

**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 :
H91C0: Caledonian forest**

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

Please cite as: Joint Nature Conservation Committee. 2007. *Second Report by the UK under Article 17 on the implementation of the Habitats Directive from January 2001 to December 2006*. Peterborough: JNCC. Available from: www.jncc.gov.uk/article17

H91C0 Caledonian forest

Audit trail compiled and edited by JNCC and the JNCC Woodland Lead Coordination Network

This paper and accompanying appendices contain background and data used to complete the standard EC reporting form (Annex D), following the methodology outlined in the document entitled “Assessment, monitoring and reporting under Article 17 of the Habitats Directive, Explanatory Notes & 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 NVC and other habitat types

Table 1.1.1 provides a summary description of H91C0 and its relations with UK classifications. The majority of this habitat corresponds to NVC woodland type W18 (see Rodwell 1991), but it also includes some birch-dominated stands of W17 and W4. In addition, juniper stands of W19 are included where they occur within W18 woodland. Examples of *Pinus sylvestris* growing on bog may, in certain circumstances, be referable to H91D0 Bog woodland. The NVC recognises five sub-communities for W18: W18a and W18b show a distinctly easterly distribution within the overall range, whilst W18e has a distinctly westerly distribution (Rodwell 1991, Hall 1997).

H91C0 Caledonian forest occurs in the central and north-eastern Grampian mountains and in the northern and western Highlands of Scotland. It comprises relict, indigenous pine forests of Scots pine *Pinus sylvestris* var. *scotica*, and associated birch *Betula* spp. and juniper *Juniperus communis* woodland of northern character. Self-sown stands naturally regenerated from stock of genuinely native local origin recorded in the Caledonian Pinewood Inventory (Forestry Commission 1998) are included in the type. Studies of the terpenes in the resin of pine shoots have shown that there are biochemical differences between different pinewoods that are an expression of genetic differences (Kinloch et al. 1986, Forrest 1980, 1982). These studies identified distinct biochemical regions, with considerable variation between the individual pinewoods. Within these regions there is further variation. The pinewoods of the North West zone, near Kinlochewe, and those of the South West zone around Fort William are the most genetically distinct groups. Differences between the other regions are less significant.

Though geographically isolated from the rest of Europe, the native pine woodlands of Scotland are an integral part of a complex spectrum of variation among *Pinus sylvestris* woodlands that extends right across northern Europe (Rodwell and Dring 2001). In general terms, this woodland type belongs among the heathy acid pinewoods of the alliance *Dicrano-Pinion* Matuskiewicz 1962, sharing most of its constants, though not *Picea abies*, with the group of central and north European associations that stretches from Scotland eastwards through Fennoscandia, Germany and into Poland and European Russia. The UK examples of this kind of woodland are closest to the pinewoods of Scandinavia and particularly those in western Norway.

H91C0 Caledonian forest is usually found on strongly-leached, acidic podzols, and these soil conditions are reflected in the ground flora, which typically includes the dwarf shrubs heather *Calluna vulgaris*, bilberry *Vaccinium myrtillus* and cowberry *Vaccinium vitis-idaea*, wavy hair-grass *Deschampsia flexuosa*, and the bryophytes *Dicranum scoparium*, *Hylocomium splendens*, *Pleurozium schreberi* and *Rhytidiadelphus loreus*. This type of woodland is noted for several rare northern species, including creeping lady's-tresses *Goodyera repens*, twinflower *Linnaea borealis* and the moss *Ptilium crista-castrensis*. Some stands support populations of notable bird species, such as western capercaillie *Tetrao urogallus* and Scottish crossbill *Loxia scotica*.

Table 1.1.1 Summary description of habitat H91C0 and its relations with UK vegetation/habitat classifications

Classification	Correspondence with Annex I type	Comments
EU Interpretation Manual	= H91C0	This includes relict, indigenous pine forests of <i>Pinus sylvestris</i> var. <i>scotica</i> , endemic in the central and north eastern Grampians and the northern and western Highlands of Scotland and associated <i>Betula</i> and <i>Juniperus</i> woodlands of northern character within this area. They are mostly open and have a ground layer rich in ericaceous species and bryophytes, in particular <i>Hylocomium splendens</i> , and often harbouring abundant <i>Deschampsia flexuosa</i> , <i>Goodyera repens</i> , <i>Listera cordata</i> , <i>Corallorhiza trifida</i> , <i>Linnaea borealis</i> , <i>Trientalis europaea</i> , <i>Pyrola minor</i> , <i>Moneses uniflora</i> , <i>Orthilia secunda</i> . The dominant trees are: <i>Pinus sylvestris</i> , <i>Sorbus aucuparia</i> , <i>Betula pubescens</i> , <i>B. pendula</i> , <i>Juniperus communis</i> , <i>Ilex aquifolium</i> , <i>Populus tremula</i> .
National Vegetation Classification (NVC) (see Rodwell 1991, Hall 1997)	H91C0 mainly = W18 <i>Pinus sylvestris</i> – <i>Hylocomium splendens</i> woodland Includes some W17 <i>Quercus petraea</i> – <i>Betula pubescens</i> – <i>Dicranum majus</i> woodland; some W4 <i>Betula pubescens</i> – <i>Molinia caerulea</i> woodland; and some W19 <i>Juniperus communis</i> ssp. <i>communis</i> – <i>Oxalis acetosella</i> woodland	The majority of H91C0 corresponds to NVC type W18 woodland, which has five recognised sub-communities W18a-e. Some associated birch-dominated stands of W17 and W4 woodland are included, as are stands of W19 woodland that occur within W18 woodland. Most W17 woodland conforms to Annex I type H91A0, whilst many W19 Juniper stands are referable to type H5130. Certain stands of <i>Pinus sylvestris</i> and W4 woodland growing on bogs are referable to type H91D0.
UK BAP priority habitat type	H91C0 mainly = Native Pine Woodland	The Native Pine Woodland BAP priority habitat type is broadly equivalent in scope to H91C0.

