New Forest SAC Management Plan Version II

Part 2: Evaluation, monitoring and priorities for management

Natural England Research Report NERR147 Version: II

Published 2025

NATURAL ENGLAND

www.gov.uk/natural-england

Contents

Landscape and nature conservation designations

The New Forest is covered by a range of national and international nature conservation designations and conventions, which are summarised in the following table.

Table 1: New Forest SSSIs and their international designation

SSSI	Area (ha)	SPA	Ramsar	SAC
New Forest	28,924.51	Yes (27,997.59ha)	Yes (27,997.59ha)	Yes (29,254.11ha)
Langley Wood and Homan's Copse	220.32	No	No	Yes
Whiteparish Common	63.95	No	No	Yes
Landford Bog	9.11	No	No	Yes
Loosehanger Copse and Meadows	56.54	No	No	Yes
Roydon wood	294.94	No	No	Yes
Lymington River	34.84	Part	Part	Part
Total (ha)	29,604.21	27,997.59	27,997.59	29,254.11

New Forest National Park

This is predominantly a landscape designation. The National Parks & Access to the Countryside Act 1949 as amended by the Environment Act 1995 provides the legislative framework through which the New Forest National Park was designated in 2005. The National Park area is some 56,658 hectares (ha) and entirely encompasses the New Forest SSSI, SAC, SPA and Ramsar sites.

SSSI

The New Forest Special Area of Conservation [SAC] contains seven whole or part Sites of Special Scientific Interest [SSSIs] designated under the Wildlife & Countryside Act 1981 (as amended). The component sites which together cover 29,604.21ha are the New Forest SSSI, Roydon Wood SSSI and the Lymington River SSSI in Hampshire; and Langley Wood and Homan's Copse SSSI, Landford Bog SSSI, Loosehanger Copse and Meadows SSSI

and Whiteparish Common SSSI in Wiltshire. Hence, all of the SAC is also designated a SSSI. A map of individual SSSIs is included in Appendix 1 of this document.

The Lymington River SSSI was notified as a site in its own right (for river features) in 1998. However, prior to this, parts of the Lymington River were separately notified as part of the New Forest SSSI in 1987 (renotified in 1996), Lymington River Reedbeds SSSI in 1984 and Roydon Wood SSSI in 1985. Most of the Lymington River SSSI headwaters lie within the New Forest SPA and Ramsar site. The Highland Water is a Geological Conservation Review [GCR] Site.

SPA

27,997.59ha of the New Forest SAC is a Special Protection Area [SPA] for birds, designated under the Birds Directive. A boundary map is included in Appendix 1. The site qualifies under Article 4.1 of the Directive by supporting nationally important populations of the following species:

During the breeding season

- Dartford warbler *Sylvia undata*
- Honey buzzard *Pernis apivorus*
- Nightjar *Caprimulgus europaeus*
- Woodlark *Lullula arborea*
- Eurasian hobby *Falco subbuteo*
- Wood warbler *Phylloscopus sibilatrix*

Overwinter:

- Hen harrier *Circus cyaneus*

Ramsar

27,997.59ha of the New Forest SAC is a Wetland of International Importance under the Ramsar Convention. The boundary is co-incident with the SPA boundary. It was selected under the following criteria (text taken from the Ramsar citation is in italics).

Criterion 1

'…by virtue of its valley mires and adjacent wet heaths which are of outstanding scientific interest'

Criterion 2a

'…by supporting a number of rare species and animals'

Criterion 2b

'…by virtue of the high ecological quality and diversity of the mire communities and their undisturbed transition zones'

SAC

The boundary of the SAC is included in Appendix 1. The SAC has been selected under for the following criteria (including revisions under the moderation process in 2000).

Qualifying Priority Features

(H91D0) Bog Woodland

Considered to be rare as its total extent in the UK is estimated to be less than 1,000ha; for which the New Forest is considered to be one of the best areas in the UK.

(H91E0) Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, *Alnion incanae, Salicion albae*); Alder woodland on floodplains

For which the New Forest is considered to be one of the best areas in the UK.

(H3110) Oligotrophic waters containing very few minerals of sandy plains (*Littorelletalia uniflorae*); Nutrient-poor shallow waters with aquatic vegetation on sandy plains

For which the New Forest is one of only four know outstanding localities in the UK.

Considered to be rare as its total extent in the UK is estimated to be less than 1,000ha; for which the New Forest is considered to be one of the best areas in the UK.

(H3130) Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the *Isoëto-Nanojuncetea*; Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels (H3130)

For which the New Forest is considered to be one of the best areas in the UK.

(H4010) Northern Atlantic wet heaths with *Erica tetralix*; Wet heathland with cross-leaved heath

For which the New Forest is considered to be one of the best areas in the UK.

(H4030) European dry heaths

For which the New Forest is considered to be one of the best areas in the UK.

(H6410) *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*); Purple moor-grass meadows

For which the New Forest is considered to be one of the best areas in the UK.

(H7140) Transition mires and quaking bogs; Very wet mires often identified by an unstable 'quaking' surface

For which the New Forest is considered to support a significant presence.

(H7150) Depressions on peat substrates of the *Rhynchosporion*

For which the New Forest is considered to be one of the best areas in the UK.

(H7230) Alkaline fens; Calcium-rich springwater-fed fens

For which the New Forest is considered to support a significant presence.

(H9120) Atlantic acidophilous beech forests with *Ilex* and sometimes also *Taxus* in the shrub layer (*Quercion robori-petraeae* or *Ilici-Fagenion*); Beech forests on acid soils.

For which the New Forest is considered to be one of the best areas in the UK.

(H9130) *Asperulo-Fagetum* beech forests; Beech forests on neutral to rich soils

For which the New Forest is considered to be one of the best areas in the UK.

(H9190) Old acidophilous oak woods with *Quercus robur* on sandy plains

For which the New Forest is one of only four outstanding localities in the UK; and considered to be one of the best areas in the UK.

(S1044) *Coenagrion mercuriale*; southern damselfly

For which the New Forest is considered to be one of the best areas in the UK.

(S1083) *Lucanus cervus*; stag beetle

For which the New Forest is one of only four known outstanding localities in the UK.

(S1166) *Triturus cristatus*; great crested newt

For which the New Forest is considered to support a significant presence.

Obligations arising from the nature conservation designations

It is appropriate in this Management Plan to give only the briefest outline of the obligations under the various nature conservation designations. The reader is strongly advised to refer to the appropriate legislative texts, government guidance and explanatory documents for

comprehensive information.

National Park

National Park purposes are enshrined in legislation (Section 62 (2) of the Environment Act 1995). Specifically, it states that, “in exercising or performing any functions in relation to, or so as to affect, land in a National Park any relevant authority shall have regard to the purposes”:

1. To conserve and enhance the natural beauty, wildlife and cultural heritage.

2. To promote opportunities for the understanding and enjoyment of the special qualities of National Parks by the public.

When National Parks carry out these purposes, they also have the duty to seek to foster the economic and social wellbeing of local communities within the national park.

When the two purposes conflict with each other and management intervention(s) cannot resolve this conflict, then the Sandford Principle should be applied. Within the Act this principle states that “if it appears that there is a conflict between those purposes, [the National Park Authority] shall attach greater weight to the purpose of conserving and enhancing the natural beauty, wildlife and cultural heritage of the area”.

In exercising or performing any functions in relation to, or so as to affect, land in a National Park, any relevant authority shall have regard to the purposes of the National Park (including application of the Sandford Principle). ‘Relevant authority’ includes any public body or Statutory Undertaker (Environment Act).

SSSI

The Wildlife & Countryside Act 1981 (as amended) [W&CA] provides the legislative framework for the legal protection of cited flora and fauna as well as the notification and protection of SSSIs.

In accordance with government policy aimed at preventing damage to SSSIs and to encourage them to be managed in a way consistent with achieving favourable condition, the W&CA was amended in part by the Countryside & Rights of Way Act 2000 [CROW]. This provides legal mechanisms aimed at achieving positive management for SSSIs. This

builds upon the positive relationships between Natural England and many owner/occupiers, but also provides effective back-up mechanisms should constructive dialogue break down.

Under Section 28G of the W&CA public bodies are given a statutory duty to ***further the conservation and enhancement of SSSIs*** in carrying out their functions. The Act requires owners or occupiers of SSSIs to apply to Natural England to seek consent to carry out operations that may damage the special interest of the site. Natural England may grant consent, with or without conditions, or refuse consent on operations, if it considers that the proposal is not compatible with furthering the conservation and enhancement of the special interest of the site. The operations that require Natural England's consent (also previously referred to as 'Operations Likely to Damage') are listed in the notification documents of each SSSI and are relevant to the notified features within the site. Where public bodies request to carry out operations on a SSSI which have been identified as potentially damaging the special interest features of a SSSI, then assent under 28H of the Act is required. Where another public body is permitting an operation within or affecting a SSSI there is a requirement for the public body to formally consult Natural England for advice under Section 28I of the Act (Natural England Standard SSSI Regulation Operational Standard 2013).

Natural England is a statutory consultee on development plans, Strategic Environmental Assessments [SEA], Habitats Regulations Assessments [HRA] and certain development proposals. These include development proposals requiring an Environmental Impact Assessment [EIA] and proposals affecting SSSIs (Section 28I of W&CA) and European Protected Sites. Local Authorities have specific duties to take account of the advice provided by Natural England.

NERC Act

Section 40 of the Natural Environment & Rural Communities Act 2006 [NERC] places a duty to conserve biodiversity on public authorities in England. It requires local authorities and government departments to have regard to the purposes of conserving biodiversity in a manner that is consistent with the exercise of their normal functions such as policy and decision-making. 'Conserving biodiversity' may include enhancing, restoring or protecting a population or a habitat.

Section 41 of the NERC Act provides a list of species and types of habitats which are regarded by Natural England to be of 'principal importance' for the purposes of conserving biodiversity in England (S.41 species & habitats). These 56 Priority Habitats and 943 species are drawn from earlier lists of the UK Biodiversity Action Plan Priority Species and Habitats. The Section 41 lists are needed by decision-makers in local and regional

authorities when carrying out their duties under Section 40 of the Act. There is a duty to maintain current lists—and so within this is a responsibility to monitor the status of such species and habitats.

SPA/SAC

Together, SPAs and SACs make up a series of sites across Europe designated to protect Europe's rich variety of wildlife and habitats**.** The Conservation of Habitats and Species Regulations 2017 (as amended) [the Habitats Regulations]: transpose the requirements of the European Directive (92/43/EEC) on the Conservation of Natural Habitats and Wild Flora and Fauna [the Habitats Directive] which aims to protect habitats and species of European nature conservation importance. The Directive established a network of internationally important sites designated for their ecological status. These are referred to as European Sites and comprise Special Areas of Conservation [SACs] and Special Protection Areas (SPAs) (formerly designated under the European Habitats Directive and the Birds Directive respectively).

The conservation objectives for the New Forest SAC can be found here: the conservation objectives for the New Forest SPA can be found here.

At the point of the UK's exit from the European Union, the UK's Habitats Regulations will remain in force. A number of limited operability changes will take effect through formal legislative amendments to the Regulations, including the future management of the UK's network of European Sites and the transfer of the European Commission's role in the HRA process to the Secretary of State.

The Habitats Regulations establish the general statutory duties of Natural England and all other competent authorities, the selection of European Sites and the ongoing protection of those sites. Protection means that new proposed operations, projects and plans including land use plans must be assessed for any impacts and:

a. Requires competent authorities (i.e. those bodies exercising statutory functions) responsible for regimes covered by Part I Paragraph 9 of the Regulations (for example, Planning Authorities, Forestry England) to undertake a formal assessment (*appropriate assessment*) of any plan or project which is likely to have a significant effect on the nature conservation interests for which a SPA/SAC has been designated (Part 6 Regulation 63). The plan or project can only be agreed to if there is no adverse effect on the integrity of the European Site, specifically the achievement of its conservation objectives.

Where the authority concludes that the plan or project, either alone or in combination with other plans or projects, would have an adverse effect on the integrity of the site, consent can only be given in the absence of alternatives (i.e. less damaging ways of carrying out the plan or project), if, exceptionally there are imperative reasons of overriding public importance as to why it must proceed. This decision would be usually made by the relevant Secretary of State. If the project proceeds on this basis then compensatory measures must be taken to ensure that the overall coherence of the European Site network is protected.

b. Competent authorities would have to consult Natural England as part of its assessment and have due regard to any representations which Natural England made (for further information: www.gov.uk/guidance/appropriate-assessment)

c. Requires competent authorities to review any extant consent (i.e. any unimplemented or partially implemented consent and other authorisations) granted before the site became a European Site which, if implemented, would be likely to have a significant effect on the on the nature conservation interests of the European Site. Any review should be carried out under existing statutory procedures where they exist and, if none exist, the Secretary of State may give directions as to the procedure to be followed. The review must conclude with one of three courses of action:

- to affirm
- to modify or
- to revoke the consent, permission or authorisation.

An HRA must be undertaken of the consent under review.

d. Allow an appropriate authority, after consultation with Natural England, to make in respect of any land within a European Site a Special Nature Conservation Order [SNCO] specifying operations (whether on land specified in that order or elsewhere and whether or not within the European Site) which appear to the appropriate authority to be of a kind which, if carried out in certain circumstances or in a particular manner, would be likely to destroy or damage protected features. SNCOs protect the natural features (the range of habitats and species populations) of European Sites from damage by limiting the work and activities that can be carried out both on and near a site.

Specific to the New Forest are the conservation objectives for the SAC and SPA, as referred above. In addition, Natural England has produced supplementary advice for the SAC here and SPA here which provide more detailed advice and information to enable

the application and achievement of the Objectives.

Ramsar

Many areas in the UK are designated under the International Wetlands Convention and known as Ramsar sites (after the Iranian town where the convention was signed in 1971).

The objective of the Ramsar Convention is to 'stem the progressive encroachment on and loss of wetlands now and in the future'. To achieve this the convention seeks to promote the wise use of all wetlands: special protection for wetlands included in the list of Wetlands of International Importance. Almost 90% of UN Member States, from all the world's geographic regions, have acceded to become Contracting Parties to this inter-governmental treaty (www.ramsar.org). This means parties have agreed to establish and protect wetlands of international importance.

It is UK Government policy that Ramsar sites should have the same level of protection as SPAs and SACs.

The Water Environment (Water Framework Directive) (England & Wales) Regulations 2017

The Water Environment Regulations require the preparation of River Basin Management Plans to deliver the two core objectives of the legislation:

- To prevent deterioration of the surface water status or groundwater status of a body of water.

- Otherwise, to support the achievement of the environmental objectives set for a body of water.

The River Basin Management Plans cover large areas across a number of counties. The New Forest SAC is covered under the River Basin Management Plans for both the South West England river basin district and the South East England river basin district.

