3.7		CG/MG/U
NY/NY90/A01	NY90-2	ARKENGARTHDALE, field 2	NY988065		1980	NY	YDNP	2.7	2.7	MG
NY/NY90/A02	NY90-1	ARKENGARTHDALE, field 1	NY987065		1980	NY	YDNP	3.1	3.1	MG
NY/NY90/A03		ARKLE BECK MEADOWS, WHAW	NY984041	Arkle Beck Meadows, Whaw	1986	NY	YDNP, SSSI	8.4		MG
NY/NY90/A04	SE-73	ARKLE BECK SIDE	NY992041		1985	NY	YDNP	c2		MG
NY/NY90/B01	SE-136	BOULDERSHAW	NY999017		1986	NY	YDNP	c2		MG
NY/NY90/F01		FOTHERING HOLME	NY991040	Fothering Holme	1989	NY	YDNP, SSSI	10.3		MG
NY/NY90/H01	NE-75	HIGH FAGGERGILL	NY987066		1985	NY	YDNP	c1		CG
NY/NY90/K01		KISDON FORCE WOODS	NY900009	Kisdon Force Woods	1985	NY	YDNP, SSSI	38.0		MG
NY/NY90/L01	NE-57	LOW FAGGERGILL	NY982052		1985	NY	YDNP	c2		MG
NY/NY90/S01	SE-69	near STIKEY PIECE WOOD	NY992042		1985	NY	YDNP	c1		MG
NY/NY90/W01	SE-81,82	WHAW BRIDGE (2 target notes)	NY985042		1985	NY	YDNP	c6		MG/U
NY/NZ00/A01	SW-1	ARTELE BECK	NZ026010		1985	NY	YDNP	c3		U
NY/NZ00/E01	SW-82	ESKELETH WOOD	NZ001038		1986	NY	YDNP	c1.5		MG
NY/NZ00/E02	SW-50	EAST WINDY HALL	NZ035004		1986	NY	YDNP	c2		MG
NY/NZ00/E03	SW-52,53	EAST WINDY HALL (2 target notes)	NZ038001		1986	NY	YDNP	c4		MG
NY/NZ00/H01		15 HOLGATE (3 fields)	NZ072033		1989	NY		3.0	3.0	MG
NY/NZ00/H02		16 HURST ROAD	NZ056021		1989	NY		c5	1.4	MG/CG
NY/NZ00/K01		9 KEXWTH	NZ052049		1989	NY		3.0	2.1	U/MG
NY/NZ00/L01	NZ00-2	LANGTHWAITE	NZ005022		1981	NY	YDNP	1.0	1.0	MG
NY/NZ00/L02	NZ00-5	LANGTHWAITE, nr West House	NZ002033		1981	NY	YDNP	0.6	0.6	MG
NY/NZ00/L03	NZ00-6	LANGTHWAITE, DW49	NZ001029		1980	NY	YDNP	2.4	1.6	MG
NY/NZ00/L04	NZ00-7	LANGTHWAITE, DW49	NZ001030		1980	NY	YDNP	1.2	1.2	MG
NY/NZ00/L05	SW-68	LANGTHWAITE	NZ004028		1986	NY	YDNP	c8		MG
NY/NZ00/O01		10 OWLANDS	NZ054013		1989	NY		c11	4.8	CG/MG/U
NY/NZ00/S01		17 STELLING FARM	NZ060014		1989	NY		c7	4.0	MG
NY/NZ00/S02	SW-100	STORHWAITE	NZ017021		1985	NY	YDNP	c3		MG
NY/NZ00/T01		TONGUE HILL (note 33)	NZ081028		1989	NY		c1	c1	MG
NY/NZ00/T02		TONGUE HILL (note 34)	NZ082026		1989	NY		c1	c1	MG
NY/NZ00/T03		TONGUE HILL (note 35)	NZ083027		1989	NY		c1.5	c1.5	MG

North Yorkshire (NY)/ Cumbria/Durham

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