2. Range^{2.3}

2.1 Current range

Range surface area^{2.3.1}: 24,120 km²

Date calculated^{2.3.2}: May 2007

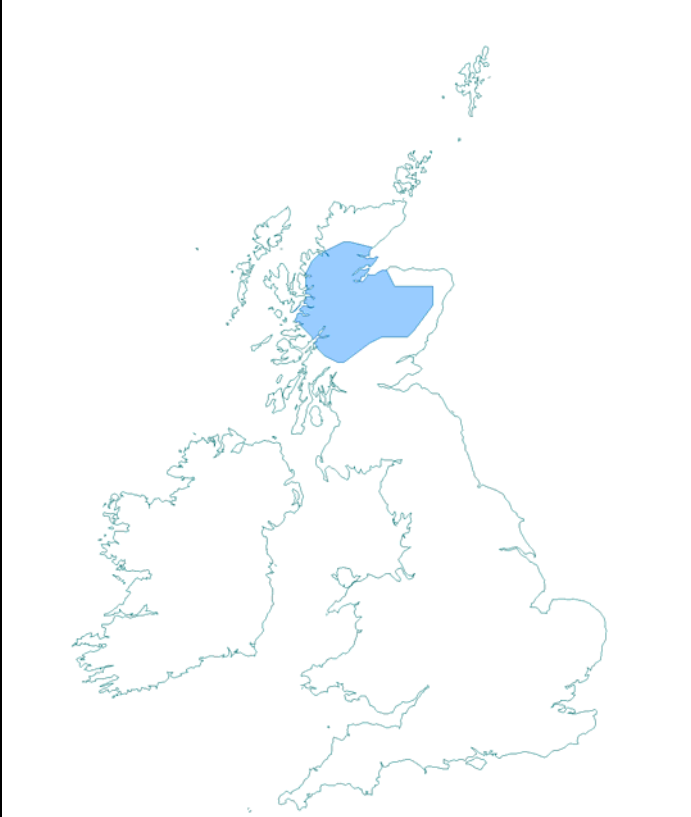
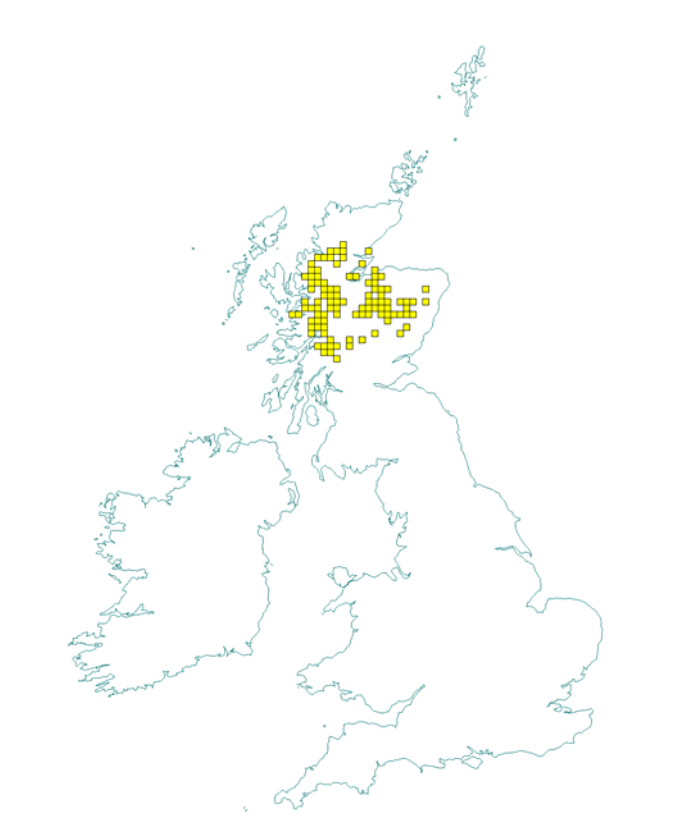
Quality of data^{2.3.3}: Good

Maps 2.1.1-2 show the range and distribution of H91C0 in the UK. The habitat occurs across the central and north-eastern Grampian Mountains and in the northern and western Highlands of Scotland. The maps are based on comprehensive records for the habitat type. These were extracted from the JNCC Database of Woodland Community Types. They include all known native stands of Caledonian pinewood (including relevant SACs) that conform to NVC type W18, including sub-communities W18a-d. Stands of W18 outside of native Caledonian forest zone derived from plantations were excluded. All or almost all associated W17/W4 birch-dominated stands and W19 juniper stands are accounted for in the maps, as such stands occur in close proximity to W18 pinewood areas.

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 H91C0 Caledonian forests appears to have not changed since 1994.