More locally the north and west of the New Forest SAC are within the Hampshire Avon catchment and administered through the Hampshire Avon Catchment Partnership (www.hampshireavoncatchmentpartnership.org.uk). The priority river basin management issues are poor water quality (particularly diffuse sources of phosphorus, nitrate and

sediment from rural areas), water quantity (low flows and flood conditions) and habitat degradation (over-widening of the river channel, disconnection with the floodplain and in-channel obstructions).

In the south and east the New Forest Catchment Partnership is co-hosted by the Freshwater Habitats Trust and the National Park Authority (freshwaterhabitats.org.uk/projects/catchment-projects/). The priority issues in the catchment are diffuse pollution, morphology (loss of natural processes, floodplain and habitat connectivity) and enhancing high-value biodiversity.

Comparative evaluation of features of nature conservation importance in the New Forest

Table 2 shows the comparative status of the features for which the New Forest has been variously designated in terms of their international and national context. The national assessment of significance is also given in relation to the New Forest Natural Character Area (NCA 131), summarising the national evaluations for key habitats and species groups undertaken by Natural England. Individual habitats and species groups are discussed briefly under the section heading ‘Habitat Evaluation’ below. Using these evaluations a more holistic evaluation is undertaken using the Ratcliffe criteria, under the section heading ‘Evaluation of the ecosystem using the Ratcliffe Criteria’.

Table 2: Comparative evaluation of New Forest features of nature conservation importance. Note some cells have been left deliberately blank

Site feature	NVC	Habitats Directive	Internationally important SAC/SPA/Ramsar	Nationally important SSSI	Significance of the New Forest Natural Area for site feature
Geology and geomorphology	—	—		Yes	Considerable
Pasture woodland	W15, W14 W16, W10a/11 W10b/11 W14, W8b	Atlantic acidophilous beech Old acidophilous oak No equivalent *Asperulo-Fagetum* beech woods	Yes (SAC) Yes (SAC) No Yes (SAC)	Yes Yes Yes Yes	Outstanding
Riverine woodland	W7, W8	Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*	Yes (SAC)	Yes	Outstanding
Bog woodland	W4b W5b	Bog woodland No equivalent	Yes (SAC) No	Yes Yes	Outstanding
Inclosure woodland	None (plantations)	No equivalent	Yes, for their restoration potential	Yes	
Dry heath	H2a, H3c, H2c, H3a, H3b	European dry heaths	Yes (SAC)	Yes	Outstanding
Wet heath	M16a, M16b M16c,	Northern Atlantic wet heaths with *Erica tetralix* Depressions on peat substrates (*Rhynchosporion*)	Yes (SAC) Yes (SAC)	Yes Yes	Outstanding
Mire	M6di, M25a,	No equivalent	No	Yes	Outstanding

Site feature	NVC	Habitats Directive	Internationally important SAC/SPA/Ramsar	Nationally important SSSI	Significance of the New Forest Natural Area for site feature
	M21a, M1, M10a, M14 M9, M14, M29, M21	Depressions on peat substrates (*Rhynchosporion*) Alkaline fens Transition mires and quaking bogs	Yes (SAC) Yes (SAC) Yes (SAC)	Yes Yes Yes	
Dry grassland	U1, U3, U4, U20, MG6	No equivalent	No	Yes	Outstanding
Wet grassland	M23a Rush pasture M24c/M25b Fen meadow	No equivalent Eu-molinion (*Molinia* meadows on chalk and clay)	No Yes (SAC)	Yes Yes	Outstanding Outstanding
Temporary ponds	M30 (OV35) Pool edge assemblages (No NVC equivalent) OV31, S22	Oligotrophic waters containing very few minerals of Atlantic sandy plains with amphibious vegetation. Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the *Isoeto-Nanojuncetea* Not included	Yes (SAC) Yes (SAC) No	Yes Yes Yes	Outstanding

Site feature	NVC	Habitats Directive	Internationally important SAC/SPA/Ramsar	Nationally important SSSI	Significance of the New Forest Natural Area for site feature
Permanent ponds	A24b A22a	(Natural dystrophic lakes and ponds) Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the *Isoeto-Nanojuncetea*	No Yes (SAC)	Yes Yes	Outstanding
Streams	A14, A20, A16a	(Floating vegetation of *Ranunculus* of plain sub mountainous rivers)	No	Yes	Outstanding
Mammals	—	—	No	Yes	Otter: medium Water vole: medium Dormouse: high Pipistrelle: high Hare: low Barbastelle: not included Bechstein's bat: high
Birds	—	SPA	Yes	Yes	Outstanding
Amphibians and reptiles	—	SAC (great crested newt)	Yes	Yes	Smooth snake: high Great crested newt: medium Sand lizard: high

Site feature	NVC	Habitats Directive	Internationally important SAC/SPA/Ramsar	Nationally important SSSI	Significance of the New Forest Natural Area for site feature
Fish	—	—	No	Yes (probably)	Not reviewed
Invertebrates	—	SAC (stag beetle, southern damselfly)	Yes	Yes	Nationally significant
Lichens	—	Covered in woodland habitats	Yes	Yes	Outstanding
Vascular plants	—	No	Yes	Yes	Outstanding
Bryophytes	—	No	Yes	Yes	Considerable
Fungi	—	No	Yes	Yes	Not reviewed

Habitat evaluation

Pasture woodland

Pasture woodland extends to some 4,430ha (excluding riverine and bog woodland), comprising some 3,100ha of old growth woodland and 1,330ha of more recent secondary expansion. Of the 3,100ha of old growth pasture woodland some 2,520ha conforms to the Habitats Directive Annex I habitats of *Atlantic acidophilous beech* (2,000ha), *Old acidophilous oak* (120ha) and *Asperulo-Fagetum beech woods* (400ha). The remainder comprises more mesotrophic, herb-rich oak woodland which has no Habitats Directive equivalent. All old growth pasture woodland is of international importance for nature conservation.

Pasture woodland is a high priority for nature conservation in the UK and is encompassed within the Habitats of Principal Importance (NERC S.41)-Wood Pasture and Parkland.

International perspective: Old growth woodland has declined internationally and is a priority for nature conservation. There is a shortage of literature concerning the European significance of British woodland (and other habitats). However, the context and character of UK examples are explored in Rodwell and Dring (English Nature Report ENRR460).

Beech forests with *Ilex* and *Taxus*, rich in epiphytes *(Ilici-Fagion)*

The New Forest is one of the best areas for this woodland type in the UK, supporting significant stands of this Qualifying Feature for which the site is designated as a SAC.

The Interpretation manual of European habitats (1996) lists three 'varieties' of the *Ilici-Fagion:*

a. subatlantic beech-oak forests of the plains and hill levels with *Ilex aquifolium*

b. hyper-Atlantic beech-oak forests of the plains and hill levels with *Ilex* and *Taxus*, rich in epiphytes

c. pure beech forests or acidophilous beech-fir forests of the montane level, with *Ilex aquifolium* in the field layer

The UK has a substantial proportion of European *Ilici-Fagion* woodlands which are a distinctive form of acidophilous beech-oak forest with holly and oceanic herbs (Rodwell & Dring, 2000). Indeed, Brittany and the southern British Isles are the main locus for 'variety b' above. The striking physiognomy and historical interest of the New Forest stands gives them a particular character and individuality. Only the beech-holly pasture woodlands in

northern Spain (Type c), share and maintain this long continuity of wood pasture management, undoubtedly contributing to their outstanding richness floristically.

The *Ilici-Fagion* woodlands are considered a high priority for nature conservation in the UK and are encompassed within the Habitats of Principal Importance (NERC S.41)-*Lowland beech and yew woodland*.

***Asperulo-Fagetum* beech forests**

The New Forest is one of the best areas for this woodland type in the UK, supporting significant stands of this Qualifying Feature for which the site is designated as a SAC. This community is of international importance for nature conservation.

Compared with the more extensive stands of these complex range of beech forests which extend right across the north-west European lowlands into the mountains of the centre and south, UK examples tend to be small and fragmented. Hence, the occurrence of some 400ha of *Asperulo-Fagetum* in the New Forest is of considerable significance.

The *Asperulo-Fagetum* beech forests are considered a high priority for nature conservation in the UK and are encompassed within the Habitats of Principal Importance (NERC S.41)-*Lowland beech and yew woodland*.

Old acidophilous oak woods with *Quercus robur* on sandy plains

There are around 120ha of old growth acidophilous oak woodland in the New Forest referable to the Habitats Directive Annex I habitat *Old acidophilous oak woods with Quercus robur on sandy plains*. This community is of international importance for nature conservation and is a Qualifying Feature for which the New Forest is designated as a SAC. The New Forest is one of the best areas for this feature in the UK; furthermore, the New Forest is one of only four known outstanding localities in the UK.

International perspective: Britain has relatively little of this now much reduced and fragmented woodland. Very similar woodlands have been described on impoverished acid sands from Germany, Denmark, south Norway, south Sweden, the Netherlands, Belgium and France. It is often only the absence of May lily *Maianthemum bifolium* that distinguishes UK examples. (*Maianthemum bifolium* is present in eastern England, e.g. Swanton Novers Woods National Nature Reserve [NNR] which has the largest coppiced oak stand in East Anglia). The New Forest is far too oceanic for this species—indeed it is rather more oceanic than the oak woods described in this Annex I habitat, but not quite as oceanic as the woods selected for the Annex I habitat *Old oak woods with Ilex and blechnum* in Britain. Right across their range these woodlands and the heathlands derived from them are now extremely local (e.g. the military training grounds at Luneberger Heide). Where stands have not been converted to agriculture, pine plantations have replaced native woodlands.

The old acidophilous oak woods are considered a high priority for nature conservation in the UK and are encompassed within the Habitats of Principal Importance (NERC S.41)-*Lowland oak and mixed deciduous woodland*.

Riverine woodland

There are around 212ha of old growth riverine woodland in the New Forest referable to the Habitats Directive Annex I Priority Habitat *Alluvial forests with alder and ash.* The New Forest is one of the best areas for this feature in the UK. This community is of international importance for nature conservation and is a qualifying priority feature for which the New Forest is designated as a SAC.

International perspective: In general, alluvial forest with alder and ash habitat is widespread in Europe, but in the more intensively agricultural and long-settled lowlands where flooding is now tightly controlled and woodlands much reduced in cover, examples tend to be fragmented and small. The New Forest stands are relatively extensive and where not affected by localised stream canalisation, remain functionally intact. They also contain extensive old growth stands which are exceptionally rare in Europe.

The alluvial forests with alder and ash are considered a high priority for nature conservation in the UK and are encompassed within the Habitats of Principal Importance (NERC S.41)-*Wet woodland***.**

Bog woodland

There is an estimated 250ha of bog woodland in the New Forest, of which about 33ha is ancient sallow carr referable to the Habitats Directive Annex I Priority Habitat *Bog woodland*, which is of international importance. The New Forest is one of the best areas for this rare feature in the UK, whose total extent is estimated to be less than 1,000ha. This community is of international importance for nature conservation and is a qualifying priority feature for which the New Forest is designated as a SAC.

International perspective: Extremely restricted and local in the northwestern European lowlands where mire drainage and reclamation has destroyed large areas of former bog woodland. The most extensive areas lie in northern Finland in the huge peatlands in the distinctive aapa mires, though these are comparable to Scottish pine dominated stands rather than the birch dominated lowland bog woodlands such as are found in the New Forest.

Bog woodland is considered a high priority for nature conservation in the UK and is encompassed within the Habitats of Principal Importance (NERC S.41)-*Wet woodland.*

Inclosure woodland

On the Crown Lands, Inclosure woodland extends to some 8,536ha, comprising relatively recent broadleaf and conifer plantation on former heathland or ancient woodland sites. Where recognisable, remnant heathland and woodland Habitats Directive Annex I habitats contribute to the international importance of the individual Annex I habitats. Particularly significant in this regard are the 400ha of pasture, riverine and bog woodland communities which were incorporated within 18th and 19th century Statutory Inclosures. The current New Forest Inclosures Forest Plan cites 876ha of open habitats and 290ha of proposed new heathland restoration (clear fells): 735ha of grazed native woodland area and 490ha of riverine habitats (New Forest Inclosures Forest Plan 2019-2029).

The 722ha of so-called Verderers' Inclosures were largely planted on heathland in the latter half of the 20th century. The underlying remnant heathland has a very high potential for restoration and, subject to appropriate restoration, would quickly recover to internationally important heathland communities.

Elsewhere, the broadleaved plantations, particularly on ancient woodland sites, have great potential. Those that have developed a more semi-natural character may form refuges for woodland plants and animals which are intolerant of high grazing pressure, many of which have suffered national declines in recent decades.

The New Forest SAC conservation objectives supplementary advice provides coarse quantitative or qualitative estimates of existing and potential habitats currently within Inclosures (summarised from Sanderson 2007) as follows:

- More than 3,000ha of former heathland (wet and dry) is estimated to be located within the woodland plantation Inclosures. Those planted with conifer will readily restore to heathland.

- Approximately 200ha of former wet grassland is estimated to be located within the plantation Inclosures and many have been drained and planted with trees, but still have restoration potential

- Large valley mire complexes are also located within the woodland Inclosures. Many of these mires have been drained and planted with conifers but where they are partially intact, there is the potential for restoration. Restoration may lead to the development of M9 plant communities in situations where there is seepage of base-rich water, usually from Headon Beds. Restoration may also lead to the development of *Rhynchosporion* habitat where the reintroduction of grazing creates bare peat.

- Stands of alluvial woodland were also located within the plantation Inclosures. Many of these habitats have been degraded by forestry operations such as drainage and planting of trees but where they are partially intact, there is the potential for restoration.

- Approximately 400ha of pasture woodland is enclosed within forestry plantation with the consequent loss of traditional grazing management. Much of it still retains the characteristics of pasture woodland and could be restored.

- Within forestry plantation, Inclosures are broadleaf plantations on former pasture woodland which, given sufficient time and opened up to grazing by commoners livestock, could develop back into Annex I woodland habitats.

Outside of the Crown Lands

The SAC includes additional parcels of land containing woodland referable to H9120, H9130 and H9190 features at Whiteparish Common, Loosehanger Wood, Langley Wood and Franchises Wood in the north.

Heathland

New Forest heathland is extensive, including 7,600ha of dry heath, 2,110ha of wet heath and 2,021ha of valley mire communities. Various communities are referable to the Habitats Directive Annex I habitats, *European dry heaths*, *Northern Atlantic wet heaths with Erica tetralix, Depressions on peat substrates (Rhynchosporion), Transition mire* and *alkaline fen.* All remaining lowland heathland is of national and international importance for nature conservation.

International perspective: Webb (1998) in a review of the extent of European heathlands reveals that lowland heaths occur throughout the Atlantic region of western Europe, occurring in a zone extending from northern Spain (Galicia) to beyond the polar circle on the northwest coast of Norway.

Lowland heathland has declined internationally and is a priority for nature conservation. There is an estimated 350,000ha of lowland heathland in the Atlantic zone (Diemont, Webb and Degan, 1996) of which around 58,000ha occurs in the UK. While these figures are likely to be incomplete (e.g. data is incomplete for Ireland, Norway and Germany), it is manifestly clear from Table 3 that heathland has shrunk dramatically from several million hectares to the current figure largely as a result of conversion to farmland, forestry and urban and industrial development. Most of what remains is protected.

Table 3: Estimates of current area of lowland heathland in Europe (Diemont, Webb and Degn, 1996)

Country	Area (ha) in 19th century	Current area
United Kingdom	145,000	58,000
The Netherlands	800,000	40,000
Belgium	163,000	13,000
France	200,000	65,000
Germany	1,000,000	55,000
Denmark	658,000	70,364
Sweden	300,000	93,000

If we just consider the contribution that the New Forest dry and wet heath communities make to the UK total (i.e. excluding mire and acid grassland communities), then with 9,710ha we have about 17% of the total UK resource or around 2.7% of the total Atlantic zone resource. If we add in mires and the dry acid grassland communities then the figure becomes 14,559ha or 25% of the total UK resource, or around 4% of the total Atlantic zone resource.

Dry heath

There are around 7,600ha of dry heath in the New Forest all of which is referable to the Habitats Directive Annex I habitat *European Dry Heaths.* Dry heath communities are of international importance for nature conservation and is a Qualifying Feature for which the New Forest is designated as a SAC. New Forest is considered one of the best areas for this feature in the UK.

International perspective: Covered above.

Dry heath is considered a high priority for nature conservation in the UK and is encompassed within the Habitats of Principal Importance (NERC S.41)-*Lowland heathland.*

Wet heath

There is around 2,110ha of wet heath in the New Forest of which some 1,890ha is referable to the Habitats Directive Annex I habitat *Northern Atlantic wet heaths with Erica tetralix* and 210ha is referable to the Habitats Directive Annex I habitat *Depressions on peat substrates (Rhynchosporion)*. Wet heath communities are of international importance for nature conservation and are a Qualifying Feature for which the New Forest is designated as a SAC. The New Forest is one of the best areas for these two habitats in the UK.

International perspective: Covered above.

Wet heath communities are considered a high priority for nature conservation in the UK and are encompassed within the Habitats of Principal Importance (NERC S.41)-*Lowland Heathland*

Mires

The national importance of New Forest mire communities has been described in Tubbs (1986). While undoubtedly locally damaged by drainage, most of the New Forest mire system is still largely intact—and its extensive cover and transitions to other heathland communities is unparalleled in the UK. Outside of the New Forest comparable mire communities have suffered considerable direct loss through urbanisation, forestry and management neglect. Now, they exist in fragmentary form in Dorset, the East Devon Pebble Beds and the Surrey heaths, with some scattered outliers on fragments of lowland heath elsewhere.

International perspective: There are particular difficulties in evaluating the New Forest mires at the European level, in that the largest proportion are ground water-fed valley bogs (NVC: M21), a vegetation type simply not recognised in the Corine classification or the Habitats Directive, even though comparable examples undoubtedly exist in north-west France. However, three individual components of valley bog complexes are recognised in the Directive, none of which could exist in isolation out with the valley bogs and wet heaths of the New Forest. It is unlikely that such variation in mire communities over such an extent in an intimate mosaic with other heathland exists in comparable form anywhere else in the Atlantic zone. While no absolute figures are available, a small proportion of the total mire area of 2,020ha is referable to the Habitats Directive Annex I habitats, *Transition mire and quaking bogs* and *Alkaline fen.* These mire communities are of international importance for nature conservation and are Qualifying Features for which the New Forest is designated as a SAC.

Dry grassland

There are no Habitat Directive equivalents to the New Forest dry grassland communities. Sanderson (1998) conducted a review of the extent, conservation interest and management of lowland acid grassland in England for English Nature (now Natural England). From this he concluded that the New Forest acid grassland is of national importance in that the composite area on the common grazings is the largest single surviving area of unimproved acid grassland and estimates that this represents around 20% of the surviving resource of parched acid grassland (U1) in England (Sanderson, 1999). The floristic diversity of the U1 communities is unparalleled. In addition, around 75% of the lowland U3 (Heathy acid grassland) resource in England is contained in the Forest dry grassland communities.

Wet grassland

There are around 1,063ha of wet grassland in the New Forest comprising a complex and intimate mosaic of various vegetation communities. Most is referable to the Habitats Directive Annex I habitat *Eu-molinion (Molinia meadows on chalk and clay).* This community is of international importance for nature conservation and is a Qualifying Feature for which the New Forest is designated as a SAC. The New Forest is considered to be one of the best areas for this habitat in the UK. The New Forest is probably second only to the Culm Grasslands for acid fen meadow (M24c), particularly as both exist within a wider heathland context.

International perspective: Very little comparative data exists. The costed action plan for purple moor-grass and rush pastures (UK Steering Group, 1995) suggests that with the possible exception of Ireland, the UK contains considerably more of this habitat than survives in the rest of Europe.

Wet grassland communities are considered a high priority for nature conservation in the UK and are encompassed within the Habitats of Principal Importance (NERC S.41)-*Purple moor-grass and rush pastures (Molinia-Juncus).*

Temporary ponds

The New Forest temporary ponds support a complex suite of vegetation communities some of which are referable to the Habitats Directive Annex I habitats *Oligotrophic waters containing very few minerals of sandy plains (Littorelletalia uniflorae)* and *Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and/or of the Isoeto-Nanojuncetea*. These communities are of international importance for nature conservation and are Qualifying Features for which the New Forest is designated as a SAC. The New Forest is considered to be one of the best areas for these two habitats in the UK. In addition, the New Forest is one of only four known outstanding localities in the UK for the *Littorelletalia uniflorae*, which is considered to be rare as its total extent in the UK is estimated to be less than 1,000ha.

Probably the best comparative study was carried out by Chatters (1996) who compared the floristic quality of ephemeral ponds and provided totals of Red Data Book and nationally scarce species for the best areas. This study indicates that the New Forest is the most important area in Britain for ephemeral pond specialist flora, even when directly compared to the Lizard Peninsula sites in Cornwall. This view is further supported by the Freshwater Habitats Trust survey report (2014).

A survey of a random selection of 38 ponds on the Crown Lands was undertaken in 2013 (Ewald et al, 2014) and the findings suggest that the majority of the New Forest ponds are of exceptional importance for wildlife.

Permanent ponds

There are a number of permanent ponds in the New Forest of varying acidity and nutrient status. Hatchet Pond is notable for its extensive population of shoreweed and associated flora including the nationally scarce six-stamened waterwort *Elatine hexandra*. This together with the distinctive marginal amphibious vegetation communities are referable to the Habitats Directive Annex I habitat *Oligotrophic to mesotrophic standing waters with vegetation of the Littorelletea uniflorae and Nanojuncetea.* This community is of international importance for nature conservation and is a Qualifying Feature for which the New Forest is designated as a SAC.

Streams

The New Forest streams are a geographically isolated type with no equivalent in lowland England. The largest is the Lymington River with its two contrasting tributaries the Ober Water and Highland Water. As the streams flow downstream they become progressively less acidic and nutrient-poor and consequently exhibit a unique vegetation succession from acid communities at the source akin to mountainous upland regions, through richer stream floras as they pass through open grassland and woodland communities, to more typical enriched neutral river plant communities in the lower reaches.

NB: There is no data available for a comparative evaluation of the European importance of temporary and permanent ponds and streams. Several of the characteristic species of temporary ponds, however, are also threatened species in France including *Pilularia globulifera* and *Pulicaria vulgaris*.

Species evaluation

Mammals

The assemblage of mammal species in the New Forest is of national importance as indicated by the presence of some 14 species of conservation concern, principally bats (especially Bechstein's and Barbastelle), as well as otter and water vole along the Lymington River.

Britain's mammalian fauna is naturally impoverished in species through its early post-glacial isolation as an island away from the rest of Europe. It has also been reduced by man's activities. No species of mammal is endemic to Britain.

Birds

With 37 bird species of conservation concern regularly occurring, the New Forest is of national importance for its bird populations. The heathland and woodland assemblages both exceed the threshold site index values given in the *Guidelines for selection of SSSIs* (NCC, 1989).

In addition, the New Forest is of international importance for breeding woodlark, nightjar, Dartford warbler, wood warbler, Eurasian hobby and honey buzzard and for its wintering population of hen harrier.

Amphibians and reptiles

The New Forest is of national importance for its reptile and amphibian populations, supporting all six native species of reptiles and five of the six native species of amphibians.

In addition, the New Forest is of international importance for its population of great crested newt, given its distribution in 13 localities with an estimated population of between 500-1,000 individuals (Davidson-Watts, 2000).

Fish

With 20 species of fish having been recorded in the New Forest streams and rivers—including bullhead and brook lamprey (both species listed on Annex II of the Habitats Directive), European eel, sea and brown trout—the Forest is probably of national importance for its native fish populations. Although the Environment Agency holds annual survey data further work is required to provide data for full description and evaluation.

Invertebrates

Some 164 Red Data Book species and upwards of 400 notable species have been recorded from the New Forest. New records have been found since 2001 and more targeted survey would undoubtedly produce more new records. The New Forest is clearly of national importance for its invertebrate populations.

It is difficult to evaluate Britain’s invertebrate fauna in a European context due to the lack of consistent recording and data. As knowledge of invertebrates improves it is likely that a number of features of invertebrate populations in Britain and in the New Forest in particular will be recognised as being of international importance. Already, the New Forest dead wood invertebrate fauna is regarded as being of international importance and it is likely that in future specialist invertebrate communities of heathland and wetland habitats will also prove to be important at this European level. However further studies are required to assess the

invertebrate faunas in Britain and continental Europe before sites can be evaluated at the international level.

Lichens

718 species have been recorded from the New Forest since 1967, representing some 30% of the British and Irish flora. Of these, some 71 species are of conservation concern. 74% are epiphytes, all but one found in pasture woodlands, while 26% are heathland species. The New Forest pasture woodlands and heathlands are of international importance for their lichen flora.

A total of 350 checklist taxa have been recorded from the pasture woodlands of the SAC and this is clearly the single most significant habitat in the SAC for lichens (Sanderson, 1998). A further associated 27 fungi, mainly lichen parasites, have also been recorded. The pasture woodlands carry a lichen flora that is rich in species characteristic old growth stands (i.e. with a stand continuity greater than 200 years) and this flora is of the highest international importance. This is due to the destruction of old growth pasture woodland by forestry management across the northern Temperate Zone (Vera, 2000). For example the pasture woodlands support 48 species listed in a draft of International Responsibility Species (i.e. species which Britain holds a significant proportion of the European or world population). Most of these species still have large viable populations in the New Forest but are very rare and threatened beyond Britain. In this context one of the most important communities is that found on the dry bark of ancient oaks characterised by species such as *Lecanactis premnea* and *Lecanactis lyncea*. The latter species, which is not even nationally scarce in Britain, is otherwise known from a handful of ancient oaks in France, while *Enterographa sorediata*, which is endemic to Britain, also occurs. This community, endemic to western Europe, is at its most extensive anywhere in Europe within the SAC.

Vascular plants

Some 540 species of vascular plant have been recorded from the New Forest SAC representing 36% of the total British flora. Of these, some 41 species of conservation concern have been recorded in the last 50 years, of which 10 are listed in the *Red Data Book of Vascular Plants* (Perring and Farrell, 1983); five of these 10 are listed in Schedule 8 of the Wildlife and Countryside Act (1981). The remaining 31 are nationally scarce. The New Forest is clearly of national importance for its vascular plant flora.

The British vascular plant flora is not rich by comparison with that of continental Europe. Island isolation has resulted in floristic impoverishment, yet it has been too recent for any appreciable degree of endemism to have developed. However, the strongly Atlantic element restricted to the northwest European seaboard has several species better represented in Britain and Ireland than elsewhere. These range from common British species, some of which are community dominants (e.g. all three species of gorse *Ulex*,

bluebell *Hyacinthoides non-scripta* and heath rush *Juncus squarrosus*, to species of specialised habitats such as *Pinguicula lusitanica* and *Rhynchospora alba*).

Bryophytes

There are about 1,030 species of bryophytes in Britain of which at least 326 have been recorded from the New Forest SAC (96 liverworts and 230 mosses), representing some 31% of the British flora (Paton, 1961; Crundwell and Rose, 1996). Of these, 33 are of conservation concern and have been recorded in the last 50 years. Four liverworts of conservation concern are known only from 19th century records. Of the recently recorded species, a third (11) are woodland species and the rest are heathland species.

The full importance of the New Forest bryophyte flora, however, is not expressed by simply looking at the species of conservation concern. A major feature of the New Forest is the presence of many species that are otherwise rare or absent in the lowlands. Some of these disjunctions are very marked: for example, *Thuidium delicatulum* is common on sloping wet lawns on clay (M24a and M16b) in the New Forest but is otherwise totally absent from lowland Britain. Concentrations of such species are found particularly in transition mires and in the pasture woodlands. The former include species such as *Sphagnum teres*, *Sphagnum contortum* and *Sphagnum subsecundum*; and the latter includes quite a few Atlantic bryophytes including *Saccogyna viticulosa*, *Plagiochila killarniensis*, *Bazzania trilobata*, *Frullania fragilifolia*, *Harpalejeunea ovata* and *Hyocomium armoricum*. Other examples are the liverwort *Preissia quadrata* in alkaline fen at Stony Moors and *Splachnum ampullaceum* on pony and cattle dung in wet heath and mires.

The bryophyte flora of the SAC is the richest in lowland Britain and clearly of national importance.

Fungi

At least 89 fungi of conservation concern have been recorded from the SAC, of which 18 have not been seen in the last 50 years. Of the species of nature conservation concern most are woodland species, with only nine heathland and grassland species recorded. These include species of acid grassland and species that are mycorrhizal on *Salix repens*. The best-known heathland species is *Poronia punctata*, which is a specialist confined to dung from horses grazing acidic rough pastures. It is found on dung deposited on acid grassland and heath and is possible now confined to the New Forest (and recently from introduced dung in Dorset) in Europe.

The 71 woodland species include a group of 11 species confined to old trees, or fallen large trees, within the pasture woodlands. These include the toothed fungi *Hericium cirrhatus*, *Hericium coralloides*, *Hericium erinaceum* and the bracket fungi *Phellinus robustus*. These are clearly old growth dependent species and have very low population densities (Wicks,

1999). They are only ever found on tiny numbers of old trees in a pasture woodland complex with approximately 250,000 old trees. Many epiphytic lichens exhibit a similar restriction to tiny numbers of trees, which suggests that very large areas of pasture woodland are required to support such old growth dependent species. The rest of the woodland fungi are ground growing species, mainly mycorrhizal on trees, but including some saprophytes.