Map 2.1.1 Habitat range map ^{1.1} for H91C0	Map 2.1.2 Habitat distribution map ^{1.2} for H91C0
	
<p>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)</p>	<p>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: 101</p>

See Section 7.1 for data sources

2.3 Favourable reference range

Favourable reference range^{2.5.1}: **Approx. 24,000 km²**

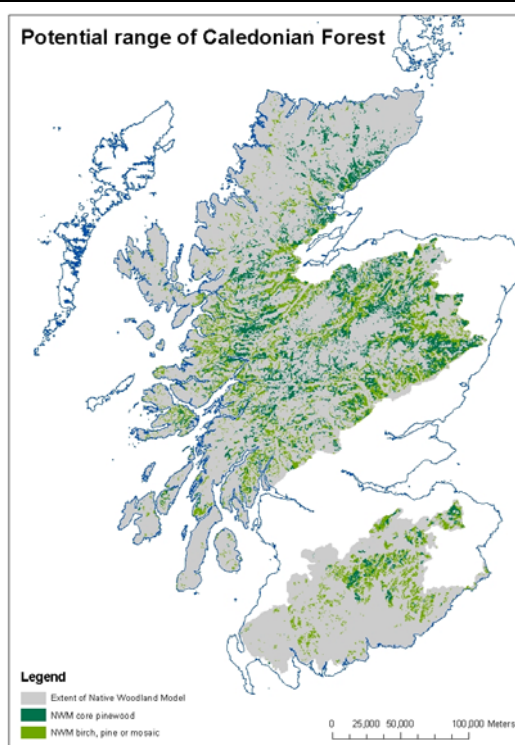
Section 3.2.1.3 of 'Assessing Conservation Status: UK Approach' sets out how favourable reference range estimates for habitats have been determined in the UK. Based on this approach, the current surface area of c.24,000 km², has been set as the favourable reference area. Reasons for this are discussed below.

Available evidence suggests that the current range of H91C0 is both sufficiently large (c. 24,000 km²) and compact (with many of the 10 km squares within the range envelope at least partly occupied) not to raise any major concerns about viability of the habitat on these accounts. The current range certainly includes most of the potential natural range of native pinewoods, and recent research suggests that, despite some losses in area, the overall broad range of native pinewoods has been relatively stable over the last 400 years (Rackham 2006, p.407; see also Smout, MacDonald and Watson 2005). The favourable reference range area can therefore be taken as being approximately equal to the current range area.

Map 2.1.2 shows that the distribution of H91C0 is somewhat fragmented. However, this is partly a reflection of natural/historical limitations. Suitable locations for the habitat are widespread in the Scottish

Uplands (see Map 2.3.1), but in many situations other types of woodland or non-wooded habitat are expected (e.g. parts of the upland massif of the Cairngorms where the soils are richer or are above the natural tree-line). Suitable sites are predicted in the Southern Uplands (see Map 2.3.1), but native pine woodland disappeared from here long ago and this is now regarded as outside of the native range of H91C0. The same applies to other areas somewhat further north, south and west of the current range. Thus, even though a significant number of potential locations within the current central part of the range appear to be unoccupied, this is not considered to be a major concern as regards viability.

Map 2.3.1 Potential range of H91C0 Caledonian pinewoods based on the Scottish Native Woodland Model. The map shows the predicted potential locations for: (i) core pine woodland (not all of which qualifies as H91C0); and (ii) birch, pine or pine-birch mosaic woodland (only a small part of which qualifies as H91C0). See text for further details.



2.4 Conclusions on range

Conclusion^{2.6.1}: **Favourable**

The habitat range has remained stable since 1994 and appears both sufficiently large and compact. It includes most of the potential natural range of native pinewoods. The range does show some fragmentation, but this is partly a reflection of natural/historical conditions. It has, anyway, remained largely stable over the past 400 years. The current range is therefore considered to be viable and at least equal in area to that of the favourable reference range.

3. Area^{2.4}

3.1 Current area

Total UK extent^{2.4.1}: **254.4km²**

Date of estimation^{2.4.2}: **May 2007**

Method^{2.4.3}: **3 = ground based survey**

Quality of data^{2.4.4}: **Good**

Table 3.1.1 provides information on the current area of H91C0 in the UK, which is estimated at slightly over 25,000ha. This is based on the Caledonian Pinewood Inventory, which concentrates on well-Audit trail

H91C0 Caledonian forest

developed existing native pinewoods. Some mature stands of planted native pine have been included, but the majority of planted Scots pine forest has not. The figure takes account of some recent regeneration.

Table 3.1.1 Area of H91C0 in the UK

	Area (ha)	Method ^{2.4.3}	Quality of data ^{2.4.4}
England	Not present	-	-
Scotland	25,440*	3	Good
Wales	Not present	-	-
Northern Ireland	Not present	-	-
Total UK extent ^{2.4.1}	25,440	3	Good

* from MacKenzie (1999)

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}: Stable
Trend magnitude ^{2.4.6}: Not applicable
Trend period ^{2.4.7}: 1994-2006
Reasons for reported trend ^{2.4.8}: Not applicable

Since 1994 the area of Caledonian forest appears to have increased slightly, though precise figures are not available. In the decades prior to the 1990s substantial losses of native pinewoods occurred (see Section 3.3). Since this time, such loss has been stemmed, although some localised erosion may still be occurring due primarily to excessive deer/sheep browsing/grazing. In contrast, substantial progress has been made to remove non-native conifers and pine trees of non-local provenance from former native pinewood sites. In addition, establishment of new Scots pine woodland has been substantial: 45,800 ha of new native pinewood were established during 1990-2003 through the Forestry Commission Woodland Grant Scheme (WGS); use of native Scots pine trees in plantings increased from 4% of all conifers planted by Forest Enterprise in North Scotland Region in 1988 to 15% in 1997; and Scots pine accounted for more than 50% of all conifers established during 1994-98 in the Highland Conservancy under the WGS. This restored/new woodland will take time to develop the characteristics of H91C0 Caledonian forest, so the majority has not, as yet, been counted as H91C0 Caledonian forest.

3.3 Favourable reference area ^{2.5.2}

Favourable reference area: Approx. 280 km²

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.