The fungal diversity of the New Forest is clearly high and a large number of species of conservation concern have been recorded and on present evidence the woodlands are of international significance for fungi.

Evaluation of the ecosystem using the Ratcliffe Criteria

In the *Nature Conservation Review* (Ratcliffe, 1977) the New Forest is listed as a NCR Grade 1* for woodlands and heathlands. (NCR Grade 1* = Internationally important.) While now somewhat dated the NCR sets an accepted standard for evaluation of sites of nature conservation importance and this is followed in this evaluation carried out from the perspective of the ecosystem as a whole.

Size

The SAC extends to around 29,000ha, which makes it the largest semi-natural lowland heathland and wood pasture ecosystem in the Atlantic zone. It is particularly significant in a region where similar habitats tend to be highly fragmented as a result of enormous habitat losses. Rarely do the combination of habitats present in the Forest occur together and nowhere else on such a scale and diversity.

Diversity

The New Forest supports an outstanding range of vegetation communities and rare and scarce plant and animal species. The Description in Part 1 describes 17 features of European importance, an extensive range of NVC communities and lists some 860 species of conservation concern. Individually this variation is highly significant, but when considered as a whole, operating in a dynamic equilibrium at the ecosystem scale, with a multitude of transitions, it is without parallel in the intensively farmed lowlands of northwestern Europe.

Naturalness

With 5,000 years of recorded human interventions, the New Forest can hardly be regarded as natural. However, those interventions have maintained a wood pasture/heathland system which is likely to have continuity with prehistoric lowland Britain. Woodlands will have existed on many of the ancient woodland sites in the Forest since those times. Canopy gaps will have supported grassland and heathland communities in a mosaic of mire and swamp, maintained by large wild grazing animals. Vera (2000) questions the widely held belief that a climax vegetation of closed forest covered the lowlands in prehistoric times before the onset of agriculture. He argues that vegetation communities were governed by the activities of large herbivores creating a prehistoric parkland landscape consisting of grasslands, scrub, solitary trees and groves bordered by a mantle and fringe vegetation. This is arguably analogous to the situation in the Forest today, though in a greatly modified form, with commoners' animals having replaced wild herbivores.

Rarity

Heathland communities are now internationally fragmented and scarce. The combination of extensive woodland and heathland in an intimate mosaic is unparalleled. The niche separation afforded by this functional ecosystem is vast and hence the New Forest supports a significant proportion of the rare and scarce plant and animal species characteristic of such habitats. In the following table they are listed and described in Part 1 but in summary by group.

Table 4: Summary of species groups and their conservation status

Group	Status
Mammals	14 species of conservation concern
Birds	37 species of conservation concern
Amphibians and reptiles	11 species of conservation concern
Invertebrates	RDB 1: 38 species RDB 2: 28 species RDB 3: 89 species RDB K: nine species Notable A: 59 species Notable B: 287 species Notable: 34 species Total: 544 species of conservation concern
Lichens	71 species of conservation concern
Vascular plants	41 species of conservation concern
Bryophytes	33 species of conservation concern
Fungi	71 species of conservation concern

Fragility

Maintenance of the features for which the New Forest is designated requires continuation of extensive livestock grazing and additional interventions including cutting and prescribed burning. In their absence (and in the absence of a suite of prehistoric herbivores), the open communities would change over time to secondary woodland and the majority of the features of interest would be lost.

Given the continuation of essential maintenance regimes, the vulnerability of the key wetlands habitats to drainage is largely safeguarded by designation and legislation. Indeed, government policy is to restore SAC habitats to favourable condition. Given therefore that the habitats are likely to improve over the coming years, many characteristic plant and animal species are likely to also be more secure. The exceptions probably lie with those species which are susceptible to disturbance, particularly during the breeding season (e.g. ground nesting birds) and species which are susceptible to trampling and compaction (e.g. vascular plants) given the ever-increasing recreational pressures which will inevitably come to bear on the New Forest. In the longer term, issues associated with climate change may result in species changes to the various plant and animal communities, although it is currently difficult to predict what form they may take.

Typicalness

Taken as a whole, the New Forest ecosystem is unique. However, the individual features also provide a suite of type localities for the range of variation in lowland heathland and woodland community types.

Recorded history

Land use history is well recorded down the centuries enabling statements about habitat continuity and priorities for restoration to be made. The New Forest is a site which lends itself to ecological research and a great many studies have been carried out there and will undoubtedly continue to do so.

Position in an ecological/geographical unit

The New Forest contains a comprehensive suite of characteristic woodland and heathland (in the widest sense) communities associated with the geographical area and underlying formations, in one huge site. This is truly exceptional in the lowland context; elsewhere,

habitat fragmentation has meant that a series of individual sites are required to achieve anything like the full representation.

Potential value

The New Forest is unquestionably of international importance for those habitat units in favourable condition. However, some of the issues described in Part 3 have resulted in some habitat units becoming unfavourable over time. Of particular significance in this regard are the wetland communities which have been adversely affected by artificial drainage (e.g. mires, riverine woodland, bog woodland) and the woodland, heathland and mire communities affected by modern silviculture (Sanderson, 2007). The potential for habitat restoration is enormous, particularly given the surrounding sources of plants and animals, which virtually guarantee successful re-establishment of semi-natural communities over time, given appropriate restoration management.

Intrinsic appeal

The New Forest supports an outstanding suite of plant and animal communities, in which many characteristic species both common and rare may be found. However, it is also a key locality for many features of nature conservation value which do not have the wider public appeal associated with birds and vascular plants, such as saproxylic invertebrates, epiphytic lichens and geomorphological features.

European Site conservation objectives for the New Forest Special Area of Conservation

Natural England has issued revised European Site objectives for the New Forest SAC (Natural England 2018; Version 3). This document updates and replaces an earlier version dated 30 June 2014 to reflect the consolidation of the Habitats Regulations in 2017. The 2014 (Version 2) updated the original 2001 (V1) as stated in the original New Forest Management Plan (Wright and Westerhoff, 2001).

For clarity these are copied together with the accompanying text in italics:

With regard to the SAC and the natural habitats and/or species for which the site has been designated (the Qualifying Features listed below) and are subject to natural change.

Ensure that the integrity of the site is maintained or restored as appropriate and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring:

- The extent and distribution of qualifying natural habitats and habitats of qualifying species.
- The structure and function (including typical species) of qualifying natural habitats.
- The structure and function of the habitats of qualifying species.
- The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely.
- The populations of qualifying species.
- The distribution of qualifying species within the site.

This document should be read in conjunction with the accompanying supplementary advice document, which provides more detailed advice and information to enable the application and achievement of the objectives set out above.

Qualifying Features

H3130. Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the *Isoëto-Nanojuncetea*; Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels

H4010. Northern Atlantic wet heaths with *Erica tetralix*; Wet heathland with cross-leaved heath

H4030. European dry heaths

H6410. *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*); Purple moor-grass meadows

H7140. Transition mires and quaking bogs; Very wet mires often identified by an unstable 'quaking' surface

H7150. Depressions on peat substrates of the *Rhynchosporion*

H7230. Alkaline fens; Calcium-rich, springwater-fed fens

H9120. Atlantic acidophilous beech forests with *Ilex* and sometimes also *Taxus* in the shrub layer (*Quercion robori-petraeae* or *Ilici-Fagenion*); Beech forests on acid soils

H9130. *Asperulo-Fagetum* beech forests; Beech forests on neutral to rich soils

H9190. Old acidophilous oak woods with *Quercus robur* on sandy plains

H91D0. Bog woodland*

H91E0. Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*); Alder woodland on floodplains*

S1044. *Coenagrion mercuriale*; Southern damselfly

S1083. *Lucanus cervus*; Stag beetle

S1166. *Triturus cristatus*; Great crested newt

Priority natural habitats and species

Some of the natural habitats and species listed for which UK SACs have been selected are considered to be particular priorities for conservation at a European scale and are subject to special provisions in the Habitats Regulations. These priority natural habitats and species are denoted by an asterisk (*) in Annex I and II of the Habitats Directive. The term ‘priority’ is also used in other contexts, for example with reference to particular habitats or species that are prioritised in Section 41 of the NERC Act. It is important to note however that these are not necessarily the priority natural habitats or species within the meaning of the Habitats Regulations.

Explanatory notes: European Site conservation objectives

These conservation objectives are those referred to in the Conservation of Habitats and Species Regulations 2017 as amended from time to time [Habitats Regulations]. They must be considered when a competent authority is required to make a Habitats Regulations Assessment, including an Appropriate Assessment, under the relevant parts of this legislation.

These conservation objectives and the accompanying supplementary advice will also provide a framework to inform the measures needed to conserve or restore the European Site and the prevention of deterioration or significant disturbance of its Qualifying Features.

These conservation objectives are set for each habitat or species of a Special Area of Conservation [SAC]. Where the objectives are met, the site will be considered to exhibit a high degree of integrity and to be contributing to achieving favourable conservation status for that species or habitat type at a UK level. The term favourable conservation status is defined in Regulation 3 of the Habitats Regulations.

In addition to the European Site Objectives for the New Forest SAC, in 2019 Natural England published the New Forest SAC conservation objectives supplementary advice. Its function is to provide additional advice when developing, proposing or assessing an activity, plan or project that may affect the New Forest SAC.

The way in which it does this is explained in the section below, Monitoring.

As the SPA features are largely reliant on the SAC habitats, for completeness the New Forest SPA conservation objectives and New Forest SPA conservation objectives supplementary advice are also included here.

Monitoring

The nature conservation objectives state that the features for which the New Forest is designated must be maintained or restored to favourable condition. Favourable condition means that the underlying SSSI's habitats and features are in a healthy state and are being conserved by appropriate management.

For assessment, Natural England divides SSSIs into smaller units and assesses them against:

- a list of the features for which the site was designated
- related targets

The monitoring specification and condition comments can be accessed from Designated Sites View.

Purpose of monitoring

The fundamental purpose of monitoring is to assess whether the conservation objectives for the New Forest SAC are being achieved and if not then to focus action.

There are also obligations to monitor sites designated under International Agreements within Europe, obligations resulting from the UK Government's commitment to achieving targets set under Biodiversity Action Plans (now the Section 41 of the NERC Act) and obligations under the former LIFE programme to monitor the long-term health of the SAC. Specifically:

Habitats Directive

Article 11 requires, 'Member States shall undertake surveillance of the conservation status of the natural habitats and species referred to in Article 2 with particular regard to priority natural habitat types and Priority Species'.

Birds Directive

Special Protection Areas established under the Birds Directive, are to be protected and managed using the same measures as applied to SACs, implying that measures taken to monitor SPAs should match those applied to SACs.

The Ramsar Convention

Article 3.2 requires, 'Each Contracting Party shall arrange to be informed at the earliest possible time if the ecological character of any wetland in its territory and included in the List has changed, is changing or is likely to change as the result of technological developments, pollution or other human interference'.

NERC Act (formerly Biodiversity Action Plans)

Requires the maintenance of current lists; and so within this is a responsibility to monitor the status of such species and habitats.

LIFE Programme

Required the establishment of a monitoring programme to monitor the long-term health of the entire SAC.

Objective of monitoring

The following objectives embrace the fundamental purpose of monitoring and the requirements of the other drivers:

- To assess and report on the condition of important New Forest habitats and species

- To assess and report on the effectiveness of existing management programmes
- To assess and report on the effectiveness of restoration programmes
- To assess and report on the impacts of long-term environmental and social changes such as variations in grazing pressure, climate change etc.
- To trigger appropriate action in terms of adjustments to management regimes where monitoring reports dictate

Favourable conservation status

Article 1 of the Habitats Directive defines criteria for determining whether the conservation status of a habitat or species is favourable. The conservation status of a natural habitat will be taken as 'favourable' when:

- its natural range and areas it covers within that range are stable or increasing; and
- the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future; and

The conservation status of its typical species is favourable as defined by:

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

Essentially this means that to achieve favourable conservation status across Europe, a feature's extent, abundance and range must be stable or increasing; and that those factors which ensure its continued existence are present (Shaw and Wind, 1997).

In the UK the adoption of Common Standards for Monitoring Designated Sites has determined that assessments on conservation status will be made at UK level from analysis of individual feature specific condition assessments.

Common standards for monitoring designated sites

Common Standards Monitoring and condition assessment

Natural England and the Joint Nature Conservation Committee [JNCC] issued a joint statement concerning Common Standards Monitoring [CSM] (JNCC, 2019). This statement re-iterates the legal basis under the NERC Act, for Natural England (and the other country agencies) to 'establish common standards throughout the UK for the monitoring of nature conservation'. In 1998 Common Standards were established for monitoring designated sites as a universal set of common principles adopted by the statutory nature conservation agencies across Great Britain.

CSM implemented through a comprehensive programme of condition assessment of designated features on protected sites in UK has led to a targeting of resources on site features requiring restorative management works and the expenditure of considerable sums of European and GB resources in implementation. As a result, many sites including the New Forest are in far better condition in this century than they were in the last century.

However, in common with other agencies post-2008 financial crisis has led to a reduction in resources available for monitoring. While CSM through commonality in feature condition assessment will remain the standard, its interpretation will, in future, increase emphasis on wider environmental monitoring techniques (e.g. Earth Observation, eDNA etc.) which will enhance the ability to monitor at larger scales and to monitor attributes which cannot be measured through traditional field survey.

Precise protocols for implementing this new approach and how CSM will sit in a matrix of wider new and traditional monitoring methodologies are currently under development by Natural England, other country agencies and the JNCC. Hence, the existing field templates for condition assessment described in the 2001 SAC Plan are no longer in use and therefore are not repeated in this new edition.

However, a similar approach to defining favourable condition is used in the European Site conservation objectives: Supplementary advice on conserving and restoring site features (Natural England, 2019). This document provides detailed statements about what a designated feature looks like when in favourable or unfavourable condition. (Text copied directly from the document is in italics.)

- Natural England has responsibilities under the NERC Act to advise on the safeguarding, management and monitoring of SSSIs.

- *A 'risk-based' approach will be taken to prioritising and planning their monitoring programme.* This is still under development and replaces the original three- and six-

yearly monitoring cycles for all features of interest which Natural England is no longer resourced to undertake.

- CSM will be part of a wider monitoring programme under development.

- *The common standards are the Interest Feature (designated feature), the broad Attributes and the Condition Categories.* Interest features within protected areas are defined in the Citation for the SSSI or, in the case of European Sites and Ramsar sites, the features for which the site is designated.

- *Interest features are dynamic and change over time and site management needs to reflect this dynamism*. It may be that conservation objectives will need to change over time to reflect dynamic natural processes otherwise the original objectives may be unachievable.

- High level attributes will be used together with detailed measures to assess the attributes at site level and to define the condition of the interest feature and to set targets for management.

- *Four condition categories will be used as Common Standards in assessing the condition of interest features.* This replaces the seven categories formerly used though it is at Natural England's (and the other Country Agencies) discretion as to whether they use these additional former categories or not.

The four categories are:

1. **Favourable**: An interest feature should be recorded as favourable when its condition objectives are being met.

2. **Unfavourable**: An interest feature should be recorded as unfavourable when its condition objectives are not being met.

3. **Partially Destroyed**: It is possible to destroy sections or areas of certain features or to destroy parts of protected areas with no hope of reinstatement because part of the feature itself, or the habitat or processes essential to support it has been removed or irretrievably altered. In such instances it is usual for a condition assessment to be carried out on the remaining, intact feature.

4. **Destroyed:** The recording of a feature as destroyed will indicate the entire interest feature has been affected to such an extent that there is no hope of recovery, perhaps because the supporting habitat or processes have been

removed or irretrievably altered.

New Forest monitoring strategy: protocol

A two-strand approach to monitoring will continue to be used in the New Forest SAC. Natural England uses the evolving Common Standards Monitoring using high level attributes and measures defined in the conservation objectives, to classify the condition of a particular designated feature. The precise method by which this is to be achieved is under development, though is likely to continue to require visits to site units using favourable condition tables per feature for the foreseeable future.

This will continue to be supported by specific validation monitoring programmes designed by individual landowners (Forestry England, National Trust or Hampshire County Council, for example) to answer specific questions required by that organisation to inform management. This two-strand approach ensures that:

- Condition assessment objectives are set which define favourable condition for each interest feature (SSSI, SAC, SPA, Ramsar) for which the Forest was designated.

- Through the validation programme Section 41 species and habitats (formerly BAP priorities) which do not coincide with designated SSSI features, plus the outcomes of specific restoration programmes may be monitored, analysed and reported upon.

Condition assessment summary baseline 2001-2020

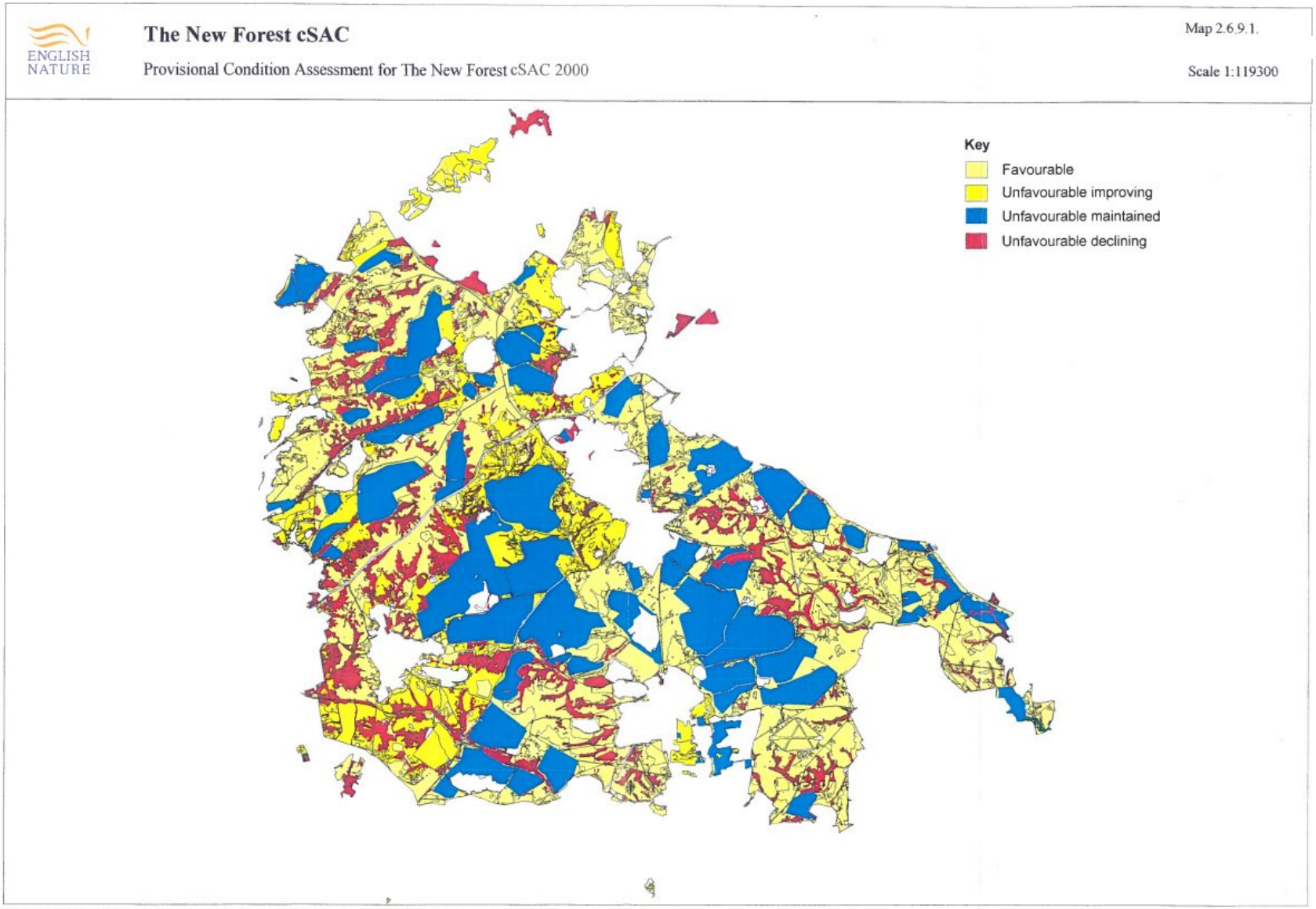
Map 1 on the following page gave the provisional overview as of 2001. At the time complete coverage had not been achieved. Subsequently all units have been condition assessed, the situation as of 2020 is shown on Map 2.

Validation survey and monitoring programme

Since 2001, a huge amount of time, money and effort has been expended on restoring considerable areas to favourable or improving condition. The focus has been on physical works to restore a variety of habitats including mires, heathland, streams and others—this has been highly successful.

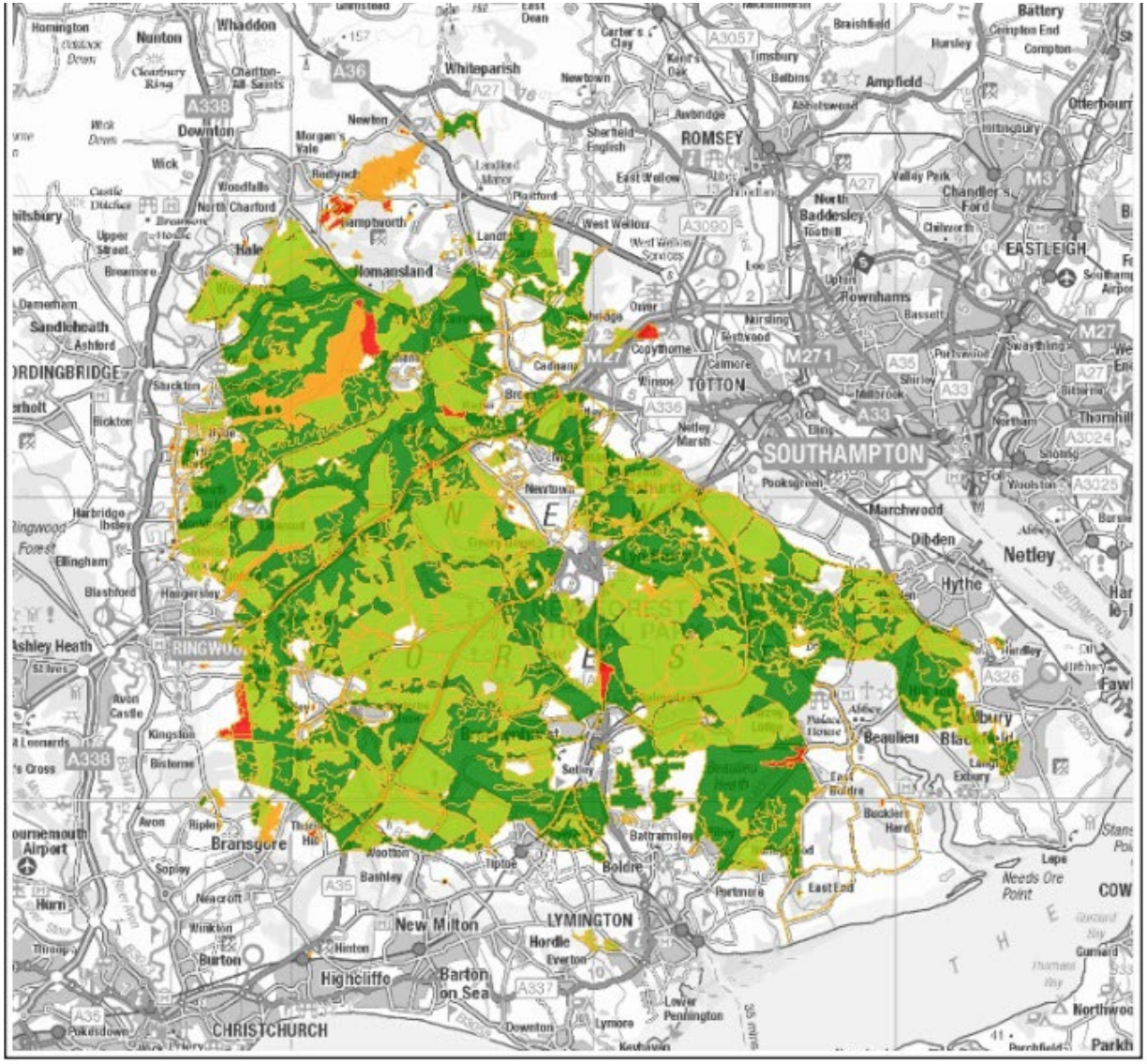
However, it has been difficult to prove to those critical of certain aspects of the restoration works, particularly stream restoration, that real ecological improvements have been made. This has caused the emphasis to shift to monitoring restoration works to prove the ecological benefits before undertaking further extensive works, particularly on wetlands.

Map 1: The New Forest cSAC



Template: D:\GISmaps\nfdata\SAC Plan maps\SAC plan template.wor . Compiled by D Westerhoff on 22 March 2001 .

Map 2: Assessment of SSSI Condition in 2020



New Forest SAC - condition of underlying SSSI units

Key

SSSI England Site Condition Units © Natural England

- UNKNOWN
- FAVOURABLE
- UNFAVOURABLE RECOVERING
- UNFAVOURABLE NO CHANGE
- UNFAVOURABLE DECLINING
- PART DESTROYED
- DESTROYED
- NOT ASSESSED

Ordnance Survey (Greyscale) © Ordnance Survey

NATURAL ENGLAND

Map Produced from WebMap2 on 26/06/20

Map Projection: British National Grid

Map Scale at A4: 1:190,000

Progress in survey over the last 20 years has furthered our understanding of the restoration requirements for a range of New Forest habitats. Surveys of flora, fauna and physical attributes have been undertaken to understand ecological change over time in response to varied restoration techniques. The monitoring of sample sites will provide an understanding of existing ecological interest as well as rates of ecological change or recovery once natural processes are restored (e.g. grazing, hydrology, etc.).

During this period there has also been the appointment and development of a permanent Forestry England Ecology Team in Lyndhurst. Furthermore, a wealth of expertise has been engaged from individual professionals and organisations alike to produce supporting information such as monitoring protocols, various habitat surveys, site restoration plans and independent reviews of the outcomes of restoration works. The Freshwater and Wetland Restoration Forum have been tasked with developing an evidence and monitoring plan to inform future restoration plans.

Progress on the restoration of New Forest habitats continues to be monitored and reported on by Natural England.

The information derived from these varied survey and monitoring activities have helped to inform strategic planning, sustainable forestry work and habitat restoration planning and implementation works.

Factors influencing management

The issues associated with the factors described below are fully discussed in Part 3 from which the generic prescriptions are formulated. Hence, they are not discussed in any depth below.

Natural trends

The New Forest is a dynamic ecosystem whose individual habitats enlarge and contract over time according to environmental conditions (climatic) and levels of management intervention. Left to itself, in the total absence of grazing, cutting and prescribed burning, the drier habitats would quickly succeed to scrub and woodland. The wetlands would rapidly become dominated by *Molinia* tussocks and would progress towards closed carr habitats. While this evolving ecosystem would undoubtedly develop its own nature conservation interest over the millennia, it would be at the expense of the vast majority of the individual habitats, plant and animal communities for which the New Forest is designated.

The global scarcity of these designated features, particularly in the uniquely intimate mosaic in which they exist in the New Forest, requires that they be maintained in favourable condition. It is clear that a return to the self-maintaining ecosystem of pre-history with attendant wild herbivore herds and associated predators (mainly extinct) and natural wildfires is out of the question. Hence, maintenance of favourable condition is now dependent upon management interventions through a maintenance programme of grazing, cutting and burning. The maintenance programme keeps habitats open and diverse; and also exerts control on competitive species requiring restraint such as *Molinia*, bracken, invasive woody species (including seedling Scots pine) and invasive non-native and introduced species such as *Rhododendron ponticum.*

Principal natural trends are:

- Scots pine regeneration on open heathland and open woodland habitats
- Spread of invasive non-native species such as *Rhododendron ponticum, Crassula helmsii* and *Gaultheria shallon* on heathland habitats and non-native conifers in woodland
- Increasing deer populations
- An increase in bracken cover
- An increase in scrub cover

Man-induced trends

The first two issues for consideration in this section are drainage, forestry operations and recreation. While summarised here as ‘man-induced trends’ they are described in detail in relevant sections of Part 1 and Part 3.

Artificial drainage and forestry operations

The Forest wetland habitats have been profoundly affected by artificial drainage schemes and drier habitats by forestry operations including planting of non-native conifers and shrubs. (Please refer to Riverine Woodland, Heathland and Inclosures sections of both Parts 1 and 3 of the SAC Plan.)

Recreation

Recreational activities and their associated infrastructures have also adversely affected both heathland and woodland habitats. The role of the National Park Authority in promoting the understanding and enjoyment of the special qualities of the National Park is discussed in both Parts 1 and 3 of the SAC Plan.

Climate change

For a review of the global position on climate change the reader is directed to the comprehensive literature on the subject, including the detailed scientific analysis produced by the Intergovernmental Panel on Climate Change [IPCC]. This body prepares comprehensive Assessment Reports about the state of scientific, technical and socio-economic knowledge on climate change, its impacts and future risks—as well as options for reducing the rate at which climate change is taking place.

This section uses the relevant literature to provide an evidence-based discussion of the current and likely forthcoming impacts of climate change on New Forest habitats and what, if anything, can be done to mitigate and adapt to the impacts. It does not attempt to integrate the likely global issues around mass migration, food and power shortages and sea-level rise which are beyond the scope of this management plan.

Context

The Met Office UK defines climate change as the long-term shift in average weather patterns across the world.