Available evidence suggests that the current area H91C0 is probably not sufficient to ensure viability, mainly because it remains overly fragmented and isolated, despite some recent restoration and establishment. This is evident in the UK BAP Habitat Action Plan for native pinewoods (see <http://www.ukbap.org.uk>), which aims to further restore and substantially increase the extent and connectivity of this habitat to mitigate the negative effects of fragmentation and isolation of individual pinewoods.

Part of the concern about long-term viability is raised by the scale of habitat loss in previous decades, the resultant increase in fragmentation and isolation, and effects on the viability of the species community. This was primarily due to the conversion of native pinewoods to non-native conifer plantations, though

other areas were cleared or converted to heath or moor through a combination of felling and/or heavy grazing. This resulted in a major and rapid decline in native pinewood area: Bain (1987) estimated that the rate of loss in areas across 35 major native pinewood sites during 1957-87 was 35% overall, i.e. circa 1% per year. Although such loss has now been stemmed, it further increased fragmentation and isolation, which were already profound compared to natural conditions, i.e. forming very extensive tracts – as indicated in Map 2.3.1 – within a largely wooded landscape. Admittedly, much of the demise in native pinewoods took place long ago, so the habitat has been rather fragmented for many centuries.

Another compounding issue is that the habitat cannot be simply replicated by planting. Although further restoration of ‘damaged’ woods and planting and natural regeneration will clearly help reduce fragmentation and isolation, such woodland will take decades to mature and, even then, it is not certain that all will develop the full characteristics of H91C0 Caledonian forest.

Fragmentation and isolation are most likely to impoverish rather than destroy the habitat, and their potential effects are mitigated because H91C0 occurs mainly where the extent and diversity of semi-natural vegetation and inter-connecting features is relatively high. Thus, despite the concerns laid out above, it is unlikely that these factors require an increase of more than 10% above the current habitat area, i.e. the favourable reference area can be taken as not more than 10% above 25,440ha.

3.4 Conclusions on area covered by habitat

Conclusion^{2.6.ii}:

Unfavourable – Inadequate but improving

Despite some recent restoration and establishment, the habitat still appears to be overly fragmented and isolated and therefore insufficient in extent to ensure viability. It is currently much less extensive compared to the mid-20th century: during 1957-87 native pine woodland declined in area by about a third at a rate of c.1% per year. This further increased fragmentation and isolation, which were already profound compared to natural conditions. Planned restoration and expansion will clearly help matters, but such woodland will take decades to mature and not all is certain to develop the full characteristics of H91C0 Caledonian forest. Despite these concerns, it is unlikely that the remedy requires an increase of more than 10% above the current habitat area, i.e. the favourable reference area can be taken as not more than 10% above current area. The area of the habitat appears to have somewhat improved since 1994, given that earlier clearance and conversion has largely been stemmed and some recent expansion and restoration of plantations on former native pinewood sites has taken place.

4. Specific structures and functions (including typical species)

4.1 Main pressures ^{2.4.10}

The main pressures affecting H91C0 are listed below. These are derived from the UK BAP Habitat Action Plan for native pine woodland and via the adverse features listed in Common Standards Monitoring condition assessments (see Section 4.2.1). The related EC codes are shown in brackets.

- **Browsing/grazing (140 Grazing)**

Much of the H91C0 resource is suffering from excessive browsing, principally by deer and sheep, which causes poor natural regeneration and reduced diversity of the ground vegetation. This is not only a major pressure at present, but has affected some woods for many decades.

- **Habitat fragmentation and isolation (151 Removal of hedges and copses, 164 Forestry clearance, 990 Other natural processes)**

The H91C0 resource is highly fragmented and many sites are isolated from each other. It is believed that this is an important factor in the loss of wildlife interest and possibly loss of genetic variation.

- Inappropriate forestry operations (**160 General Forestry management, 161 Planting, 162 Artificial planting, 163 Replanting, 164 Forestry clearance, 165 Removal of undergrowth, 166 Removal of dead and dying trees**)

Many H91C0 woods have suffered from historical large-scale felling and extraction of trees, associated forestry operations (e.g. ploughing), and replanting with non-native species and/or Scots pine trees of non-local provenance. These woods tend to have limited structural diversity and are made-up of inappropriate trees.

- Air pollution (**702 Air pollution**)

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

4.2 Current condition

4.2.1 Common Standards Monitoring condition assessments

Condition assessments based on Common Standards Monitoring (see <http://www.jncc.gov.uk/page-2199>) provide a means to assess the structure and functioning of H91C0 in the UK. The following attributes were examined for all CSM assessments relevant to the habitat:

- Extent
- Structure and natural processes
- Regeneration potential
- Composition (trees and shrubs)
- Indicators of local distinctiveness

SAC condition assessments

Table 4.2.1 and Map 4.2.1 summarise the Common Standards Monitoring condition assessments for 12 UK SACs supporting habitat H91C0. 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, 80% of the area and 75% of the number of assessments were Unfavourable. This means that at least 48% of the total UK habitat area was in an Unfavourable condition. Most of the Unfavourable assessments were classed as not changing, with some reported as declining and none as recovering. It is likely that some of the Unfavourable assessments were in fact recovering. These results are not surprising, given the pressures that woodland, even protected sites, have been under during the 20th century.