Globally, since the mid-1880s, humans have been burning fossil fuels to provide energy for industry, transport and homes. While releasing energy, combustion of fossil fuels also releases greenhouse gas by-products such as methane, nitrous oxide and carbon dioxide, which build up in the atmosphere. These gasses trap heat from the sun and cause the earth to heat up, commonly referred to as the Greenhouse Effect.

The impact has been a global average rise in temperature since 1850 of 1.1°C. The World Meteorological Organisation [WMO] reported in its 2019 annual report that concentrations of carbon dioxide in the atmosphere hit 407.8 parts per million (ppm) only three years after passing a symbolic barrier of 400ppm. Before 1850, atmospheric carbon dioxide was 280ppm. This means that there is now more carbon dioxide in the atmosphere than at any time in the last three million years, when sea levels were between 10m and 20m higher and global temperature was 2-3°C higher.

With greenhouse gas emissions still rising annually, it is predicted that global temperatures could rise from 2-4°C by the end of the century. All the top 10 warmest years for the UK

since 1884 have occurred 2003 to 2020. World leaders at the Paris climate summit in 2015 pledged to keep temperature rises to 1.5°C, but progress towards meeting this has been negligible.

Given this global background, it is likely that southern England and the New Forest will face increases in annual temperatures, warmer, wetter and stormier winters and drier, hotter springs and summers with increasing frequency and intensity of storm events featuring high winds and heavy rainfall (Met Office, 2019).

Clearly this is highly significant ecologically for two main reasons. It is happening very fast; the last time global CO2 levels were this high was the Pleistocene when the New Forest was a lagoon. Habitats and species need time to adapt to changing climatic conditions. Secondly, stressed habitats and species are more vulnerable to changes in climatic and other environmental conditions than those which are more stable and not at the limits of their ecological tolerances.

Ecological impacts of climate change

Ecosystems respond over time to changes in climate. In the past responses have occurred over millennia, but with the rapid onset of the current increase in climate, there is far less time to respond.

Species which are at the edge of their climatic tolerances will be affected more rapidly than species with a wider range or, which are comfortable within the current shift. Key aspects are temperature rise and water availability—either the ability to survive frequent inundation and drought and robustness against more frequent storm events. It is likely that mobile species will be driven northwards to niches with cooler climates. That does of course also imply that species will be coming from the south which currently are not represented in the New Forest (or Great Britain) but need to find a more favourable climatic regime. In a world where semi-natural habitat was widespread this would be of little consequence but with the scarcity and highly fragmented distribution of remaining habitats, extinctions are likely.

Along with species movements, diseases are likely to spread—particularly those which have been kept at bay by freezing winters. Several of our native trees and commercial conifer species are under attack by disease and invertebrates formerly uncommon in Great Britain.

Examples: impact of climate change on beech and Dartford warbler

Natural England, RSPB and others have carried out various studies using modelling to predict how varying climate change scenarios may affect distribution of UK species by the end of the century (for example, Natural England & RSPB, 2020). They all predict that there will be species movements in response to a warmer climate, the success or failure of which

will depend on the availability and suitability of appropriate semi-natural habitats. For example:

Beech: Predictions indicate that although total annual rainfall in southern England may not change, its frequency and amount per rainfall event will. Beech is unlikely to be affected by increased carbon dioxide levels, but it will be affected by prolonged springtime waterlogging of soils and extended periods of summer drought. All aspects of the life cycle will be affected from masting, seedling development, growth and canopy cover. Being shallow rooted it is also vulnerable to strong storm events particularly when in full leaf.

Dartford warbler: A heathland species which is highly vulnerable to cold especially in winter. The extreme winter of 1962/3 nearly led to the extinction of this species apart from a few individuals which clung on in southern Dorset, Sussex and the New Forest. National surveys in 1974, 1984, 1994 and 2006 show Dartford warblers moving northwards and up-hill populating suitable heathlands at Cannock Chase, East Anglia and even the Peak District. There is a strong correlation between Dartford warbler range and climate. The downside is that the population in Spain is declining, probably due to climate change.

The New Forest SAC and its surrounding area has huge potential for delivering both climate change mitigation and adaptation through implementing nature-based solutions on a landscape scale. This could be through restoring the natural function of habitats including wetlands, pasture woodlands and heathlands for their long-term conservation, retaining the carbon stores held within undisturbed soils, or through the strategic use of tree planting on the fringes of the SAC. The scale of the New Forest as a semi-natural landscape, combined with the extent of its remaining habitats and their statutory designation, provides an opportunity for capturing and storing carbon, as well as providing resilience to the unavoidable effects of climate change that can be offered by few other lowland sites at a landscape scale.

Mitigating against climate change: absorbing carbon from the atmosphere

Tree growth, permanent grasslands and functioning wetlands capture and store carbon dioxide. The New Forest's ancient pasture woodlands are a significant carbon store, both above and below ground, with the potential to store around 300 tonnes of carbon per hectare; the most of any non-peat based habitat in the UK (Natural England, 2021). If managed appropriately, these habitats can continue to fulfil their full potential as large, long-term carbon stores. However, if allowed to degrade, this carbon will be released, not only losing the potential for these habitats to adapt to climate change as well-functioning ecosystems, but also contributing to land-based carbon emissions.

Peatlands represent the largest terrestrial carbon store by habitat and when in a healthy condition they sequester carbon slowly but do so indefinitely. Conserving existing New Forest peat-based habitats including mires and wet heath, as well as restoring these

habitats when they have become degraded holds great potential for providing mitigation to climate change and meeting the UK's net zero target.

Heathlands also store significant carbon stocks, mostly in their soils, at around 100 tonnes of carbon per hectare, which is comparable to that of peatlands in the top 15cm (Natural England, 2021). They are important habitats for UK biodiversity and reflect traditional management over centuries, which include depasturing of domestic stock and the cutting and burning of woody vegetation. It is important to protect old established sites due to their importance for biodiversity, as well the carbon stocks they hold, as both may have taken centuries to accumulate.

The priority for restoration remains the wetlands which are absolutely crucial for both providing mitigation and adaptation to the effects of climate change in terms of water storage, preventing flash flooding, capturing and storing carbon and in accommodating a large and rich species diversity. They also provide an essential source of water for stock. Past engineering of New Forest streams and mires creating straight channels where water flows away rapidly causing erosion and localised flooding, must be reversed.

While new woodland planting on semi-natural habitats within the New Forest SAC would be destructive, there is much that can be done in terms of new woodland planting on land surrounding the New Forest SAC. Once planted and established, areas of new woodland are afforded legislative protection in recognition of their contribution to landscape and biodiversity and cannot readily be removed in favour of alternative land-uses such as agriculture. There are opportunities to 'grow the New Forest' by bringing new areas of land into woodland cover for the benefit of wildlife and people; and also carbon sequestration.

Adapting to climate change

Beyond limiting greenhouse gas emissions there is little that can be done about the changing weather patterns brought about by climate change. The best approach is to enable the New Forest SAC to be as robust as it can be within the constraints of climate change, so that as a large area of semi-natural habitat it will continue to support a wide range of characteristic species, even if some current ones are lost and new ones arrive. The whole thrust of this management plan is to maintain those habitats and species in favourable condition and to restore those currently not in favourable condition. In the face of climate change this remains the best strategy.

To take one example—long, hot, dry summers greatly increase the risk of wildfire. These can be catastrophic in the short term since they can occur over wide areas and burn deeply into the underlying peat. Hence the continued practice of prescribed burning, keeping gorse and heather in good condition in discrete compartments is very important. This practice creates regular firebreaks across open habitats and reduces the fuel available within each compartment. While this practice releases some stored carbon dioxide into the atmosphere

it is far less than a single wildfire with the latter's potential for damaging habitats and species. In the long-term these quick burn cool fires that do not burn deep into the ground and destroy the organic content of the soil can be considered carbon neutral when averaged over a fire cycle.

Further information regarding the predicted impacts of climate change on each SAC habitat over the next century, as well as suggested adaptation responses can be found in Part 3 ('Climate change' subheading of each habitat section).

Socio-economic factors regarding climate change

In general, public perception, understanding and concern about climate change and greenhouse gas emissions is rising and government response through policy continues to unfold. Tree planting is seen as a positive way to tackle carbon dioxide rise since trees after about 10 years of being planted begin to sequester carbon dioxide. Government have set a target of 30,000 per year and the National Trust have promised to plant 20 million trees by 2030. Others are making similar statements. The Crown Lands potentially provide a lot of public land on which to plant trees. However, to do so would be to destroy large swathes of semi-natural habitats and species and destroy the centuries old practice of commoning. Under current legislation it would be illegal.

The New Forest SAC is not a self-sustaining ecosystem. Maintenance of its rich diversity relies on management interventions which include depasturing of domestic stock and the cutting and burning of woody vegetation. While mass planting of trees in the New Forest is unlikely, opposition to the management and felling of existing trees, including commercially grown conifer species, among them Scots pine, is growing. Similarly, those opposed to scrub management and heathland burning are beginning to cite climate change as an overriding reason to abandon such management.

Wetland restoration works are also likely to meet increasing opposition particularly for example, where restoration involves tree and scrub removal as a pre-cursor to stream re-alignment to their natural course. However, the occurrence of extremely dry summers are demonstrating the benefit of retaining water in mires and restored wetlands through supporting species dependent on wet habitats and the provision of summer grazing when other, drier areas remain parched.

Air pollution

Air pollutants which are proven to affect vegetation and ecosystems, as well as human health, are nitrogen oxides (NOx), sulphur dioxide (SO2) and ammonia (NH3). They are derived from industry, transport, livestock and fertiliser application. Key impacts from airborne pollutants are soil acidification and soil eutrophication.

For some important gaseous pollutants, critical loads below which significant harmful effects are not thought to occur have been adopted by, among others, the European Union and the United Nations Economic Commission for Europe (UNECE) and are used as regulatory standards.

Oxides of nitrogen may be toxic to lower plants, encourage rapid growth in some competitive higher plants and restricts growth in others. Deposition is cumulative in that it builds up in the soil over time, effecting change to soil fertility and to species tolerant and intolerant to it. It is generally the case that plants of high nature conservation value require soils of low fertility and hence low nitrogen values.

Sulphur dioxide levels have fallen rapidly since the 1970s (by 95%), with the resultant general improvements in lichen and bryophyte communities, in highly polluted areas which are particularly susceptible to ambient SO2 concentrations.

Ammonia is mainly released by agriculture. It is particularly detrimental to lower plants, but at higher levels affects all vegetation through adding to soil nitrogen levels and acid deposition (from ammonium ions).

Acid deposition (rain) increases soil acidity and reduces the buffering capacity of the soil. Habitats dependent upon slightly acid soils (heathland, acid grassland, mires) are more susceptible to increased rates of acid deposition than calcareous habitats where soil buffering is more potent.

Impact of air pollutants on New Forest SAC habitats and species

The issue of air pollution and its impact through atmospheric nitrogen deposition together with a list of designated features in the New Forest which may be affected, is mentioned in the New Forest Site Improvement Plan (Natural England, 2014). The remedy to reduce the impacts was not determined at the time of publication.

The latest and most thorough work to assess the impact of traffic-related air pollution (NOx, nitrogen deposition and ammonia) has not revealed any evidence to suggest that SAC habitats in the New Forest are being adversely affected (EPR, 2018). This work reviews the relevant literature and looks at historical studies carried out in the New Forest and described by Smithers et al (2016a): *The ecological effects of air pollution from road transport: an updated review* (Natural England Commissioned Report NECR199); *Potential risk of impacts of nitrogen oxides from road traffic on designated nature conservation sites* (Smithers et al, 2016b); and the Natural England Commissioned Report NECR200 (which was an update of: Bignal et al (2004) *The ecological effects of diffuse air pollution from road transport* (English Nature Research Report 580).

The grazing, cutting and especially prescribed burning regimes to which the New Forest habitats are subject are instrumental in removing nitrogen from the soil (Webb, 1986), ensuring that soil nutrient status remains low. The impact of this management regime over the ecosystem as a whole probably masks any impact that air-borne pollutants play in enriching soils either adjacent to roads or more widely.

However, epiphytic lichen communities are far more susceptible to airborne pollutants (particularly ammonia) than vascular plants. The critical load of ammonia for lichens is 1ug/m3, whereas for vascular plants it is 300% higher at 3ug/m3 (IAQM, 2019). Sanderson (2018) in his notes on pollution impacts on Annex I woodland habitats has conducted a desk study examining the extensive woodland lichen assemblage database (NFELD, 2018), which allows the past impact of air pollution to be assessed. As in other old growth woodland (e.g. Savernake Forest), sulphur dioxide pollution up to the 1970s had a significant impact on sensitive lichens, even though the core New Forest was far less polluted than other more industrial areas. While atmospheric SO2 levels have declined nationally by around 90% since the 1970s (with lichen communities responding to this change) the most sensitive species, including *Lobaria,* have yet to recover in the New Forest. It is not known whether the further acidification due to NOx is hindering this recovery.

In terms of airborne nitrogen-based pollutants on epiphytic lichens, ammonia seems to have the greatest impact. Sanderson (2018) notes that exposure to such pollution favours the domination of yellow lichens on oak twigs with grey lichens dominating in the cleaner air.

The biggest source of ammonia pollution is fertiliser used on intensive agricultural land. Much of the forest is buffered from this by its extensive semi-natural, low fertility habitats and extensive management regimes. There are exceptions to this where intensive activities occur, including frequently stationary vehicle traffic along certain roads (e.g. Lyndhurst) or where cars are regularly located in high numbers within old growth woodland (e.g. several of the campsites, most notably Hollands Wood). Using Hollands Wood campsite as an example, lower plant communities are impoverished in the campsite area (but not elsewhere in this woodland) due to the removal of tree limbs (public safety) as well as the likely effect of acidification of remaining tree bark due to cars when ‘cold-starting’ during the camping season (Sanderson, 2004).

The extensive management regimes used in the New Forest SAC are instrumental in buffering against nitrogen-derived air pollutants and critical loads are not generally apparent in key habitat localities. They are of course apparent in certain urban settings such as Lyndhurst High Street, but this a human health concern rather than an ecological one.

Methods of suppressing road-side pollutants used elsewhere using road-side plantings of tall vegetation are not appropriate to the New Forest situation where roads cross extensive

SAC vegetation and such planting would be damaging to the SAC features. Increasing the buffer around the SAC by taking agricultural land from intensive production, possibly through land-use change to extensive woodland planting, will afford greater protection from ammonia pollution.

Selected road closure or campsite relocation are projects which may be considered in the future and in connection with initiatives to provide recreational opportunities in buffer areas outside the SAC.

The above section on air quality considers the principal issues directly affecting the SAC. There are of course a range of existing and future developments around the periphery of the SAC which will influence air quality either now or into the future. Examples include the operations at Bournemouth and Southampton Airports, Fawley Refinery, Fawley Power Station (past and future), the future of Dibden Bay and finally the emergence of electric vehicles. Further consideration of the potential impacts of these developments is outside the scope of this management plan.

External factors

Commoning

The depasturing of livestock on Open Forest habitats is essential. Issues surrounding Commoning are explored in Part 3.

Storm damage

The Great Storm of 1987 (and the Burns Day Storm of 1990) left a trail of destruction across the Southeast. The New Forest, while affected, was not subject to the full force of the hurricane which caused such destruction to homes and property in Sussex in particular. As the ‘damage’ to woodlands became apparent there followed an exercise in tree clearance followed by extensive re-planting. Subsequent studies, many referred to in Kirby et al (2014) suggest that a more considered approach, particularly for ancient semi-natural woodlands, results in better ecological outcomes.

Increasingly wet weather, strong winds and saturated soils are becoming more frequent as climate change has its impact locally. It is not a question of what if, but when a major hurricane force storm sweeps across the Forest and lays flat any woodland, conifer or broadleaf in its path.

It is important that in the post-storm panic and public outcry, actions taken do not lead to long-term damage to the functioning of the New Forest woodland ecosystem.

Ecological impact

The ecological impact of the 1987 storm has been much studied in the literature. As background, it should be remembered that a lot of woodlands in the Southeast were fairly uniform, following post-war felling and subsequent abandonment. Old coppice stands were not re-cut and thinning and other customary woodland management virtually ceased in a lot of non-commercial woodlands. They became somewhat uniform and dark—and rather impoverished in terms of woodland fauna and flora.

The storm dramatically changed these prevailing conditions. It opened up canopy gaps and glades that subsequently allowed regeneration of trees and shrubs, diversifying the age structure. It produced open space and bright, warm conditions which favoured suppressed native woodland flora and its associated butterflies and other invertebrates. It also encouraged a flower-rich shrub understory to develop, producing more woodland edge, which greatly benefitted birds and small mammals.

The storm prematurely aged uniform timber stands providing important standing, damaged but still living trees with access holes for birds, invertebrates and fungi. It also produced a real bounty in terms of fallen and standing dead wood of fundamental value for saproxylic invertebrates. Overall niche habitat availability was transformed.

On the negative side there were concerns that where invasive non-native species such as *Rhododendron ponticum* were present, it provided opportunities for its further spread and domination. The storm also stirred up the woodland soils and subsoils as the windblow exposed root plates. The woodland soils have been important sinks for sulphur dioxide and atmospheric nitrogen; this raised a concern that the release of these plant nutrients would favour a rapid growth of highly competitive species over the semi-natural woodland flora (Kirby, 2014).

The New Forest pasture woodlands are rather different from these typical unmanaged woodlands in the Southeast. They are the result of hundreds of years of diversification, have uneven age structure from veterans to saplings and a rich epiphytic lichen and bryophyte flora. The woodland invertebrate fauna is second to none with new species being discovered annually. It is not an unmanaged or neglected ecosystem; on the contrary it is the finest remaining example of formerly extensive wood pasturage in the country.

The impacts of a hurricane through the Forest would however be the same as for any other woodland. Trees would succumb—some would be damaged, some would fail. Glades or large expanses of open ground would open up. Regeneration would thrive in the presence of a plentiful supply of protective dead wood, scrub, bracken and bramble. Saplings would in 5-10 years grow above browse height and form the next generation of forest trees.

While the immediate loss of mature and veteran trees would be regrettable, it must be remembered that this kind of pasture woodland has a cycle of 800-1,000 years; not the 70-150 years for commercial forestry. Continued depasturing of domestic stock would control any vegetation favoured by the sudden release of stored nutrients from disturbed soils.

Pests and diseases

The issue of pests and diseases is described in Part 3 of the SAC Plan (see Issue 17 for pasture woodland). But it should also be noted that some pests and diseases can affect the management of the semi-natural habitats, rather than directly affect their flora and fauna. There are a number of livestock pests and diseases which pose a threat to depastured animals in the Forest. Notable examples in recent years include the foot and mouth outbreak of 2001 and the continuing presence of bovine TB. Foot and mouth jeopardised commoning activity—and the potential loss of commoning animals to such a disease would have a rapid and dramatic deleterious effect on the Open Forest habitats. Foot and mouth also forcibly influenced human behaviour through prevention of public access in the Forest for a significant period of time. The absence of human disturbance altered some wildlife behaviour during the spring of 2001. In spring 2020, as similar restriction on public access was again in place due to the COVID-19 outbreak and short-term changes in animal behaviour became apparent during the breeding season. However, any beneficial impacts were short-lived—restrictions were relaxed from June 2020 onwards.

Legal constraints

The principal legal constraints lie with the nature conservation designations, particularly the Wildlife & Countryside Act 1981 and its considerable strengthening under the Countryside and Rights of Way Act 2000; and the requirement under the Habitats Directive to restore and maintain habitats in favourable condition. All plans or projects, either alone or in combination, not directed towards achieving favourable habitat condition must be subject to thorough assessment. Such assessments take a precautionary approach whereby a project can only proceed if it can be ascertained that the plan or project will not adversely affect the integrity of the European Site, either with or without conditions being added. Natural England cannot issue consent for any activity which would cause damage to an SSSI; owner/occupiers cannot carry out a damaging operation without Natural England's consent. Public bodies have a statutory duty to further nature conservation in the exercise of their various functions. Government policy is clearly aimed at preventing further damage to SSSIs and to restore sites to favourable condition within a specified time frame.

There is potentially conflicting legislation with regard to some of the provisions of the New Forest Acts. For example, the requirement to keep the Forest drained under the New Forest Act 1949 clearly conflicts with the provisions of the Habitats Directive and the implementing Regulations. It is supposed that the Habitats Directive has supremacy over previous

legislation, but it would probably require amendment or repeal of conflicting legislation in the unlikely event of a test case arising. The weak provision under the New Forest Act 1964 requiring the Forestry Commission and the Verderers to *have regard to the desirability of conserving flora and fauna* has clearly been superseded by the CROW Act 2000, Environment Act 2005 and NERC Act 2006 which give such public bodies a statutory duty to *have regard to* and *further* nature conservation in the exercise of their various functions.

This duty is reflected in the Forestry Commission's revised Ministers Mandate (DEFRA 1998, 2006) which sets out the operational priorities for the Forestry Commission (now Forestry England) for the New Forest in the following decreasing order of priority:

- nature conservation and cultural heritage
- recreation
- silviculture

Health and safety considerations are applicable to all aspects of New Forest management.

Management constraints

While nature conservation and the cultural heritage upon which favourable condition depends are the priority, recreation and silviculture, while of lower priority, are nonetheless currently important land uses in the New Forest.

Access and recreation

The provisions for public access under the CROW Act (2000), the Forestry Commission Byelaws and the designation of the New Forest as a National Park (2005) provide mechanisms for managing access and recreation in the SAC. The issue of increasing recreational pressure is clearly a major management priority and will continue to absorb resources. As such, the National Park Authority continues to work closely with partners through the Recreation Management Strategy Steering Group to agree and implement measures to continue to safeguard the New Forest.

Forestry

The New Forest Plan 2019-2029 sets out a bold vision for the Inclosure woodlands in which, over time will see the further restoration of substantial areas of SAC habitats from conifer plantations and creation of pasture woodland from broadleaved plantation. That said, some areas of the Inclosures may remain under 'commercial forestry' with a

broadleaved crop which could be managed to provide niches for species less tolerant of heavy grazing.

Public opinion

This must be taken fully into consideration in all proposed management. It can present a considerable constraint particularly on the speed of change in the appearance of the Forest and the necessary management interventions which directly impact upon the public use of the Forest. The solution lies in open and constructive public consultation as is so successfully demonstrated by the consultation event for the Inclosures.

Finance

The maintenance of SAC habitats in favourable condition requires considerable management interventions and on-going costs. The restoration and re-creation of habitats is generally expensive and may reduce income from former sources (e.g. forestry products). It is likely that considerable additional resources will need to be made available to land managers to achieve the nature conservation objectives in this Management Plan. It is important that the key organisations work together to demonstrate the need for additional funding and that all available sources are explored.

Since 1997 landowners across the New Forest (public bodies, NGOs and private owners) have been fortunate to receive substantial funds through EU and national grants in support of the maintenance and restoration of the SSSI/SAC. While European funds and other grant sources may remain available in the short term, it would be prudent to develop a long-term sustainable funding plan.

Priorities for managing New Forest habitats and species

The conservation objectives and supplementary advice should be used to prioritise and achieve conservation and restoration of the Qualifying Features of the New Forest European Site.

The priorities for managing New Forest habitats and species may be summarised thus:

- Maintain existing habitats in favourable condition by continuing to implement essential maintenance programmes outlined in the generic prescriptions (Part 3).

- Restore designated habitats currently in unfavourable condition to favourable condition, through a series of restoration programmes discussed in the generic prescriptions (Part 3).

- Those habitats categorised as unfavourable-declining, especially where inherent fragility makes them particularly vulnerable to damage (e.g. wetland habitats) are the first priority for restoration treatments.

- Those habitats categorised as unfavourable no change can be regarded as the second priority for restoration treatments.

- Restore SAC habitats from the Verderers and Statutory Inclosures and other enclosed land.

Appendix 1

This section contains the following maps:

A. The New Forest SAC: Geology/Bedrock Map

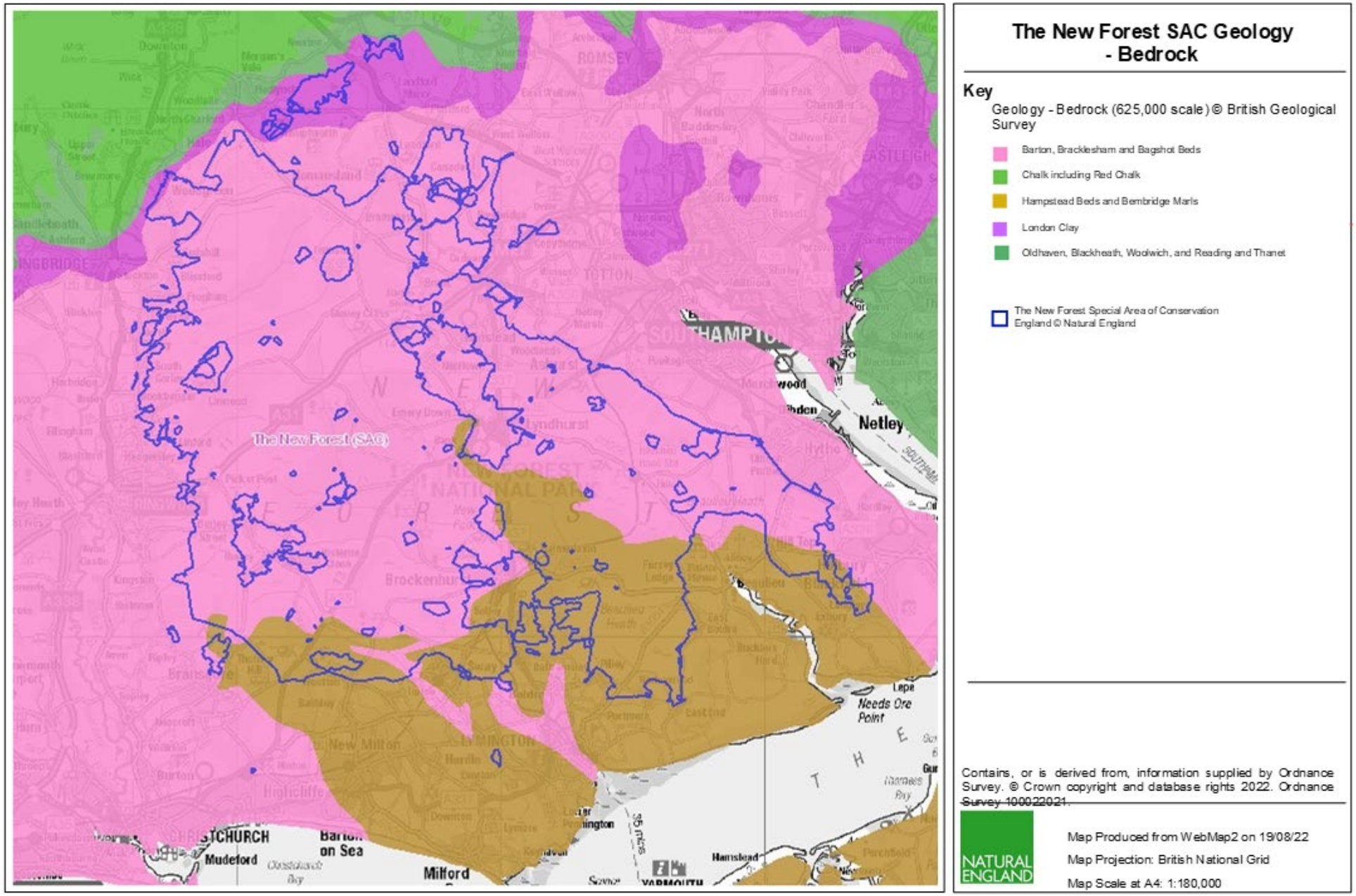
B. Individual SSSIs within the New Forest SAC