Table 4.2.1 Common Standards Monitoring condition assessment results for UK SACs supporting H91C0. 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	1,017	3
	No change	11,131	6
	Unclassified	0	0
	Recovering	0	0
	Total	12,148	9
	<i>% of all assessments</i>	80%	75%
	<i>% of total UK resource</i>	48%	unknown
Favourable	Maintained	2,970	3
	Recovered	0	0
	Unclassified	0	0
	Total	2,970	3
	<i>% of all assessments</i>	20%	25%
	<i>% of total UK resource</i>	12%	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 from 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/ASSI condition assessments

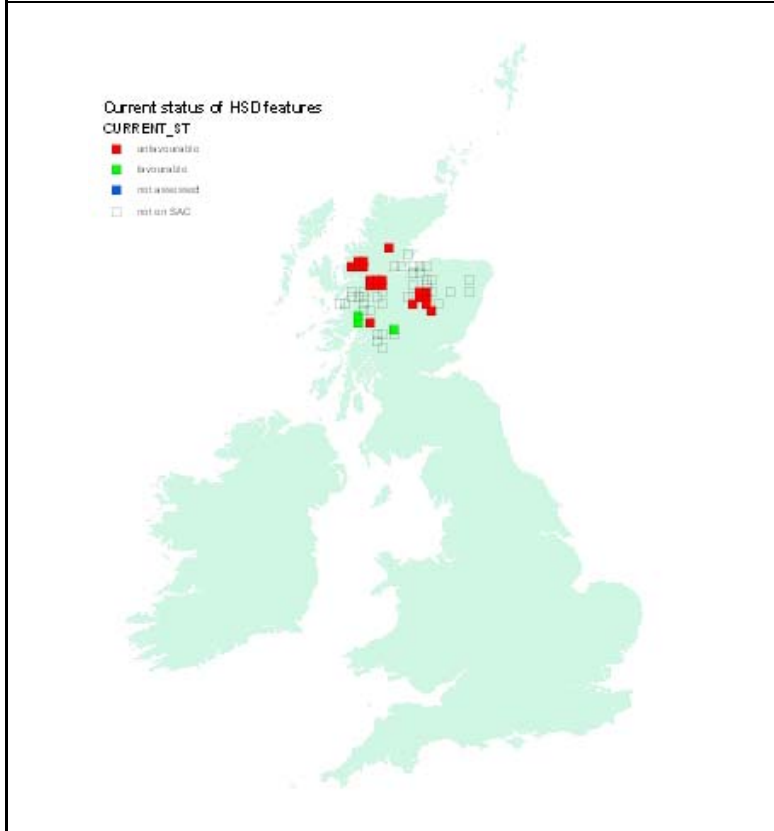
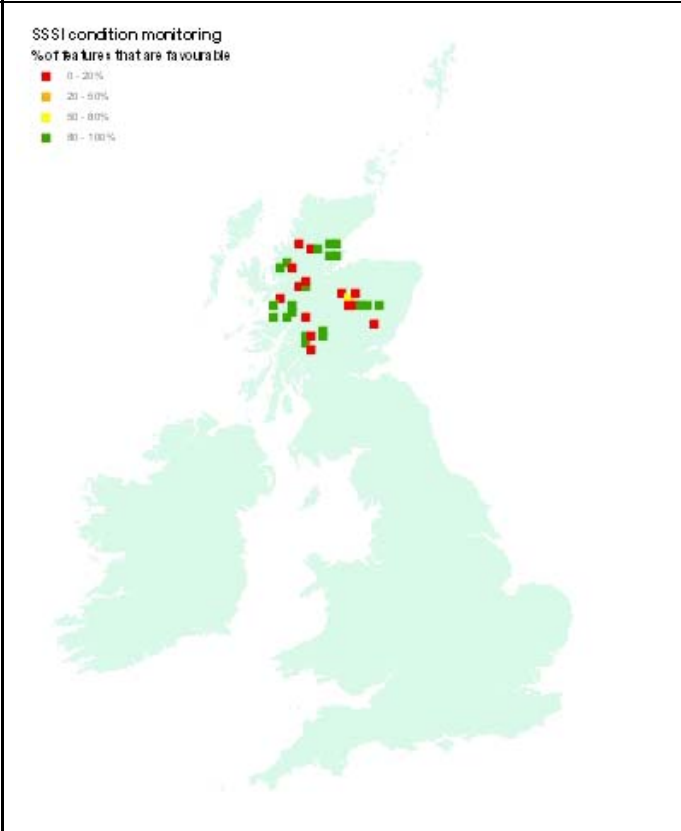
Table 4.2.2 and Maps 4.2.2 and 4.2.3 summarise the Common Standards Monitoring condition assessments that were judged to be either strongly or weakly indicative of the condition of the Annex I habitat on SSSI/ASSIs (see Technical Note II for details of methodology behind this). These data were collated 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, 41% of strongly indicative assessments were Unfavourable. Few of these were reported as recovering and as many were declining. A lower proportion of SSSIs than SACs were classed as Unfavourable: this may, in part, be an artefact of the way that the individual site data was aggregated to give a value for the whole of an SAC (which might contain several sites): if one of the component sites was Unfavourable then the whole SAC failed.

Table 4.2.2 Common Standards Monitoring condition assessment results for UK SSSI/ASSIs that were judged to be either strongly or weakly indicative of the condition of H91C0 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	9	
	Unclassified	0	
	Recovering	4	
	Total	17	
	<i>% of all assessments</i>	41%	
Favourable	Maintained	24	
	Recovered	0	
	Unclassified	0	
	Total	24	
	<i>% of all assessments</i>	59%	

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 March 2005, as used for the JNCC Common Standards Monitoring Report 2006.