C. The New Forest Special Area of Conservation (SAC)

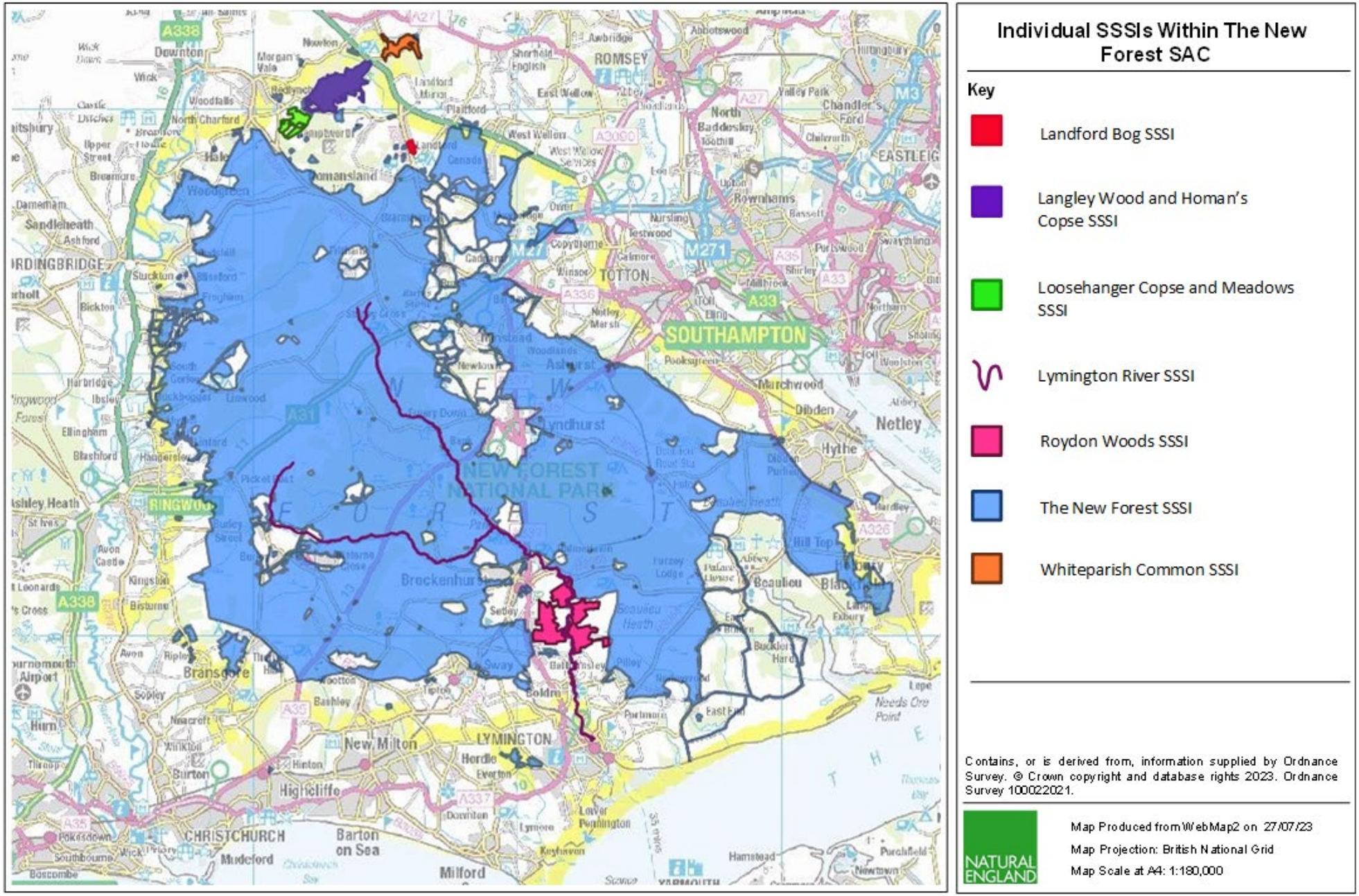
D. The New Forest Special Protection Area (SPA)

E. The New Forest Ramsar

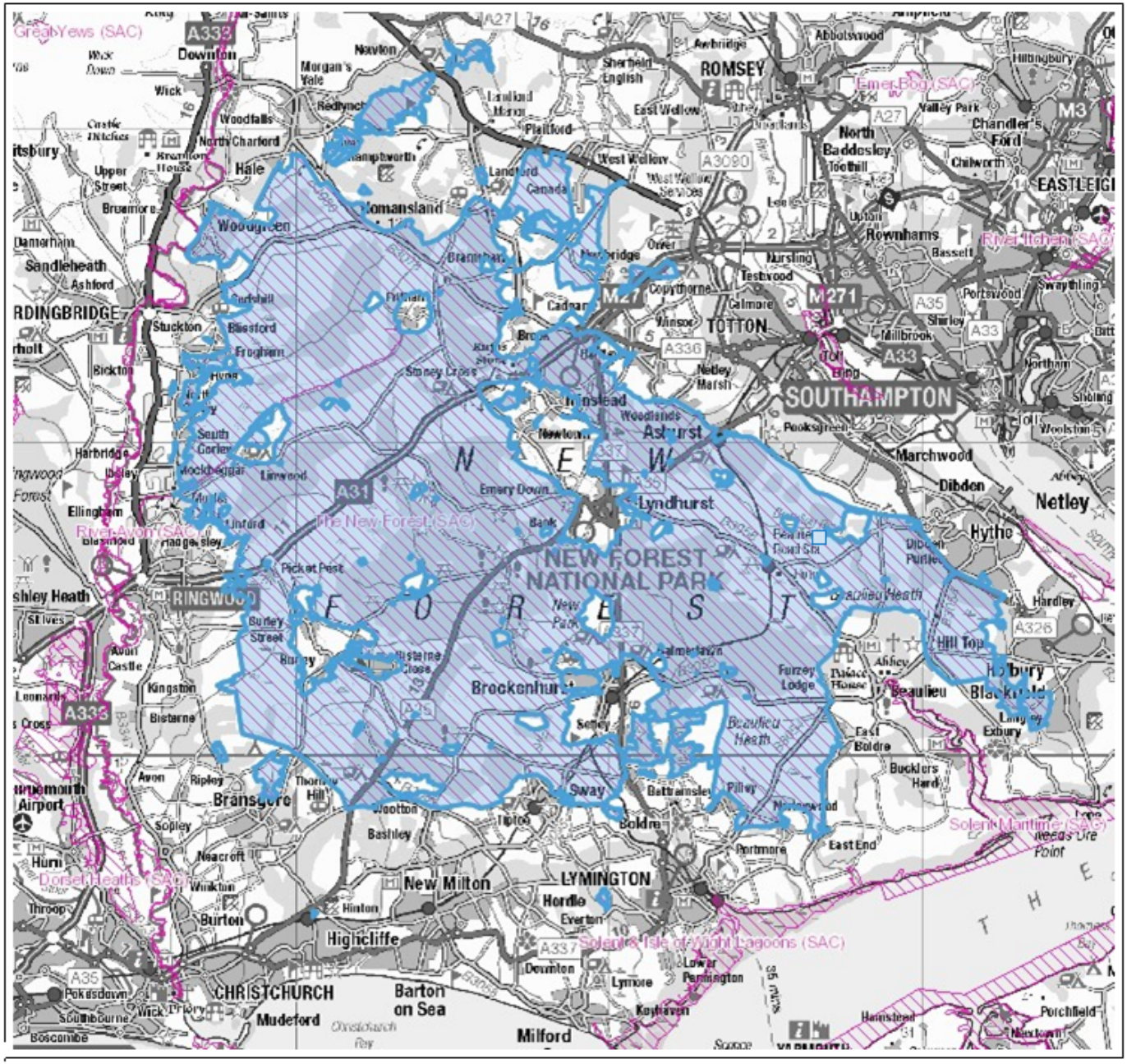
Map A: The New Forest SAC: Geology/Bedrock Map



Map B: Individual SSSIs within the New Forest SAC



Map C: The New Forest Special Area of Conservation (SAC)



The New Forest Special Area of Conservation

Key

Special Areas of Conservation England © Natural England

The New Forest Special Area of Conservation England © Natural England

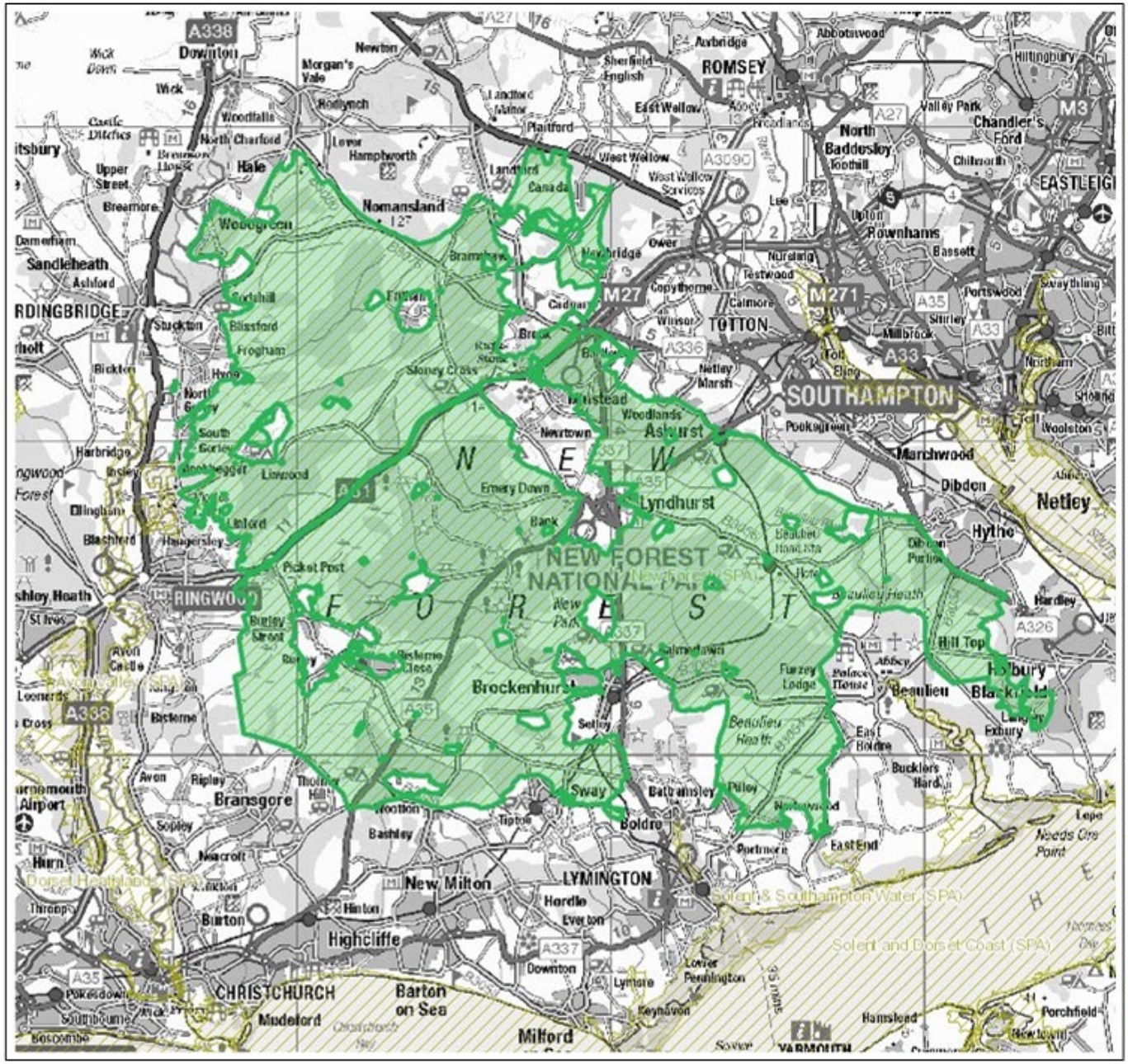
NATURAL ENGLAND

Map Produced from WebMap2 on 12/08/22

Map Projection: British National Grid

Map Scale at A4: 1:180,000

Map D: The New Forest Special Protection Area (SPA)



The New Forest Special Protection Area

Key

Special Protection Areas England © Natural England

The New Forest Special Protection Area England © Natural England

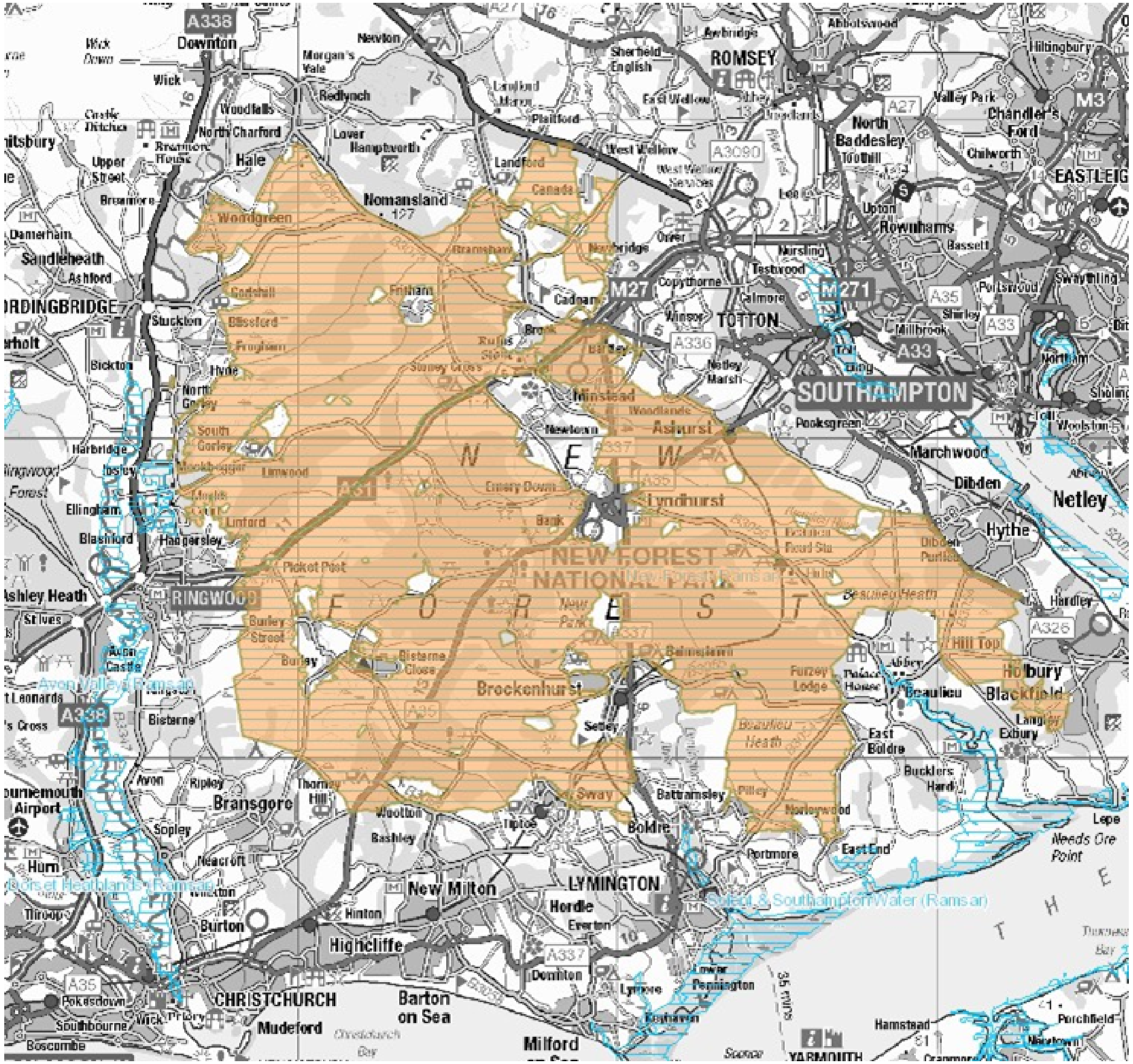
NATURAL ENGLAND

Map Produced from WebMap2 on 12/08/22

Map Projection: British National Grid

Map Scale at A4: 1:180,000

Map E: The New Forest Ramsar



New Forest Ramsar

Key

- Ramsar sites England © Natural England
- New Forest Ramsar site © Natural England

NATURAL ENGLAND

Map Produced from WebMap2 on 17/08/22
Map Projection: British National Grid
Map Scale at A4: 1:180,000

www.gov.uk/natural-england