Current Condition of H91C0 based on Common Standard Monitoring condition assessments (See Sections 4.2 and 7.2 for further information)		
<p>Map 4.2.1 SAC assessments</p>	<p>Map 4.2.2 Assessments strongly indicative of the condition on SSSI/ASSIs</p>	<p>Map 4.2.3 Assessments weakly indicative of the condition on SSSI/ASSIs</p>
		<p>Not applicable</p>
<p>Key</p> <p><u>Red</u> = Unfavourable, i.e. the square contains at least one SAC where this feature is present and has been judged to be Unfavourable</p> <p><u>Green</u> = Favourable, 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</p> <p><u>Blue</u> = SAC not assessed, i.e. the square contains at least one SAC supporting this habitat feature but no assessment has been reported</p> <p><u>Transparent</u> = SAC feature not present, i.e. the square contains some examples of the habitat type but none are SAC features</p>	<p>Key*</p> <p><u>Green</u> - 80 – 100% of assessed features on 10km square are Favourable</p> <p><u>Yellow</u> - 50 – 80% of assessed features on 10km square are Favourable</p> <p><u>Orange</u> - 20 – 50% of assessed features on 10km square are Favourable</p> <p><u>Red</u> - 0 – 20% of assessed features on 10km square are Favourable</p> <p>*This is the same key as was used for JNCC CSM Report 2006</p>	

4.3 Typical species

Typical species^{2.5.3}: **None used**

Typical species assessment^{2.5.4}: **Not applicable**

The characteristic ground flora plants listed in EU Interpretation Manual are *Corallorhiza trifida*, *Deschampsia flexuosa*, *Goodyera repens*, *Linnaea borealis*, *Listera cordata*, *Moneses uniflora*, *Orthilia secunda*, *Pyrola minor* and *Trientalis europaea*. Recent changes in these and characteristic vascular plants in the ground flora for the core NVC type W18 are set out in the table below. Amongst these only *Goodyera repens* shows a moderate degree of faithfulness to H91C0. This species showed a decline in occurrence across the UK during the last 25 years, but of less than 25% (see table below). None of the remaining species are particularly faithful to the habitat, so available trend data at the UK-level or even the GB-woodland-level is not particularly meaningful and has not been utilised here. Without more specific information, no firm conclusions can be drawn about the status of typical species for this habitat.

Table 4.3.1 Trends and faithfulness of selected typical species for H91C0

Typical species ^{2.5.3}	Faithfulness to habitat H91C0 (based on analysis of NVC synoptic tables)	Trend over last 25 years from BSBI atlas – based on change in 10 km square occupancy across UK (see http://www.jncc.gov.uk/page-3254)
<i>Goodyera repens</i>	Medium	Significant decline, but <25% in 25 years (lost from many sites)
<i>Pyrola minor</i>	Low	Significant decline, but <25% in 25 years (past losses)
<i>Trientalis europaea</i>	Low	Significant increase, but <25% in 25 years (unchanged in Scotland)
<i>Calluna vulgaris</i>	Very low	No change
<i>Deschampsia flexuosa</i>	Very low	No change
<i>Listera cordata</i>	Very low	No change
<i>Vaccinium myrtillus</i>	Very low	No change
<i>Corallorhiza trifida</i>	No information	Increasing
<i>Linnaea borealis</i>	No information	Insufficient data
<i>Moneses uniflora</i>	No information	Insufficient data
<i>Orthilia secunda</i>	No information	No change

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 was in Unfavourable condition.

The main pressures are deer/sheep browsing and grazing, habitat fragmentation and isolation, on-going impacts from past forestry operations, and air pollution. Condition assessments for SACs and SSSIs show that a large part of the habitat is in Unfavourable condition: 75-80% of assessed SACs are judged to be Unfavourable, whilst the level for relevant SSSIs is 41%. Only a limited number of assessments were reported as recovering and at least as many were declining. It is however likely that some of the Unfavourable assessments were in fact recovering. There is no reason to expect the condition of the non-designated resource to be better.

5. Future prospects

5.1 Main factors affecting the habitat

5.1.1 Conservation measures

Of all the main UK woodland types, this habitat probably has more work advanced to create new native woodland, restore and improve the condition of existing sites, and improve the landscape between sites. It is covered by a national action plan under the UK BAP (see <http://www.ukbap.org.uk>), with targets to maintain and substantially improve, restore and expand the resource. As these new and restored elements mature over the coming decades, it is expected they will make an increasingly important contribution to the habitat resource. Native pinewoods are subject to a number of legal instruments, national policy measures and grant-aid schemes. These prevent clear-felling for conversion to other land uses, and aim to maintain and restore their ecological diversity and genetic integrity and expand remnant and new native pinewoods. Felling of trees and grant aid are controlled by the Forestry Authority and are conditional upon management achieving these aims in accordance with published guidance. The Woodland Grant Scheme provides finance for regenerating, planting and other management activities. Over thirty native pinewoods are protected in whole or as part of SSSIs under the Wildlife and Countryside Act 1981. Some of these form SACs in response to the EC Habitats Directive (see <http://www.jncc.gov.uk/ProtectedSites/SACselection/habitat.asp?FeatureIntCode=H91C0>). Over 3,000 hectares in 24 of the 77 remaining native pinewoods are owned by the Forestry Commission. Various other measures and initiatives have been put in place to help conserve native pinewoods, including an inventory of native Caledonian pinewood sites, a native Scots pine seed collection registry, and published guides on their management and creation.

5.1.2 Main future threats^{2.4.11}

The most obvious major threats to H91C0 over the next 12-15 years are listed below. The related EC codes are shown in brackets.

- Browsing/grazing (**140 Grazing**)

Much of the H91C0 resource has or is suffering from excessive browsing, principally by deer and sheep.

- Habitat fragmentation and isolation (**151 Removal of hedges and copses, 164 Forestry clearance, 990 Other natural processes**)

H91C0 is a highly fragmented habitat and many sites are isolated from each other.

- Inappropriate forestry operations (**160 General Forestry management, 161 Planting, 162 Artificial planting, 163 Replanting, 164 Forestry clearance, 165 Removal of undergrowth, 166 Removal of dead and dying trees**)

Many H91C0 woods have suffered from historical large-scale felling and extraction of trees, associated forestry operations (e.g. ploughing), and replanting with non-native species and/or Scots pine trees of non-local provenance. The effects of this legacy will continue to have negative effects for a number of decades to come.

- Air pollution (**702 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 Common Standards Monitoring condition assessments

The Common Standards Monitoring condition assessments reported in Sections 4.2.1-2 provide a basis to crudely predict the possible future condition of H91C0 in the UK. This involved treating all assessments currently identified as either Favourable or Unfavourable recovering as future-favourable: remaining categories being 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 possible future condition of H91C0 on UK SACs (based on approach described above). The maps give an impression of the overall spread of where future-unfavourable and future-favourable sites might occur (summary statistics for the map are given in Section 7.2). The combined assessments show that, of the SACs assessed, only 20% of the area and 25% of the number of assessments fall within the future-favourable category. The remainder fall within the future-unfavourable category, which amounts to at least 48% of the total UK habitat area. However, this probably paints an unduly gloomy picture, as none of the unfavourable assessments were classed as recovering, when at least some must have been.

Table 5.2.1 Predicted future condition of UK SACs supporting H91C0 based on current Common Standards Monitoring 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	1,017	3
	Unfavourable no change	11,131	6
	Unfavourable unclassified		
	Total	12,148	9
	% of assessments	80%	75%
	% of total UK extent	48%	Unknown
Future-favourable	Favourable maintained	2,970	3
	Favourable recovered		
	Unfavourable recovering		
	Favourable unclassified		
	Total	2,970	3
	% of assessments	20%	25%
	% of total extent	12%	Unknown

Note that the scenario presented above is based on the same information as used to construct the Table in section 4.1. 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.

SSSI/ASSI condition assessments

Table 5.2.2 and Maps 5.2.2 and 5.2.3 summarise the predicted potential future condition of H91C0 on UK SSSI/ASSIs. This is based on the approach described above and utilises condition assessments that were judged to be either strongly 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 future-unfavourable and future-favourable sites might occur (summary statistics for the maps are given in Section 7.2). The combined condition assessments show that 68% of strongly indicative assessments fall within the future-favourable category.

Table 5.2.2 Predicted future condition of H91C0 on SSSI/ASSIs based on Common Standards Monitoring 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	9	
	Unfavourable unclassified	0	
	Total	13	
	<i>% of assessments</i>	32%	
Future-favourable	Favourable maintained	24	
	Favourable recovered	0	
	Unfavourable recovering	4	
	Favourable unclassified	0	
	Total	28	
	<i>% of assessments</i>	68%	

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.

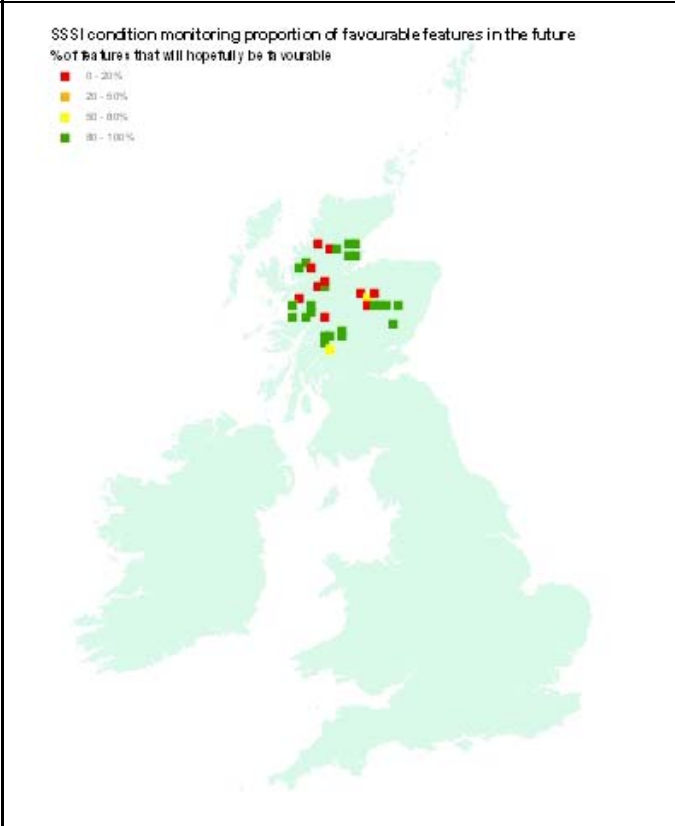
IMPORTANT NOTE: we do not have information on the timescale of the predicted recovery, which may be influenced by many past, natural and human related factors. A sustained, sympathetic management regime is more likely to result in Favourable condition being attained.

Predicted Future Condition of H91C0 based on Common Standard Monitoring 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
Red = future-unfavourable, i.e. the square contains one or more SACs where this habitat feature is present and has been predicted to be future-unfavourable.
Green = future-favourable, i.e. the square contains at least one SAC where this habitat feature is present and has been predicted to be future-favourable.
Blue = SAC not assessed, i.e. the square contains at least one SAC supporting this habitat feature but no assessment has been reported.
Transparent = SAC feature not present, i.e. the square contains some examples of the habitat type but none are SAC features.

Key*
Green – 80 – 100% of assessed features on 10km square are Favourable
Yellow - 50 – 80% of assessed features on 10km square are Favourable
Orange - 20 – 50% of assessed features on 10km square are Favourable
Red - 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 – Inadequate 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.

A substantial number of positive conservation measures have been put into place to improve the status of this habitat. The main threats that are expected to persist are deer/sheep browsing and grazing, habitat fragmentation and isolation, on-going impacts from past forestry operations, and air pollution. Condition assessments for relevant SACs indicate that only 20-25% of the habitat therein might become Favourable: the remainder falls within the future-unfavourable category and represents at least 48% of the total habitat area. This however paints an unduly gloomy picture, because none of the Unfavourable assessments were classed as recovering (most were classed as unfavourable no change) when at least some must have been. Relevant condition assessments for SSSIs are more encouraging: 68% fall within the future-favourable category. Given the good progress already made and some additional recovery once further conservation measures are put into place, the expectation is that a significant part of the habitat will be in Unfavourable condition in the next 12-15 years, but less than 25%.

6. Overall conclusions and judgements on conservation status

Conclusion^{2.6}: **Unfavourable – Bad but improving**

On the basis of Structure and Function, the overall conclusion 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 but improving	Favourable reference area is greater than the current extent, but not by more than 10%. The area appears to have improved somewhat since 1994, with earlier clearance and conversion having largely been stemmed and some recent small-scale expansion/restoration having taken place.	2
Specific structures and functions <small>(including typical species)</small>	Unfavourable – Bad but improving	More than 25% of the habitat area is considered to be unfavourable as regards its specific structures and functions. Only a limited amount is reported as recovering and at least as much is declining. It is likely that some of the unfavourable assessments are in fact recovering.	2
Future prospects <small>(as regards range, area covered and specific structures and functions)</small>	Unfavourable – Inadequate but improving	Habitat prospects over next 12-15 years considered to be bad, with severe impact from threats expected and long term viability not assured. Given the good progress already made and some additional recovery once further conservation measures are put into place, the expectation is that a significant part of the habitat will be in unfavourable condition in the next 12-15 years, but less than 25%.	2
Overall assessment of conservation status	Unfavourable – Bad but improving	On the basis of Structure and Function, the overall conclusion is Unfavourable – Bad but improving.	2

Key to confidence in judgement: 1 = High; 2 = Medium; 3 = Low

7. Annexed material (including information sources used 2.2)

7.1 References

- BAIN, C. 1987. Native Pinewoods in Scotland - A Review 1957-1987. RSPB, Edinburgh.
- FORESTRY COMMISSION. 1998. Caledonian Pinewood Inventory. Forestry Commission, Edinburgh.
- FORREST, G.I. 1980. Genotypic variation among native Scots pine populations in Scotland based on monoterpene analysis. *Forestry* 53, 101-128.
- FORREST, G.I. 1982. Relationship of some European Scots pine populations to native Scottish woodlands based on monoterpene analysis. *Forestry* 55, 19-37.
- HALL, J. 1997. An analysis of National Vegetation Classification survey data. JNCC Report 272, Peterborough.
- KINLOCH, B.B., WESTFALL, R.D. & FORREST, G.I. 1986. Caledonian Scots pine: Origins and genetic structure. *New Phytologist* 104, 703-29.
- MACKENZIE, N. 1999. The native woodland resource of Scotland. Forestry Commission Technical Paper, No. 30. Forestry Commission, Edinburgh.
- RACKHAM, O. 2003. *Ancient Woodland: Its History, Vegetation and Uses in England (New Edition)*. Castlepoint Press, Dalbeattie.
- RODWELL, J. & DRING, J. 2001. European significance of British woodland types. English Nature Research Report No. 460 (Volumes 1-2). English Nature, Peterborough.
- RODWELL, J.S. (ed.) 1991. *British Plant Communities Volume 1: Woodlands and Scrub*. Cambridge University Press, Cambridge.
- SMOUT, T.C., MACDONALD, A.R. & WATSON, F. 2005. *A History of the Native Woodlands of Scotland, 1500-1920*. Edinburgh University Press, Edinburgh.
- UK BAP Habitat Action Plan for native pine woodland. Available via UKBAP website <http://www.ukbap.org.uk/>

Map Data Sources

- JNCC International Designations Database. Joint Nature Conservation Committee.
- NVC Woodland Community Access Database. Joint Nature Conservation Committee.

7.2. Further information on Common Standards Monitoring 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)	12
Number of SACs with CSM assessments (b)	12
% of SACs assessed (b/a)	100
Extent of feature in the UK – hectares (c)	25,440
Extent of feature on SACs – hectares (d)	15,118
Extent of features assessed – hectares (e)	15,118
% of total UK hectarage on SACs (d/c)	59
% of SAC total hectarage that has been assessed (e/d)	100
% of total UK hectarage that has been assessed (e/c)	59

Notes.

1) Extent of features on SACs (d) includes only those features that have been submitted on the official Natura 2000 data form as qualifying features. This figure is based on the habitat extent figures presented on standard Natura 2000 data forms; 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 from 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).

Table 7.2.2 Summary of grid square map data shown in Maps 4.2.1-2 and 5.2.1-2

Status	Number of squares	Proportion of all squares
Current – Unfavourable (red)	20	33%
Current – Favourable (green)	3	5%
On SAC but not assessed (blue)	0	0%
Not on SAC (transparent)	37	62%
Total Number of 10km squares (any colour)	60	100%
Future – Unfavourable (red)	20	33%
Future – Favourable (green)	3	5%